ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING & TECHNOLOGY

B. Tech (Civil Engineering)

Course Structure

Academic Year 2024-25

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

VISION OF THE UNIVERSITY

To be an internationally recognized university through excellence in inter-disciplinary education, research and innovation, preparing socially responsible well-grounded individuals contributing to nation building.

MISSION STATEMENTS OF THE UNIVERSITY

M.S 01: Improve employability through futuristic curriculum and progressive pedagogy with cutting-edge technology

M.S 02: Foster outcomes-based education system for continuous improvement in education, research and all allied activities

M.S 03: Instill the notion of lifelong learning through culture of research and innovation

M.S 04: Collaborate with industries, research centers and professional bodies to stay relevant and up-to-date

M.S 05: Inculcate ethical principles and develop understanding of environmental and social realities

CHANCELLOR / VICE CHANCELLOR

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

VISION OF THE SCHOOL

To develop well-grounded, socially responsible engineers and technocrats in a way to create a transformative impact on Indian society through continual innovation in education, research, creativity and entrepreneurship.

MISSION STATEMENTS OF THE SCHOOL

M.S 01: Build a transformative educational experience through disciplinary and inter-disciplinary knowledge, problem solving, communication and leadership skills.

M.S 02: Develop a collaborative environment open to the free exchange of ideas, where research, creativity, innovation and entrepreneurship can flourish among individual students.

M.S 03: Impact society in a transformative way – regionally and nationally - by engaging with partners outside the borders of the university campus.

M.S 04: Promote outreach programs which strives to inculcate ethical standards and good character in the minds of young professionals

DEAN / SOET

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

VISION OF THE DEPARTMENT

To impart quality higher education in Civil Engineering for a continuously changing societal demands with credibility, integrity and ethical standards.

MISSION STATEMENTS OF THE DEPARTMENT

M.S 01: Produce well qualified and employable engineers by imparting quality education through industry based flexible curriculum.

M.S 02: Enhance the skills of entrepreneurship, innovativeness, management and life-long learning in young engineers.

M.S 03: To inculcate professional ethics and make socially responsible engineers.

HOD **DEAN / SOET**

ADAMAS UNIVERSITY,
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

Name of the Programme: B. Tech (Civil Engineering)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: Engage in analysis and design of various structures, tools and its applications in the field of Construction and allied engineering industries.

PEO2: Apply the knowledge of Civil Engineering to solve problems of social relevance, and/or pursue higher education and research.

PEO3: Work effectively as individuals and as team members in multidisciplinary projects.

PEO4: Engage in lifelong learning, career enhancement and adopt to changing professional and societal needs.

HOD **DEAN / SOET**

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

Name of the Programme: B. Tech (Civil Engineering)

GRADUATE ATTRIBUTE / PROGRAMME OUTCOME (PO)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

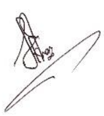
PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

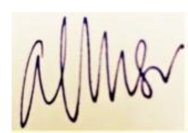
PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



HOD



DEAN / SOET

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING

Name of the Programme: B. Tech (Civil Engineering)

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO 01: Enhancing the employability skills by making the students capable of qualifying national level competitive examinations

PSO 02: Inculcating technical competencies among students to deal with rapidly changing demands in civil engineering field.

HOD

DEAN / SOET

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF CIVIL ENGINEERING
B. Tech (Civil Engineering)
Course Structure

FIRST YEAR

SEMESTER I								
S. No	**Type**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs/wk**	**Credits**
1	Theory (ESC)	MTH11501	Engineering Mathematics-I	3	1	0	4	4
2	Theory (ESC)	EVS11112	Environmental Science	2	0	2	4	3
3	Theory (CC)	GEE11001	Electrical and Electronics Technology	2	0	0	2	2
4	Theory (SEC)	GEE11012	Disruptive Technology Innovations	1	0	2	3	2
5	Theory (SEC)	MEE11002	Engineering Mechanics	2	1	0	3	3
6	Theory (ESC)	BIT11003	Life Sciences	2	0	0	2	2
7	Practical (CC)	GEE12002	Electrical and Electronics Technology Lab	0	0	4	4	2
8	Practical (CC)	MEE12001	Engineering Workshop	0	0	4	4	2
			Total	**12**	**2**	**12**	**26**	**20**

SEMESTER II								
S. No	**Type**	**Course Code**	**Course Title**	**L**	**T**	**P**	**Contact Hrs/wk**	**Credits**
1.	Theory (ESC)	MTH11502	Engineering Mathematics– II	3	1	0	4	4
2.	Theory (SEC)	DGS11002	Design Thinking & Prototyping	2	1	0	3	3
3.	Theory (ESC)	PHY13201	Applied Science	2	0	2	4	3
4	Theory (CC)	CSE11001	Introduction to Programming	2	0	0	2	2
5	Theory (AEC)	ENG11053	English Communication	1	0	2	3	2
6	Theory (SEC)	DGS11002	Design Thinking and Prototyping	1	0	2	3	2
7	Practical (CC)	CSE12002	Programming Lab	0	0	4	4	2
8	Practical (CC)	CEE12001	Engineering Drawing and CAD	0	0	4	4	2
			Total	**11**	**2**	**14**	**27**	**20**

SECOND YEAR

Semester-III								
S. No	**Type**	**Course Code**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs/wk**	**Credits**
1.	Theory (BSC)	MTH11529	Engineering Mathematics – III A/B/C	3	1	0	4	4
2.	Theory (ESC)	**CEE13001**	Applied Geology	2	0	2	4	3
3.	Theory (PCC)	CEE11005	Prof. Core – I Structural Mechanics I	3	1	0	4	4
4.	Theory (PCC)	CEE11004	Prof. Core – II Fluid Mechanics and Hydraulic Machinery	3	0	0	3	3
5.	Theory (PCC)	**CEE11062**	Prof. Core – III Surveying and Geomatics	3	1	0	4	4
6.	Practical (PCC)	**CEE12063**	Prof. Core Lab – I Fluid Mechanics and Hydraulic Machinery Lab	0	0	2	2	1
7.	Practical (PCC)	CEE12011	Prof. Core Lab – II Surveying Practice Lab	0	0	2	2	1
8.	Practical (BSC)	MTH12531	Numerical Techniques Lab	0	0	2	2	1
9.	Practical (Mandatory)	IDP14001	Interdisciplinary Project	0	0	5	5	3
10.	Practical (Mandatory)	SOC14100	# Community Service	-	-	-	-	1
			Total	**14**	**3**	**13**	**30**	**25**

 # Community Service will be taken up during the summer vacation of II Semester and evaluated in III Semester.

SEMESTER-IV								
S. No	**Type**	**Course Code**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs/wk**	**Credits**
1.	Theory (PCC)	CEE11008	Prof. Core – IV Soil Mechanics	3	0	0	3	3
2.	Theory (PCC)	**CEE11064**	Prof. Core – V Construction Engineering Materials	3	0	0	3	3
3.	Theory (PCC)	CEE11007	Prof. Core – VI Structural Mechanics II	3	1	0	3	4
4.	Theory (PCC)	CEE11010	Prof. Core – VII Water Resources Engineering	3	0	0	3	3
5.	Theory (PCC)	CEE11015	Prof. Core – VIII Transportation Engineering	3	1	0	4	4
6.	Theory (Mandatory)	PSG11021	Human Values and Professional Ethics	2	0	0	2	2
7.	Practical (PCC)	**CEE12065**	Prof. Core Lab – III Structural Mechanics Lab	0	0	2	2	1
8.	Practical (PCC)	**CEE12087**	Prof. Core Lab – V Soil Mechanics Lab	0	0	2	2	1
			Total	**17**	**02**	**04**	**22**	**21**

THIRD YEAR

SEMESTER –V								
S. No	**Type**	**Course Code**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs /week**	**Credits**
1.	Theory (PCC)	CEE11014	Prof. Core – IX Foundation Engineering	3	0	0	3	3
2.	Theory (PCC)	CEE11013	Prof. Core – X Design of RC Structures	3	0	0	3	3
3.	Theory (PCC)	**CEE11068**	Prof. Core – XI Construction Techniques, Equipment & Practices	3	0	0	3	3
4.	Theory (PCC)	**CEE11088**	Prof. Core – XII Concrete Technology	3	0	0	3	3
5.	Theory (PEC)	CEE11026/ CEE11028/ **CEE11069**	**Prof. Elective – I** 1. Remote Sensing and GIS 2. Advanced Structural Analysis 3. Waterproofing Protection of Concrete Structures	3	0	0	3	3
6.	Theory (PEC)	**CEE11070/ CEE11071/ CEE11072**	**Prof. Elective – II** 1. Traffic Engineering 2. Hydraulic Structures 3. Building Services	3	0	0	3	3
7.	Practical (PCC)	CEE12020	Prof. Core Lab – V Geotechnical Engineering Lab	0	0	2	2	1
8.	Practical (PCC)	CEE12021	Prof. Core Lab – VI Transportation Engineering Lab	0	0	3	3	2
9.	Practical (PCC)	CEE12090/ CEE12091/ **CEE12092**	**Skill Enhancement Course - 1** 1. Computer Aided Drawing 2. Designing of Structure using Sketch Up 3. Graphical Analysis using Excel	0	0	2	2	1
10.	Practical (PCC)	**CEE12066**	Prof. Core Lab – IV Construction Engineering Materials Lab	0	0	2	2	1
11.	Practical (PSI)	**CEE15089**	Technical Seminar	0	0	0	0	1
			Total	**15**	**0**	**9**	**27**	**24**

SEMESTER –VI								
S. No	**Type**	**Course Code**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs/wk**	**Credits**
1.	Theory (PCC)	CEE11024	Prof. Core – XIII Design of Steel Structure	3	0	0	3	3
2.	Theory (PCC)	CEE11025	Prof. Core – XIV Environmental Engineering	3	0	0	3	3
3.	Theory (PEC)	CEE11042/ **CEE11019/** CEE11039	**Prof. Elective – III** 1. Prestressed Concrete Structures 2. Solid Waste Management 3. Construction Planning & Management	3	0	0	3	3
4.	Theory (PEC)	**CEE11074/ CEE11075/ CEE11076**	**Prof. Elective – IV** 1. Ground Improvement Techniques 2. Railways, Airport, Docks & Harbour 3. Project Safety Management	3	0	0	3	3
5.	Theory (OEC)	**SDS11511/ ECE11050**	**Open Elective – I** 1. Probability & Statistics 2. Sensors & Actuators	3	0	0	3	3
6.	Theory (HSSM)	ECO11505	Economics for Engineers	3	0	0	3	3
7.	Practical (PCC)	CEE12033	Prof. Core Lab – VIII Environmental Engineering Lab	0	0	2	2	1
8.	Practical (Sessional) (PCC)	**CEE12093/ CEE12094/ CEE12095**	**Skill Enhancement Course – 2** 1. Architectural Planning and Drawing 2. Modelling & Photorealistic Design of Structure Using - 3D Max 3. Modelling & Animation Rendering using REVIT Architecture	0	0	2	2	1
9.	Practical (PEC)	CEE12035/ **CEE12078/ CEE12079/ CEE12096**	**Prof. Elective – I/II Lab** 1. Remote Sensing & GIS Lab 2. Advanced Structural Analysis Lab 3. Building Services Lab 4. Waterproofing Appraisal Lab	0	0	2	2	1
			Total	**18**	**0**	**6**	**24**	**21**

FOURTH YEAR

	SEMESTER-VII							
S. No	**Type**	**Course CODE**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs/week**	**Credits**
1.	Theory (HSSM)	MGT11402	Industrial Management	3	0	0	3	3
2.	Theory (PCC)	CEE11034	Prof. Core – XV Estimation and Valuation	3	0	0	3	3
3.	Theory (PEC)	**CEE11080/ CEE11081/ CEE11082**	**Prof. Elective – V** 1. Smart Materials & Smart Structures 2. Air & Noise Pollution 3. Contract Laws & Regulation	3	0	0	3	3
4.	Theory (OEC)	**CSE11202/ ECE11051/ ECE11052**	**Open Elective – II** 1. Introduction of AI & ML 2. Fundamentals of Wireless Communication 3. Introduction of Internet of Things	3	0	0	3	3
5.	Theory (OEC)	**CSE11203/ ECE11053/ ECE11054**	**Open Elective – III** 1. Applications of AI & ML 2. Application of Drone Technology 3. Application of IOT	3	0	0	3	3
6.	Practical (PCC)	**CEE12083**	**Prof. Core Lab – X** Detailing of Steel Structures	0	0	2	2	1
7.	Practical (PEC)	**CEE12084/ CEE12085/ CEE12086**	**Prof. Elective III/IV/V Lab** 1. Ground Improvement Techniques Lab 2. Air & Noise Pollution Lab 3. Structural Monitoring & Assessment Lab	0	0	2	2	1
8.	Practical (PSI)	CEE14053	Summer Internship#	-	-	-	-	2
9.	Practical (PSI)	CEE14054	Minor Project	0	0	6	6	2
10.	Practical (PSI)	CEE12097/ CEE12098/ CEE12099	**Skill Enhancement Course – 3** 1. Computational tool for Survey (Total Station) 2. Planning & Scheduling Primavera 3. Complete Processes of Construction Industry	0	0	2	2	1
			Total	**15**	**0**	**12**	**27**	**22**

 # Summer Internship for 30 days will be taken at the end of 6th semester and will be evaluated in the 7th semester.

Semester-VIII								
S. No	**Type**	**Course Code**	**Subject Name**	**L**	**T**	**P**	**Contact Hrs/week**	**Credits**
1.	Practical (PSI)	CEE14056 CEE14057 CEE14058	Industry Work Experience / SIRE* / Major Project	0	0	12	12 (For Major Project only)	6
2.	Practical (PSI)	CEE15059	Comprehensive Viva Voce	------			------	1
3.	Practical (PSI)	CEE12100/ CEE12101/ CEE12102	**Skill Enhancement Course – 4** 1. Analysis & Structural Design using Software' SAP2000 2. Analysis & Structural Design using Software' STAAD Pro 3. Analysis & Structural Design using Software- ANSYS	0	0	2	2	1
			Total	**0**	**0**	**14**	**14**	**8**

***SIRE: Scientific Investigation & Research Experience**

Total Credits Distribution Semester wise: (B. Tech)

Semester	I	II	III	IV	V	VI	VII	VIII	Total Credits
Credits	**21**	**19**	**25**	**21**	**24**	**21**	**22**	**08**	**161**

Credit Distribution (Excluding Specialization)

Sl. No.	Category	Breakup of Credits in this Course Structure	AICTE Credit Distribution
1.	**Humanities, Social Sciences & Management Courses (HSSM)**	**10**	**12**
2.	**Basic Science Courses (BSC)**	**22**	**25**
3.	**Engineering Science Courses (ESC)**	**18**	**24**
4.	**Professional Core Courses (PCC)**	**61**	**48**
5.	**Professional Elective Courses (PEC)**	**17**	**18**
6.	**Open Elective Courses (OEC)**	**09**	**18**

7.	**Project work, seminar and internship in industry or elsewhere (PSI)**	**14**	**15**
8.	**Mandatory Course (Mandatory)**	**10**	**Non Credit**
Total Credits		**161**	**160**

Year- I
Semester-I

MTH11501	Engineering Mathematics-I	L	T	P	C
Version 1.0	Contact hours-60	3	1	0	4
Pre-requisites/Exposure	12^{th} level Mathematics				
Co-requisites	--				

Course Objectives

1. To give deep knowledge about concepts of differential calculus and enable students to apply these topics in real life problems
2. To give the students a perspective to learn integral calculus and its importance in advanced study in engineering science
3. To help the student to understand the basic concepts of matrix theory with its uses in engineering science
4. To give emphasis about concepts of Eigen value and Eigen vector, vector space and linear transformation and enable students to apply these topics for analysing engineering problems
5. To help the student to understand basic concept of abstract and vector algebra with its uses in engineering science

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Define fundamental concepts related to Calculus, Linear Algebra, and Vector Algebra	Remember (L1)
CO2	Explain the mathematical principles and theorems associated with Calculus and linear algebra	Understand (L2)
CO3	Apply various techniques from calculus, vector, and linear algebra to solve problems	Applying (L3)
CO4	Analyze and interpret mathematical results from the domain of study	Analyzing (L4)
CO5	Critically evaluate advanced mathematical problems and theorems	Evaluating (L5)
CO6	Create mathematical models for complex real-world problems	Creating (L6)

Course Description

For any engineering program, Mathematics is the backbone. With a sound knowledge in fundamental mathematics, an engineering student can become a very skillful engineer. In this course, the focus will be on learning Mathematics in depth, which will motivate students to grow their thinking ability in different fields of engineering. Students will be able to apply this knowledge to tackle almost all kinds of problems in engineering and science successfully. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take part in all group activities (Problem solving, presentation etc.).

Course Content

Unit I: Differential Calculus **[20L]**

Introduction to limit, continuity, derivative for function of one variable; Successive differentiation, Leibnitz's theorem; Rolle's theorem, Lagrange's mean value theorem, Taylor's and Maclaurin's theorems with remainders; Indeterminate forms; Concavity and convexity of a curve, Points of inflexion, Maxima and Minima

Limit, continuity, and differentiability of a functions of several variables; partial derivatives and their geometrical interpretation; chain rule, total derivative, derivatives of composite and implicit functions; homogeneous function, Euler's theorem on homogeneous functions; Jacobian of variable transformation; maxima and minima of functions of several variables, Lagrange's method of multipliers

Unit II: Integral Calculus **[15L]**

Review of definite integrals, Reduction formulae, Improper integral, Beta and Gamma functions, elementary properties, Rectification, double and triple integrals, computations of area, surfaces and volumes, change of variables in double integrals, applications

Unit III: Linear Algebra **[18L]**

Basics of real and complex matrices, Determinant and its properties, Orthogonal matrices, Hermitian and skew-Hermitian matrices, Unitary matrices, Elementary row and column operations on a matrix, Rank, echelon form, Inverse of a matrix using elementary operations, Solution of system of linear equations, Consistency, Characteristic equation, Caley-Hamillton theorem, eigenvalues and eigenvectors, algebraic and geometric multiplicity, diagonalization

Unit IV: Vector Algebra **[7L]**

Scalar and vector fields, Vector product, Scalar triple product and their interpretation, directional derivative, gradient, Curl, divergence

Text Book:

1. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill
2. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House

Reference Book:

1. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications
2. G. B. Thomas Jr., M. D. Weir, J. R. Hass, Thomas Calculus Early Transcendentals, 12th Edition
3. James Stewart, Calculus: Concepts and Contexts, 4th Edition, Cengage Learning

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	MTE	Class assessment	ETE
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	2	-	-	-	-	-	-	-	-	-
Average	3	2	-	-	2	-	-	-	-	-	-	-	-	-

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION**		
Name of the Program:	B.Tech CE	**Semester:**	I
Paper Title:	Engineering mathematics I	**Paper Code:**	MTH11501
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	What is the value of y_n if $y = e^{5x}$	**U**	**CO1**
2	Demonstrate Beta function.	**Ap**	**CO2**
3	Define basis of a vector space.	**Ap**	**CO3**
4	What is Cayley-Hamilton theorem?	**Ap**	**CO3**
5	If $\vec{c}$ is a constant vector and $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then what is the value of $grad\ (\vec{c}.\vec{r})$?	**R**	**CO4**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	Find the Jacobian $J\left(\frac{u,v}{x,y}\right)$ if $u = x - y, v = x^2 - y^2$	**U**	**CO1**
	(OR)		
6 b)	Find the value of $\lim_{x\to 0} \frac{e^x - x - 1}{x^2}$ using L'Hospital rule.	**U**	**CO1**
7 a)	Define the reduction formula of $\int sin^n x\, dx$	**Ap**	**CO2**
	(OR)		
7 b)	Find the value of $\int_0^{\pi/4} tan^n x\, dx$	**Ap**	**CO2**
8 a)	What is the value of a for which the following system of equations has unique solution? $x + y + z = 1$ $x + 2y - z = 2$ $5x + 7y + az = 4$	**Ap**	**CO3**
	(OR)		
8 b)	Show that the following vectors are linearly independent: $(1, 2, 0), (2, 3, 4)$ and $(1, 5, -2)$	**Ap**	**CO3**
9 a)	Find whether the following two matrices are similar or not: $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, \quad B = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$	**Ap**	**CO3**
	(OR)		
9 b)	Let the vector addition in $\mathbb{R}^2 = \{(x, y) \vert x, y \in \mathbb{R}\}$ be defined by $(x_1, y_1) + (x_2, y_2) = (x_1 + x_2, y_1 + y_2)$. Show that the first five conditions of the vector space related to vector addition are satisfied.	**Ap**	**CO3**

10 a)	Show that $\nabla(f_1 - f_2) = \nabla\varphi_1 - \nabla\varphi_2$.	**R**	**CO4**
(OR)			
10 b)	Show that $div(\vec{A} - \vec{B}) = div\vec{A} - div\vec{B}$.	**R**	**CO4**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	(i) Show that $[\vec{a} + \vec{b}\ \ \vec{b} + \vec{c}\ \ \vec{c} + \vec{a}\,] = 2[\vec{a}\ \ \vec{b}\ \ \vec{c}\,]$ where $\vec{a}, \vec{b},$ and $\vec{c}$ are any three vectors (ii) Find the value of m for which the vectors $4\hat{\imath} - 2\hat{\jmath} + 2\hat{k},\ 2\hat{\imath} + 4\hat{\jmath} - 6\hat{k}$ and $3\hat{\imath} + m\hat{\jmath} + 5\hat{k}$ are coplanar. **3+2**	**R**	**CO4**
(OR)			
11 b)	Find $div(\vec{F})$ and $curl\ (\vec{F})$ where $\vec{F} = grad(x^3 + y^3 + z^3 - 3xyz)$	**R**	**CO4**
12 a)	If $u = \cos^{-1}\left(\frac{x+y}{\sqrt{x}-\sqrt{y}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + \frac{1}{2}\cot u = 0$	**U**	**CO1**
(OR)			
12 b)	If $y = e^{m\sin^{-1}x}$, show that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} - (n^2 + m^2)y_n = 0$	**U**	**CO1**
13 a)	If $\vec{r} = (acost)\hat{\imath} + (asint)\hat{\jmath} + (a\ t\ tan\alpha)\hat{k}$, then show that $\left[\frac{d\vec{r}}{dt}\ \frac{d^2\vec{r}}{dt^2}\ \frac{d^3\vec{r}}{dt^3}\right] = a^3\tan\alpha$.	**R**	**CO4**
(OR)			
13 b)	Show that a proper vector $\vec{r}$ has constant length if $\vec{r}.\frac{d\vec{r}}{dt} = 0$.	**R**	**CO4**
14 a)	Find maxima or minima of $f(x, y) = x^3 + y^3 - 3x - 12y + 20$.	**U**	**CO1**
(OR)			
14 b)	Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2 + y^2)dxdy$ by changing to polar coordinates.	**Ap**	**CO2**
15 a)	Find the volume generated by revolving the parabola $y^2 = 2ax$ about X-axis bounded by $x = a$.	**Ap**	**CO2**
(OR)			
15 b)	Find the area of the surface generated by revolving the parabola $y^2 = 2ax$ about X-axis bounded by $x = a$.	**Ap**	**CO2**
16 a)	Express (4,3,10) as linear combination of the vectors $(1, 2, 0), (2, 3, 4)$ and $(1, 5, -2)$.	**Ap**	**CO3**
(OR)			
16 b)	Show that the following set of vectors constitute a basis for the vector space $\mathbb{R}^3$with usual vector addition and scaler multiplication: $S = \{(1, 1, 0), (1, 0, 1), (0, 1, 1)\}$	**Ap**	**CO3**
17 a)	Find the eigen values and eigen vectors of the following matrix: $A = \begin{pmatrix} 1 & 1 & 1 \\ -1 & -1 & -1 \\ 0 & 0 & 1 \end{pmatrix}$	**Ap**	**CO3**
(OR)			
17 b)	Use Cayley-Hamilton theorem to find inverse of the following matrix (if exist): $A = \begin{pmatrix} 1 & 0 & 0 \\ 1 & 2 & 1 \\ 2 & 3 & 2 \end{pmatrix}$	**Ap**	**CO3**

EVS11112	Environmental Science	L	T	P	C
Version 1.1	Contact Hours – 45	3	0	0	3
Pre-requisites/Exposure	Basic physics, chemistry, mathematics of +2 level.				
Co-requisites	--				

Course Objectives

1. To understand the intrinsic relation between humans and environment, our position in the ecosystem around us
2. To comprehend the significance of the biodiversity surrounding us.
3. To figure out the importance and need for energy resources, various sources of energy, renewable and non-renewable sources, conventional and unconventional sources.
4. To have basic concepts about sustainability, our dependence on nature and the consequences of overexploitation.
5. To enable students to appreciate the importance and how much we owe to the earth systems for our survival.
6. To have a basic concept about the types of pollution and mitigation procedures.
7. To have an overall idea about the environmental legal framework in our country and about the EIA and environmental audit procedures.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Distinguish between various types of ecosystems, ecosystem dynamics, perceive and appreciate the surrounding nature.	Remember (L1)
CO2	Feel connected with the intrinsic relation between humans and environment, our position in the ecosystem around us, and importance of biodiversity.	Understand (L2)
CO3	Comprehend the presence of various pollutants, their significance, and impacts, and develop the underlying concepts involved in various air pollution prevention and mitigation measures.	Applying (L3)
CO4	Understand the basic science which can explain the phenomena occurring around us.	Analyzing (L4)
CO5	Build the in-depth knowledge about natural resources including energy resource.	Evaluating (L5)
CO6	Understand the legal framework in our country for safeguarding the environment including pollution prevention, control, management, and wildlife management.	Creating (L6)

Catalog Description

To distinguish between various types of ecosystems, ecosystem dynamics, perceive and appreciate the surrounding nature and feel connected, develop the concept of innate relationship of humans and biodiversity, need for conservation and different conservation strategies. The students will be developed in a way so that they can spontaneously comprehend the importance of studying about the various air pollutants, their significance and impacts, and develop the underlying concepts involved in various air pollution prevention and mitigation measures, understand fundamental water chemistry, deduce the relationship between various water pollutants, and understand the principles of various water and wastewater treatment procedures. They will understand the routes of generation, classification, management and environmental significance of solid waste, apply the basic concepts of waste management in their daily lives, understand the need of the 5Rs of waste management, importance of waste minimization.

Course Content

Module 1: Basics of Environmental Sciences: (5 hrs)
Definition, Scope and objectives, classification of environment, interrelationship between the components, ecology and ecosystem, structural and functional component of ecosystem, energy flow in an ecosystem, biogeochemical cycles, human impact on the environment, The IPAT equation, Ecological foot print, ecology and environment, ecosystem concept, energy flow in an ecosystem.

Module 2: Energy Resources: (10 hrs)
Concept of energy, SI Units of Work, Heat and Power, World energy use, Energy consumption pattern in India and U.S., Environmental aspects of energy utilization Renewable and non-renewable sources; Fossil fuel: types, use and environmental impacts, Solar energy: Solar Radiation – Passive and active solar systems – Flat Plate and Concentrating Collectors – Solar direct Thermal Application– Fundamentals of Solar Photo Voltaic Conversion- advantages and disadvantages of Solar Power generation, Solar energy status in India, Wind Energy: site selection, Wind turbine: basic working principle and types, Wind energy status in India, advantages and disadvantages of Wind Power generation, Hydroelectric power : How it is generated, advantages and disadvantages, Biomass energy: various types, generations of biofuel, Biomass direct combustion – Biomass gasifiers – Biogas plants – Digesters – Ethanol production – Bio diesel, Geothermal Energy: source, various methods of extraction: wet steam, dry steam and hot water flashed, advantages and disadvantages

Module 3: Air Pollution and Control: (10 hrs)
Classification of air pollutants, Criteria air pollutants and their impacts, Major global impacts of air pollution on man: Global warming, Ozone layer depletion, Acid rain; Air quality standards, Air pollution control methods, Methods of reducing air pollutants from IC engines, particulate pollutant and gaseous pollutant.

Module 4: Water Pollution Fundamentals and Control Strategies: (5 hrs)
Water quality: physical, chemical and biological characteristics, drinking water quality standard, effluent water quality, waste water sources and constituents, waste water treatment: preliminary treatment, primary treatment, secondary treatment, sedimentation, coagulation, floatation, aerobic and anaerobic biological treatment, activated sludge process, lagoons, trickling filters, rotating biological contractor.

Module 5: Solid Waste Management: (5 hrs)
Sources and generation of solid wastes, their characterization, chemical composition and classification. Different methods of disposal and management of solid wastes, Recycling of waste material. Waste minimization technologies.Hazardous Wastes Management and Handling Rules, 1989

Module 6: Environmental Impact Assessment: (5 hrs)
Introduction to Environmental Impact Analysis. Environmental Impact Statement and Environmental Management Plan. EIA guidelines 1994, Notification of Government of India. Impact Assessment Methodologies. Generalized approach to impact analysis. Procedure for reviewing Environmental impact analysis and statement. Guidelines for Environmental audit.

Text Books:

W.P. Cunningham and M. A. Cunningham, Principles of Environmental Science, 3rd Ed., McGraw-Hill Higher Education, 2005.

Mackenzie Davis and David Cornwell, Introduction to Environmental Engineering (The McGraw-Hill Series in Civil and Environmental Engineering), 2ndEd., McGraw Hill Education, 2012.

Reference Books:

Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 3rd Ed., Prentice Hall India Learning Private Limited, 2008.

Metcalf and Eddy, Wastewater Engineering: Treatment and Reuse, 4thEd., McGraw Hill Education, 2002.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End-Term Examination
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	2	2	-	-	2	-	-	-	-	-	-	-	2
CO2	2	-	3	-	-	3	1	-	-	-	-	-	2	-
CO3	-	3	-	-	-	1	3	-	-	-	1	-	-	3
CO4	1	-	1	-	-	1	3	-	-	-	-	-	1	-
CO5	2	-	3	-	-	3	1	-	-	-	-	-	2	-
CO6	1	-	1	-	-	1	3	-	-	-	-	-	1	-
Average	2	3	3	-	-	3	3	-	-	-	1	-	2	3

Model Question Paper

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2021

Name of the Program: B.Tech | Semester: I/II
PAPER TITLE: Environmental Studies | PAPER CODE: EVS11107
Maximum Marks: 40 | Time duration: 3 hours
Total No of questions: 12 | Total No of Pages: 02

Instruction for the Candidate:

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

	Section A (Answer All the Questions) (5 x 1 = 5)		
1.	Briefly **evaluate** what information about any ecosystem are conveyed by ecological pyramids?	**U**	**CO1**
2.	**Analyse** how DO of a water body is related to eutrophication?	**U**	**CO3**
3.	**What** are the diverse applications of solar energy unlike other renewable energy resources?	**R**	**CO4**
4.	**What** are the different types of wind turbine?	**R**	**CO4**
5.	Mention few problems associated with large dams.	**R**	**CO2**
	SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
4.	**What** are the adverse effects of open dumping of municipal solid wastes on environment? **How** does sanitary landfill differ from open dumping? (2.5+2.5 = 5) .	**U**	**CO5**
5.	**What** is electrostatic precipitator? **What** are the advantages of electrostatic precipitator? (2.5+2.5 = 5)	**U**	**CO3**
6.	**Describe** the distribution of water resources.	**R**	**CO5**
7.	**Draw** a simple flowchart describing the steps that are followed in an EIA process in India.	**R**	**CO6**
	SECTION (Answer Any Two Questions) (2 x 10 = 20)		
8.	**How** is photochemical smog formed? **What** are effects of photochemical smog? **Discuss** the factors affecting photochemical smog? (4+3+3=10)	**U**	**CO4**
9.	**What** do you mean by BOD of water? **How** thermal pollution of water is linked to DO? A city discharges 1.25 m^3/s of wastewater into a stream whose minimum rate of flow is	**Ap**	**CO3**

	8.0 m^3/s. The velocity of the stream is about 3.0 km/h. The temperature of the wastewater is 20°C and that of the stream is 15°C. The 20°C BOD_5 of the wastewater is 250 mg/l and that of the stream is 2 mg/L. The wastewater contains no dissolved oxygen, but the stream is flowing with saturated DO concentration of 9.2 mg/L. Saturated DO at 15°C is 10.2 mg/L. At 20°C, deoxygenation constant (k^1) is estimated to be 0.3 per day and reaeration constant (k^2) is 0.7 per day. Determine the critical oxygen deficit and its location. Also estimate the 20°C BOD_5 of a sample taken at the critical point. Use the temperature coefficients of 1.135 for k^1 and 1.024 for k^2. (2+2+6=10)		
10.	What is hazardous waste? Discuss the methods of hazardous waste management? What is composting? (2+6+2=10)	**An**	**CO3**

GEE11001	Electrical and Electronics Technology	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basic idea about basic mathematics				
Co-requisites	Basic idea of semiconductor devices and electromagnetism				

Course Objectives

1. To familiarize with passive components, active components and measuring instruments.
2. To familiarize the working of diodes, transistors, MOSFETS and integrated circuits.
3. To implement mini projects based on concept of electronics circuit concepts.
4. To understand d-c network theorems and apply these theorems to calculate thevoltage, current and power for a given circuit.
5. To explain the concept of active power, reactive power, power factor, quality factor, steady state sinusoids.

Course Outcomes

At the end of the course, the student will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Highlight different components used in electrical and electronics industries for common application.	Remember (L1)
CO2	Understand the working of different electrical and electronics components.	Understand (L2)
CO3	Apply the fundamental concepts of electrical and electronics technology in circuit design.	Applying (L3)
CO4	Analyze the construction and working of electrical and electronics-based measuring instruments	Analyzing (L4)
CO5	Evaluate different types of networks used in circuit design through Network theorems, phasor diagram, power factor, quality factor, etc.	Evaluating (L5)
CO6	Create different types of circuits using various components	Creating (L6)

Catalog Description

Present technology requires necessary knowledge of ELECTRONICS in most fields. Avionics, Autotropic, Agrotronics, Physics, Process Chemistry, Health Services, etc., already employ components or even whole systems based on Electronics. Thus, there is an increasing number of professionals in these and many other fields who need adequate knowledge and training. Taken this into account, ADAMAS has developed the Basic Electronics and Electricity Integrated Laboratory, capable of covering different levels of difficulty. It is based on a series of self-taught modules, each one referring to a specific area of Electronics.

Course Content

Module 1: **7 lecture hours**

D.C. Circuit Analysis and Network Theorems: Concept of network, Active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, R, Land C as linear elements, source transformation, Kirchoff's Law, mesh analysis and nodalanalysis, star-delta transformation, network theorems: Thevenin’s theorem, Norton’s theorem, maximum power transfer theorem, network analysis with dependent sources.

Module 2: **6 lecture hours**

Steady State Analysis of Single Phase A.C. Circuits: Sinusoidal, square and triangular waveforms-average and effective value, form the peak factors, concept of phasor, phasor representation of sinusoidal voltage and current, analysis of series-parallel RLC circuits. Apparent, active and reactive powers, power factor, causes and problems of low power factor, power factor improvement, resonance in series and parallel circuits, bandwidth and quality factors.

Module 3: **6 lecture hours**

Three Phase A.C. Circuits: Its necessity and advantages, meaning of phases equence, star and delta connections, balanced supply and balanced load, line and phase voltage/current relation, threephase power measurements, two wattmeter method.

Module 4: **6 lecture hours**

Basics of Semi-Conductors and PN Junction: Introduction; Carrier Concentrations- the Fermi Level; Electron and Hole Concentrational Equilibrium; Temperature Dependence of Carrier Concentration; Drift and diffusion current; The Hall Effect; Optical Absorption, Luminescence; PN Junction Diode inEquilibrium Conditions; PN Junction Diode in Forward Biased and Reverse BiasedCondition; Breakdown in PN Junction Diodes.

Module 5: **6 lecture hours**

Bipolar Junction Transistors: Introduction, Types: NPN and PNP; Current Components; Early Effect Ebber’s Moll Model; Different Configurations of a Transistor and its Characteristics; Transistor as an Amplifier (CE, CB, CC); Transistor as a Switch.

Module 6: **6 lecture hours**

Field Effect Transistors: Introduction, JFET and MOSFET, Realization of digital logic circuit using MOSFET (AND, OR, NOT etc.), Realization of switching circuit using MOSFET.

Module 7: **7 lecture hours**

Electronics Instruments & Digital Electronics Fundamental:
Signal generator, Multimeter, operation of CRO and its application. Number systems, Conversionsand codes, Logic gates and truth tables.

Text book:

1. Electronic Devices & Circuit Theory: Boyelstad &Nashelsky
2. Electronics Fundamental and application: D.Chattopadhyay and P CRakshit

3. Electronic Principle: Albert PaulMalvino
4. Digital circuits and design by S Salivahanan and SArivazhagan
5. V. N. Mittal and A. Mittal, *Basic Electrical Engineering*, Tata McGraw-Hill Publishing Company Ltd,20

Reference book:

1. Electronic Circuits, Discrete and Integrated- Charles Belove and Donald L.Schilling
2. PrinciplesofElectricalEngineeringandElectronics-VKMehta,RohitMehta, SChandandCompany,New Delhi
3. Solid State Electronic Devices- Ben G. Streetman and Sanjay Kumar Banerjee,PHI.
4. Fundamental of Digital Circuits by Anand Kumar 2nd Eddition,PHI LearningPal, Rajendra and Korlahalli, J.S. (2011) Essentials of Business Communication. Sultan Chand & Sons. ISBN: 9788180547294.
5. Theodore Wildi,*ElectricMachines, Drives and Power Systems*, Pearson,2005.
6. Vincent Del Toro, *Electrical Engineering Fundamentals*, 2^{nd} Ed., Prentice Hall India Learning Pvt. Ltd.,1989.
7. J. Millman, C. Halkias and C. D. Parikh, *Millman's Integrated Electronics: Analog and Digital Circuits and Systems*, 2^{nd} Ed., McGraw Hill Education,2017.
8. D.P.Leach,A.P.MalvinoandG.Saha,*DigitalPrinciplesandApplications*,8^{th}Ed.,McGraw Hill Education,2014.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Internal Assessment	MTE	ETE
Weightage (%)	**30**	**20**	**50**

Co-Relationship Matrix

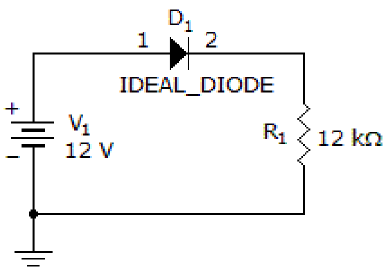
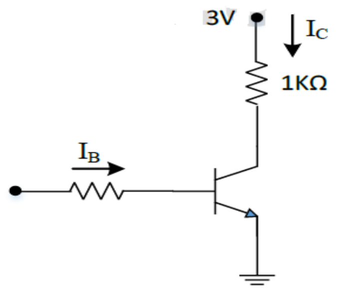
Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

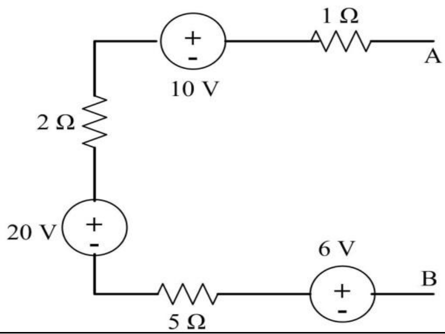
Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	-	-	-	-	-	-	1	-	-
CO2	3	3	2	1	1	-	-	-	-	-	-	1	-	-
CO3	3	3	2	1	1	-	-	-	-	-	-	1	-	-
CO4	3	3	2	1	1	-	-	-	-	-	-	1	-	-
CO5	3	3	2	1	1	-	-	-	-	-	-	1	-	-

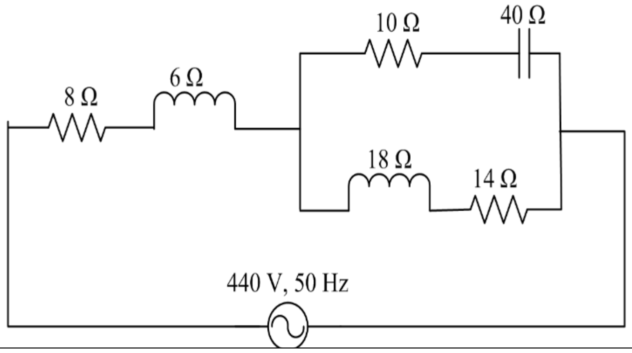
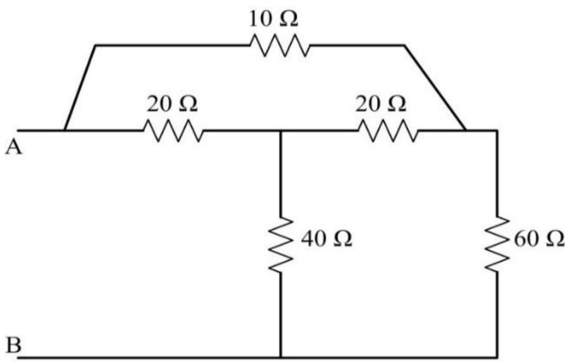
CO6	3	3	2	1	1	-	-	-	-	-	-	1	-	-
Average	3	3	2	1	1	-	-	-	-	-	-	1	-	-

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY END SEMESTER EXAMINATION**		
Name of the Program:	B. TECH	**Semester:**	I
Paper Title:	Electrical & Electronics Technology	**Paper Code:**	GEE11001
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	03
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	**Determine** the current through the diode.  	**Analysis**	**CO4**
2	**Determine** the minimum base current (I_B) required to drive the transistor to saturation (in the figure below). Assuming $V_{CEsat} = 0.2$ V and $\beta = 50$  	**Analysis**	**CO5**
3	Convert numbers: **i)** $(45.526)_{10} = (?)_2$, **ii)** $(B2C)_{16} = (?)_{10}$	**Remember**	**CO6**
4	In a R-L-C series circuit, the condition for resonance is a) The current I_L and I_C are in phase opposition b) The resultant current is zero c) The voltage drop across X_L and X_C are equal d) Power factor is zero.	**Analyze**	**CO1**
5	In a balanced three phase star connected system the relation between r.m.s value of line and phase voltage is given by **a)** $V_L=V_{ph}$ **b)** $V_{ph}=\sqrt{3}V_L$ **c)** $V_L=\sqrt{3}V_{ph}$ **d)** $V_L=\sqrt{2}V_{ph}$	**Remember**	**CO2**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	**Explain** thermal runway in Transistor?	**Understand**	**CO5**

	(OR)		
6 b)	**Determine** the collector and emitter currents, given the base current and current gain. Assume a common-base current gain $\alpha = 0.97$ and a base current of $I_B = 25\ \mu A$. Also assume that the transistor is biased forward in the forward active mode.	**Analysis**	**CO5**
7 a)	**Compare** P channel and N channel JFET.	**Understand**	**CO5**
	(OR)		
7 b)	**Design** and implement AND gate using NOR gate.	**Analysis**	**CO6**
8 a)	A transistor operating in CB configuration has $I_C = 2.98mA$, $I_E = 3mA$ and $I_{CO} = 0.01mA$. **Determine** current will flow in the collector circuit of this transistor when connected in CE configuration with a base current of 30µA?	**Analysis**	**CO5**
	(OR)		
8 b)	Write down the properties of series resonant circuit.	**Remember**	**CO2**
9 a)	What is resonance?	**Remember**	**CO1**
	(OR)		
9 b)	**Determine** equivalent current source for the circuit shown in the figure. 	**Analysis**	**CO5**
10 a)	State Kirchhoff's current and voltage law.	**Remember**	**CO3**
	(OR)		
10 b)	Three equal resistors of 6 Ω are connected in delta. What is the resistance in one of the arms of the equivalent star circuit?	**Understand**	**CO1**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	**i) Explain** the phenomenon of drift of carriers in a semiconductor. **ii)** Write Einstein's relation between mobility & diffusivity. **[4+1]**	**Understand**	**CO4**
	(OR)		
11 b)	**Analyze** the current components of PNP in Bipolar Junction Transistor.	**Analyze**	**CO5**
12 a)	**i)** Draw the common emitter (CE) circuit and **explain** it briefly. **ii) Determine** the hole concentration of a silicon crystal having donor concentration of $2.4*10^{24}$ /m^3, when intrinsic carrier concentration is $1.6*10^{18}$ /m^3? Find the ratio of electron and hole concentration. **[3+2]**	**Understand, Analysis**	**CO5 & CO4**
	(OR)		
12 b)	**i) Justify** the expression for diode current and its characteristics. **ii)** The bandgap of a specimen of gallium arsenide phosphide is 1.98 eV. **Determine** the wavelength of the EM radiation that is emitted upon direct recombination of electrons and holes in this sample. What is the colour of the emitted radiation? [Planck's constant (h) = $6.6*10^{-34}$ joule-seconds] **[2+3]**	**Analysis**	**CO4**
13 a)	**i)** Draw schematically the structure of n channel JFET and **explain** the operation briefly. **ii) Why** Silicon type transistors are more often used than Germanium type? **[4+1]**	**Understand Remember**	**CO5, CO4**

	(OR)		
13 b)	**i) How** you measure resistance value using colour code and power rating of a resistor? **ii)** Briefly **explain** the three regions that are present in the drain characteristics of JFET? **[2+3]**	**Remember** **Understand**	**CO6**
14 a)	**i) Justify** the statement: “Zener Diode acts as a Voltage Regulator” **ii) What** are the effecting parameters that responsible to change the Q points? **[3+2]**	**Apply** **Remember**	**CO4** **CO5**
	(OR)		
14 b)	State and prove maximum power transfer theorem.	**Analyze**	**CO2**
15 a)	i) What is form factor and peak factor of an alternating sinusoidal wave? ii) An alternating voltage is given by the equation $V = 282.84 \sin\left(377t + \frac{\Pi}{6}\right)$. Find the a) r.m.s value b) frequency and c) the time period. **[2+3]**	**Analysis**	**CO3**
	(OR)		
15 b)	i) What is RMS and average value of an alternating sinusoidal wave? ii) A circuit takes a current $i = 50 \sin(314t - \pi/3)$ when the supply voltage is $v = 400 \sin 314t$. Find the impedance, resistance and inductance of the circuit. **[2+3]**	**Remember** **& Analysis**	**CO2**
16 a)	i) What is power factor in electrical circuit? ii) Determine the current drawn by the series parallel circuit and find the overall power factor. **[1+4]** 	**Analysis**	**CO3**
	(OR)		
16 b)	The voltage across a circuit is given by (300+ j60) volt and the current through it by (10-j5) A. Determine the a) active power b) reactive power c) apparent power. **[5]**	**Understand**	**CO3**
17 a)	Sketch the connection diagram of two wattmeter method for the measurement of three phase power. Mention properly all element names. [5	**Remember**	**CO1**
	(OR)		
17 b)	Using star-delta conversion, find the equivalent resistance between terminals A and B in the network shown in the figure. **[5]** 	**Analysis**	**CO3**

GEE11012	**Disruptive Technology Innovations**	L	T	P	C
Version 1.0		2	0	0	2
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

1. Understand the fundamentals of Artificial Intelligence (AI) and Machine Learning (ML)
2. Explore the role of data in Machine Learning
3. Introduction to Natural Language Processing (NLP)
4. Examine the impact of AI on various industries.
5. Introduction to Data Analytics

Course Outcomes:

On the completion of this course the student will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Articulate a clear and comprehensive definition of the concept of disruptive technology through the analysis of a number of disruptive technology cases;	Remember (L1)
CO2	Describe both the common, and distinctive characteristics of specific disruptive technologies within a range of contexts;	Understand (L2)
CO3	Apply and analyze the social, financial and technological conditions that support or prevent the advent and/or implementation of a disruptive technology;	Applying (L3)
CO4	Assess and enact the power of collaboration, user feedback, and other team approaches to creative ideation and innovation;	Analyzing (L4)
CO5	Draw connections between the concepts associated with disruptive technologies to envision and evaluate a new disruptive technology; and	Evaluating (L5)
CO6	Synthesize individual research and visually present original ideas by creating a multimedia digital slide presentation.	Creating (L6)

Course Description:

The course on Disruptive Technologies aims to provide students with an in-depth understanding of various cutting-edge technologies that are reshaping industries and revolutionizing traditional practices. Through a comprehensive curriculum spanning six units, students will delve into Artificial Intelligence/Machine Learning (AI/ML), Data Analytics, Internet of Things (IoT), Cybersecurity, Robotic Process Automation (RPA), and Additive Manufacturing (AM) and Rapid Prototyping (RP).

Course Content:

Unit I: [10 hours lecture]

Artificial Intelligence/Machine Learning

Introduction To Artificial Intelligence, Definition And Brief History Of Ai, Key Ai Concepts And Terminology, Importance And Impact Of Ai In Various Industries, Machine Learning Basics, Distinction Between Ai And ML, Types Of Machine Learning: Supervised, Unsupervised, And Reinforcement, The Role Of Data In Machine Learning, Evaluation Metrics In ML, Natural Language Processing (NLP), Text Preprocessing And Tokenization, Basic Sentiment Analysis, applications Of NLP In Real-world Scenarios, Generative Ai And Large Language Models, Introduction To Generative Ai, What Are Large Language Models?, Ai In Business And Industry, How Ai Is Transforming Various Industries (E.G., Healthcare, Finance, Retail), Case Studies Of Successful Ai Implementations, Business Opportunities And Challenges In Ai Adoption, Ai Ethics And Bias, The Importance Of Ethics In Ai, Ethical Considerations In Ai Development And Deployment.

Unit II: [6 hours lecture]

Data Analytics with Tools

Introduction To Data Analytics, The Importance Of Data In Decision-making, Types Of Data (Structured Vs. Unstructured), Role Of Data Analytics In Various Industries, Data Collection And Preprocessing, Data Collection Methods, Data Cleaning And Quality Assessment, Dealing With Missing Data, Data Transformation And Feature Engineering, Introduction To Data Analytics Tools, Overview Of Popular Data Analytics Tools, Introduction To Microsoft Excel For Data Analysis, Data Visualization With Advanced Tools (E.G., Tableau, Power Bi)

Unit III: [10 hours lecture]

Introduction To Iot

Definition And Concept Of The Internet Of Things, Significance And Impact On Various Industries, Iot Architecture And Components Overview, Iot Hardware Components (Sensors, Actuators, Microcontrollers), Basics Of Cloud Computing And Iot, Sensors And Actuators, Types Of Sensors (Temperature, Humidity, Motion, Etc.), Sensor Characteristics And Selection Criteria, Actuators And Their Role In Iot Systems, Practical Sensor And Actuator Examples, Iot Applications In Healthcare, Remote Patient Monitoring, Wearable Health Devices, Smart Citie, Agriculture And Environmental Monitoring, Augmented Reality (Ar) And Virtual Reality (Vr) In Iot, Digital Twins In Iot, Basics Of Arduino And Raspberry Pi, Hardware Components And Capabilities, Programming With Arduino Ide And Raspberry Pi, Hands-on Exercises With Arduino And Raspberry Pi

Unit IV: [9 hours lecture]

Cyber Security

Introduction To Cybersecurity, Definition And Scope Of Cybersecurity, Historical Perspective And Evolution Of Cybersecurity, Cyber Threats And The Need For Protection, Overview Of Common Cyber Threats (Malware, Phishing, Ransomware, Etc.), Social Engineering Attacks, Confidentiality, Integrity, And Availability (Cia) Triad, Risk Assessment And Management, Security Policies And Procedures, Cybersecurity Best Practices, Security Technologies And Tools, Introduction To Antivirus Software, Firewalls And Intrusion Detection/Prevention Systems (Ids/Ips), Encryption And Secure Communication, Application Of Cybersecurity In Business, Healthcare, Finance, Critical Infrastructure, Emerging Trends In Cybersecurity (Ai In Cybersecurity, Iot Security, Etc.

Unit V: [6 hours lecture]
Robotic Process Automation
Definition Of Robotics And Automation, Historical Overview Of Robotics, Types Of Robots And Their Applications, Role Of Automation In Various Industries, Current Trends And Future Prospects, Robot Anatomy, And Components, Sensors: Proximity, Vision, Force, Touch, Etc, Actuators And Motors: Dc Motors, Servos, Stepper Motors, Robot Programming: Python, C++, Etc, Introduction To Computer Vision, Types Of Robot End-effectors/Grippers, Pick-and-place Operations, Introduction To Cobots (Collaborative Robots), Safety Considerations And Standards, Emerging Trends And Research Areas: Soft Robotics, Swarm Robotics, Bio-inspired Robotics, Industry 4.0 And Smart Factories.

Unit VI: [7 hours lecture]
Additive Manufacturing (Am) And Rapid Prototyping (Rp)

Evolution And History Of Am And Rp, Basic Principles Of Am And Rp, Comparison With Traditional Manufacturing Methods, Applications And Benefits Of Am And Rp, Stereolithography (Sla), Fused Deposition Modeling (Fdm), Selective Laser Sintering (Sls), Selective Laser Melting (Slm), Electron Beam Melting (Ebm), Materials For Am: Polymers, Metals, Ceramics, And Composites Used In Am, Applications Of Am And Rp: Aerospace And Automotive Industries, Medical And Healthcare Applications, Consumer Goods And Electronics, Art And Fashion, Customization And Personalization, Tooling And Jigs.

Modes of Examination: Assignment/Quiz/Project/Presentation/Written Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO2	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO3	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO4	-	-	-	-	-	3	-	-	-	-	-	3	-	-
CO5	-	-	-	-	-	3	-	-	-	-	-	3	-	-

CO6	-	-	-	-	-	3	-	-	-	-	-	3	-	-
Average	-	-	-	-	-	3	-	-	-	-	-	3	-	-

MEE11002	**Engineering Mechanics**	L	T	P	C
Version 1.0		2	1	0	3
Pre-requisites/Exposure	12th level Physics, Mathematics				
Co-requisites	--				

Course Objectives

1. To enable learners to solve force problems related to practical world.
2. To be able to determine the centroid, centre of gravity and moment of inertia.
3. To learn the effect of friction on equilibrium.
4. To learn kinematics, kinetics of particle and rigid body, related principles.
5. To introduce the concepts of Dynamic motion.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Define conditions of equilibrium of bodies subjected to forces	Remember (L1)
CO2	Express the centroid, centre of gravity and moment of inertia of various one dimensional and two dimensional objects	Understand (L2)
CO3	Determine motion under the effect of dry friction	Applying (L3)
CO4	Explain the concept of virtual work for bodies in equilibrium	Analyzing (L4)
CO5	Review the D'Alembert's Principle for reducing the problem of kinetics to equivalent statics problem.	Evaluating (L5)
CO6	Solve the problems related to statics and dynamics	Creating (L6)

Catalog Description

Engineering Mechanics. This is a basic first level course to learn rigid body mechanics covering both statics and dynamics. Statics covers free body diagrams, equilibrium of rigid bodies, analysis of trusses and beams, discussion on friction, virtual work and stability. Students will be expected to be familiar with engineering problems related to practical field.

Course Content

Module 1 11 lecture hours

Basics of Statics and Concurrent Forces

Statics of Particles: Force System: Force, classification & representation, force as a vector, composition and resolution of forces, principle of superposition and transmissibility of forces.

Statics of Rigid bodies: Equilibrium of coplanar force system, free body diagrams, determination of reactions, equilibrium of a body under three forces, Lami's theorem. Moment of a force about a point and an axis, moment of coplanar force system, Varignan's theorem.

Module 2: 11 lecture hours

Parallel and Distributed Forces

Parallel forces in a plane, Distributed Parallel forces in a plane, couple, resolution of a force into a force and a couple, moment of a couple.

Centroid and Moment of Inertia: Determination of centre of gravity, centre of mass and centroid by direct integration and by the method of composite bodies, area moment of inertia of composite plane figures and mass moment of inertia, radius of gyration, parallel axis theorem, Pappas theorems, polar moment of inertia.

Module 3: 6 lecture hours

Friction Introduction to wet and dry friction, laws of dry friction, cone of friction, block friction, ladder friction, wedge friction, application of friction in machines.

Module 4: 4 lecture hours

Virtual Work Virtual displacement, principle of virtual work.

Module 5: 8 lecture hours

Introduction to Dynamics Laws of motion, Projectile motion, D'Alembert's Principle, Work and energy, impulse and momentum, impact of bodies.

Text Books

1. Engineering Mechanics [Vol-I & II] by Meriam&Kraige, 5th ed. – Wiley India
2. Engineering Mechanics by S.S. Bhavikatti and K.G. Rajashekarappa – New Age International
3. Mechanics of Solids by Crandall,Dahl and Sivakumar-MC Graw Hill ,5th Edition 2015,New Delhi

Reference Books

1. Engineering Mechanics: Statics & Dynamics by I.H.Shames, 4th ed. – PHI
2. Engineering Mechanics by Timoshenko, Young and Rao, Revised 4th ed. – TMH

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	1	1	1	1	-	1	-	1	-	3
CO2	2	-	-	-	1	1	1	1	-	1	-	1	-	3
CO3	2	-	3		1	1	1	1	-	1	-	1	-	3
CO4	-	3	3	2	1	1	1	1	-	1	-	1	-	3
CO5	-	-	3	2	1	1	1	1	-	1	-	1	-	3
CO6	-	-	3	2	1	1	1	1	-	1	-	1	-	3
Average	2	3	3	2	1	1	1	1	-	1	-	1	-	3

Model Question Paper

ADAMAS
UNIVERSITY
PURSUE EXCELLENCE

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

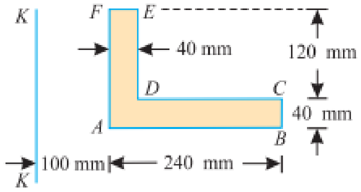
Name of the Program: B.Tech
Stream: CE/ME/EE/CSE/ECE
PAPER TITLE: Engineering Mechanics — PAPER CODE: MEE11002
Maximum Marks: 40 — Time duration: 3 hours
Total No of questions: 12 — Total No of Pages: 01

Instruction for the Candidate:

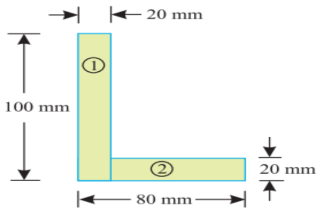
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.

3. Assumptions made if any, should be stated clearly at the beginning of your answer.

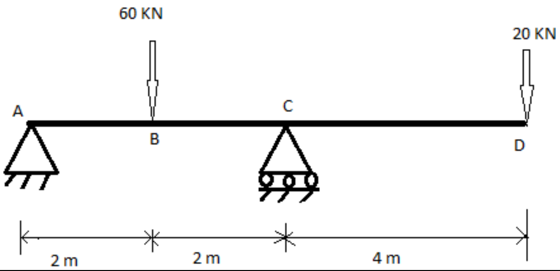
<table>
<tr><td colspan="4">Section A (Answer All the Questions) (5 x 1 = 5)</td></tr>
<tr><td>1.</td><td>State the Parallelogram Law of forces.</td><td>U</td><td>CO1</td></tr>
<tr><td>2.</td><td>Explain:
Varignon’s principle of moments</td><td>U</td><td>CO1</td></tr>
<tr><td>3.</td><td>



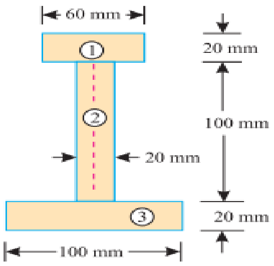
Compute the moment of inertia of the above area about axis K-K.</td><td>R</td><td>CO2</td></tr>
<tr><td>4.</td><td>Find the centroid of an unequal angle section 100 mm × 80 mm × 20 mm.



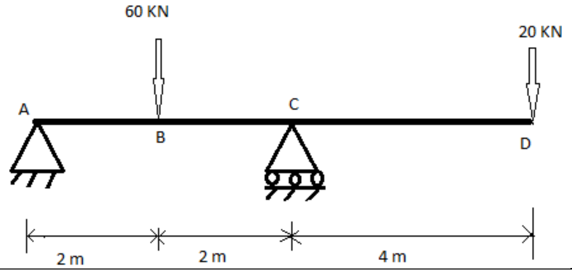
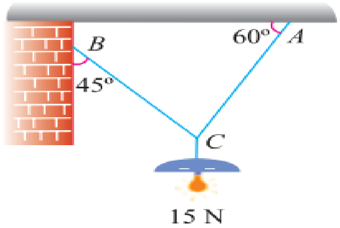
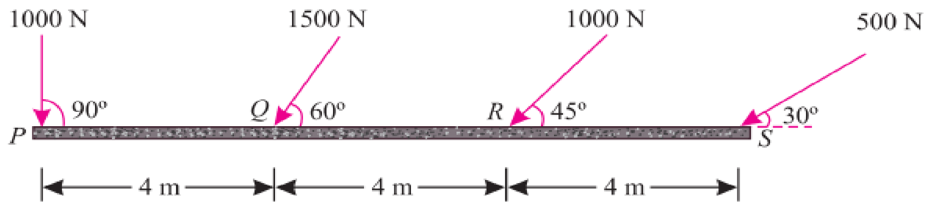
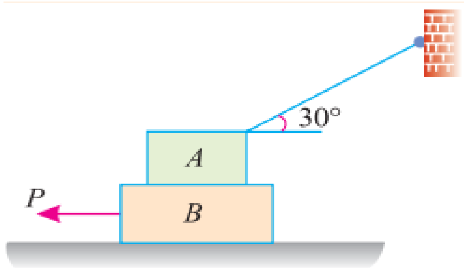
</td><td>R</td><td>CO2</td></tr>
<tr><td>5.</td><td>What is friction?</td><td>U</td><td>CO3</td></tr>
<tr><td></td><td>SECTION B (Attempt any Three Questions) (3 x 5 = 15)</td><td colspan="2"></td></tr>
<tr><td>4.</td><td>a) Explain principle of transmissibility?
(b)Find out the reaction forces at support as shown in figure below using principle of virtual work.



</td><td>U</td><td>CO1</td></tr>
<tr><td>5.</td><td>(a) Derive the moment of inertia of perpendicular axis theorem
(b) An I-section is made up of three rectangles as shown in Figure below. Find the moment of inertia of the section about the horizontal axis through the CG and parallel to the X-X axis.



</td><td>Ap</td><td>CO2</td></tr>
<tr><td>6.</td><td>(a) Explain Laws of friction?
(b) An effort of 200 N is required just to move a certain body up an inclined plane of angle 15° with the force acting parallel to the plane. If the angle of inclination of</td><td>Ap</td><td>CO3</td></tr>
</table>

	the plane is made 20° the effort required, again applied parallel to the plane, is found to be 230 N. Find the weight of the body and the coefficient of friction.		
7.	a) Explain principle of transmissibility? (b)Find out the reaction forces at support as shown in figure below using principle of virtual work. 	Evaluate	CO1 /CO4
	SECTION (Answer Any Two Questions) (2 x 10 = 20)		
8.	An electric light fixture weighting 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Figure. Using Lami's theorem, determine the forces in the strings AC and BC. 	U	CO1
9.	A horizontal line PQRS is 12 m long, where PQ = QR = RS = 4 m. Forces of 1000 N, 1500 N, 1000 N and 500 N act at P, Q, R and S respectively with downward direction. The lines of action of these forces make angles of 90°, 60°, 45° and 30° respectively with PS. Find the magnitude, direction and position of the resultant force 	Create	CO1
10.	2. Two blocks A and B of weights 1 kN and 2 kN respectively are in equilibrium position as shown in Figure 1. If the coefficient of friction between the two blocks as well as the block B and the floor is 0.3,find the force 'P' required to move the  block B. (5)	An	CO3

BIT11003	Life Sciences	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Class 12Biology				
Co-requisites	-				

Course Objectives:

1. To acquire the knowledge about the cell structure and interaction with neighboring cells in biological system.
2. To gain the knowledge about the genetic switches and oscillators and evolutionary dynamics.
3. To acquire the knowledge about the transport of molecules in different cellular compartments.
4. To gain the knowledge about dynamics of different systems in human body.
5. To understand the application and significance of different techniques of medical biotechnology.

Course Outcomes

At the end of the course, the student will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the structure and functions cell organelles and their interrelationship.	Remember (L1)
CO2	Understand the genetic switches and evolutionary dynamics of living system.	Understand (L2)
CO3	Examine the mode of transport of molecules in biological system numerically.	Applying (L3)
CO4	Analyze the different networks of human body and other physiological systems and can summarize consequences of physiological disorders.	Analyzing (L4)
CO5	Review different techniques of medical biotechnology on human body to analyse the malfunction of different human system during diseased conditions.	Evaluating (L5)
CO6	Devise a moral code of conduct for various scientific practices	Creating (L6)

Catalog Description

Cell is the structural and functional unit of living organism, it is well known throughout the universe, but mystery the molecular mechanism for performing the different kinds of functions of cell organelle (along with their development in both plant and animal system) and their integration into a beneficial outcome for living organism and as well as the outcome of physiological responses is almost unknown. So the course consists of structure function relationship of cell organelles, trafficking of different molecules between different cellular compartments and their secretion, creation of physiological responses and their assessment by several kinds of instrumentation techniques whichcan create a common platform between science of engineering and biological science.

Course Content:

Unit I: Cell biology & Communication: [7 hours lecture]

Structure, function, and synthesis of cellular membranes and organelles; cell growth and cancer; cytoskeleton and extracellular matrix; cell cycle; transport, receptors, and cell signaling; functions of specialized cell types.

Unit II: Genetics & Systems Biology [4 hours lecture]
Genetic switches and oscillators, cell-to-cell interactions, cellular and genetic networks, and evolutionary dynamics.

Unit III: Transport & Flow in Biological Systems [7 hours lecture]
Diffusion, osmosis, facilitated, and active transport; Heat Conduction and Radiation; Fluid Dynamics; Heat and Mass Transfer. Electromechanical and physicochemical interactions in cells and biomaterials.

Unit IV: Human Physiology & Diseases [10 hours lecture]
Anatomical, physiological and pathological features of the cardiovascular, respiratory and renal systems. Identifications of deficiencies and diseases from blood, urine and feces; genetic disorders and gene therapy.

Unit V: Neurophysiology [10 hours lecture]
Neuron structure and function; Regeneration of nerve; flow and transport of signals from one neuron to other; Nervous system; Aging and its effect on brain; Behavioral functions of the brain - emotion, memory, learning and consciousness; Disorders of the nervous system and treatment.

Unit VI: Medical Biotechnology [7 hours lecture]
Understanding the handling and usefulness of electrocardiograms, ultrasound images, X-ray images, magnetic resonance images (MRI), computerized tomography (CT) or computerized axial tomography (CAT) images, glucose sensors, and other biosensors.

Text Books

1. Biology for Engineers by Arthur T. Johnson. CRC Press, 1 edition, 2010.
2. New Biology for Engineers and Computer Scientists by Aydin Tozeren and Stephen W.Byers. Pearson, 1 edition, 2003.

Reference Books

1. Applied Cell and Molecular Biology for Engineers by Gabi Nindl Waite and Lee R. Waite. McGraw-Hill Education, 1 edition, 2007.
2. Samson Wright's Applied Physiology.

Modes of Examination: Assignment/Quiz/Project/Presentation/Written Examination Scheme:

Components	Class Assessment	Mid Term	End Term
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2	-	1	1	1	-	1	-	3	2
CO2	-	-	2	-	-	1	1	-	-	-	1	-	-	-
CO3	2	1	1	2	1	1	-	1	-	1	1	-	2	1
CO4	1	1	2	-	1	2	-	3	2	2	1	2	1	1
CO5	-	1	1	-	1	2	-	2	3	3	1	2	-	1
CO6	-	1	1	-	1	2	-	2	3	3	1	2	-	1
Average	1	1	1	2	1	2	1	2	3	3	1	2	1	1

Model Question Paper

Name: **Enrolment No:**	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: BIT11003– Life Sciences

Program: B.Tech (CE) **Time: 03 Hrs.**
Semester: I **Max. Marks: 50**

Instructions:
Attempt any three questions from **Section A** (each carrying 4 marks); any **Two Questions** from **Section B** (each carrying 10 marks)**. Section C** is Compulsory (carrying 8 marks)**.**

SECTION-A(Attempt **any Three) (3 x 5 = 15)**			
1..	**Discuss** role of different cell organelles in eukaryotic cells	**U**	**CO1**
2.	**Compare** between Prokaryotic and eukaryotic cells.	**U**	**CO1**
3	**What** are theconsequences of physiological disorders?	**R**	**CO4**
4.	If someone is suffering from cancer, **what treatment can be given to treat the cancerous cells?**	**App**	**CO3**
SECTION B (Attempt any **Two Questions) (2 x 10 = 20)**			
5.	**Explain** oncogenes. **How** can they affect the cells**? Is this relates with** Tumor suppressive gene? Discuss in detail.	**App**	**CO1** **CO2**
6.	a) **What** are the factors influencing living cells and negative as well as positive ways? **4** b) **Explain** different type of networks in human body.**6**	**U** **R**	**CO1** **CO4**
7.	a) **Explain**different techniques of medical biotechnology on human body to analyze the malfunction of different human system during diseased conditions.	**App**	**CO5**
SECTION C is Compulsory (1 x 15 = 15)			
8.	a) **What** is cell? **2** b) **How** plant cells are different from animal cells? **Explain** any two cell organelles which are considered to be evolved by bacterial cells. **6**	**U** **An**	**CO1**

GEE12002	Electrical and Electronics Technology Lab	L	T	P	C
Version 1.0		0	0	3	2
Pre-requisites/Exposure	Class 12th Level physics				
Co-requisites					

Course Objectives

1. To study basic electronic components
2. To observe characteristics of electronic devices
3. To study basic electrical circuits

Course Outcomes

On completion of this course, the students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Highlight different components used in electrical and electronics industries for common application.	Remember (L1)
CO2	Understand the working of different electrical and electronics components.	Understand (L2)
CO3	Apply the fundamental concepts of electrical and electronics technology in circuit design.	Applying (L3)
CO4	Analyze the construction and working of electrical and electronics-based measuring instruments	Analyzing (L4)
CO5	Evaluate different types of networks used in circuit design through Network theorems, phasor diagram, power factor, quality factor, etc.	Evaluating (L5)
CO6	Create different types of circuits using various components	Creating (L6)

Catalog Description

Present technology requires necessary knowledge of ELECTRONICS in most fields. Avionics, Autotronics, Agrotronics, Physics, Process Chemistry, Health Services, etc., already employ components or even whole systems based on Electronics. Thus, there is an increasing number of professionals in these and many other fields who need adequate knowledge and training. Taken this into account, ADAMAS has developed the Basic Electronics and Electricity Integrated Laboratory, capable of covering different levels of difficulty. It is based on a series of self-taught modules, each one referring to a specific area of Electronics.

Course Content:

List of experiments (Electrical Part):

1. Verification of Thevenin's theorem and Norton's theorem.
2. Verification of Superposition theorem.
3. Verification of Maximum power transfer theorem.

4. Study of R-L-C series circuit.
5. Study of R-L-C parallel circuit.
6. Performance study of fluorescent, LED, tungsten and carbon lamps.
7. Measurement of power in a three-phase circuit using two-watt meter method.

List of experiments (Electronics Part):

1. Familiarization of bread board and electronics elements such as R, L, C, diode, and BJT etc.
2. Familiarization of Function generator and measuring instruments such as CRO and multimeter.
3. Study the V-I characteristic of PN junction diode and find knee voltage.
4. Study the input and output characteristic of bipolar junction transistor (BJT): Commonemitter (CE) configuration
5. Study the transfer and drain characteristic of junction field-effect transistor (JFET), hence determine the drain resistance, transconductance factor, amplification factor.
6. Study the transfer and drain characteristic of MOSFET, hence determine the drain resistance, transconductance factor, amplification factor.
7. Realization of digital logic circuit using MOSFET (AND, OR, NOT etc.).

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/Written Examination Scheme:

Components	**Internal Assessment**	**ETE**
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	1	1							1		
CO2	3	3	2	1	1							1		
CO3	3	3	2	1	1							1		
CO4	3	3	2	1	1							1		
CO5	3	3	2	1	1							1		

CO6	3	3	2	1	1							1		
Average	3	3	2	1	1							1		

Model Question Paper

Name:

Enrolment No:

Course: GEE12002 - Electrical and Electronics Technology Lab

Program: B. Tech. (CE)Time: 03 Hrs.
Semester: I **Max. Marks: 50**

Follow the instruction given by Lab Instructor during the exam

1	Draw the forward V-I Characteristic curve of p-n junction diode with proper circuit connection and also find out the knee voltage. Explain the mechanism of drift & diffusion of carriers.	**U**
2	Draw and compare the input characteristics of BJT with proper circuit connection (in common emitter configuration) with three different V_{CE} values. What are the differences between BJT & FET? Explain thermal runway	**R**
3	v and compare the output characteristics of BJT with proper circuit connection (in common emitter configuration) with three different I_B values.	**U** **R**

	B) What do you mean by pinch-off voltage? Derive the relationship between α, β and γ.	
4	Draw and compare the drain characteristics of FET with proper circuit connection with three different V_{GS} values (0v, -1v & -2v). Define the following terms of a FET with mathematical expressions: Trans conductance (g_m), **ii)** Drain resistance(r_d).	**U** **R**
5	**i)** Calculate the various resistance values using colour code andcompare with measured values. Measure the forward & reverse resistance of various diodes. Identify the pnp & npn transistors and find out the differentterminals. What are the differences between intrinsic and extrinsic semiconductor? Write approximate value of cut-in voltage for Si and Ge diode.	**luateU**
6	Observe the different signals (Sine, Square & Triangle) using function generator and measure the amplitude and frequency of each signal. Draw and explain the common emitter transistor circuit and output characteristics.	**U**
7	**A)** Verify Thevenin’s, Norton’s, Superposition and Maximum power transfer theorem. What is load matching? To what type of circuit Thevenin’s theorem is applicable? What is the use of Thevenin’s theorem?	**EvaluateU** **R**
8	**A)** Calculate the resistance, inductance and capacitance for series and parallel RLC circuit using ammeter and voltmeter reading. Calculate power factor for RLC series circuit.	**Evaluate**
9	**A)** What is the nature (i.e. positive or negative) of the slop of the voltage vs. Resistance characteristics of Tungsten Filament Lamp? Explain it briefly. What is the function of starter? What is the function of choke?	**R**

MEE12001	Engineering Workshop	L	T	P	C
Version 1.0		0	0	4	2
Pre-requisites/Exposure	12th level Physics, Engineering Mechanics				
Co-requisites	--				

Course Objectives:

1. To develop a skill in dignity of labour, precision, safety at work place, team working and development of right attitude.
2. To acquire skills in basic engineering practice
3. To identify the hand tools and instruments
4. To gain measuring skills
5. To develop general machining skills in the students

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Demonstrate the basic operations in pattern and mould making.	Remember (L1)
CO2	Experiment with different metal fitting works	Understand (L2)
CO3	Show basic forging and welding works	Applying (L3)
CO4	Understand the operations of machine tools	Analyzing (L4)
CO5	Select the appropriate tools required for specific operation	Evaluating (L5)
CO6	Understand the safety measures required to be taken while using the tools	Creating (L6)

Catalog Description:

Engineering Workshop is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment. Students will be expected to be familiar with engineering problems related to practical field.

Course Content

List of Experiments (Any ten)	
1	To make a single piece pattern from the given work piece and dimensions.
2	To make a double piece match pattern from the given dimensions.
3	To make a single piece cylindrical (solid) pattern from the given dimensions.
4	To make a cone from sheet metal as per given dimensions.
5	To make a frustum from sheet metal as per given dimensions.
6	To prepare a sand mould, given the single piece pattern and casting.
7	To prepare a sand mould, given the double piece match pattern and casting with different dimensions and shape
8	To make a square fitting from the given mild steel piece and the dimensions.
9	To make a square fitting from the given mild steel piece and the dimensions.
10	To make a single 'V' butt joint between two metal plates by using ARC welding.
11	To make a square butt joint between metal plates by using gas welding.
12	To perform various types of machining operations (cantering, facing and turning) on a given mild steel rod followed by the given dimensions.

13	To perform various types of machining operations (chamfering, grooving, thread cutting, andknurling) on a given mild steel rod followed by the given dimensions.

Reference Books

1. Workshop Technology by S.K. Garg, 3rd Edition, LP

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	3	3	1	2	-	-	-	-	-	-	2
CO2	3	-	3	-	-	-	-	-	-	-	-	2
CO3	-	3	-	-	2	-	-	-	-	-	-	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-
CO6	-	3	-	-	2	-	-	-	-	-	-	-
Average	3	3	3	1	2	-	-	-	-	-	-	2

Model Question Paper

Course: MEE12001 - Engineering Workshop

Program: B. Tech. (CE) **Time: 03 Hrs.**
Semester: I & II **Max. Marks: 50**

Section A (Answer All the Questions) (5 x 1 = 5)

1.	Discuss advantages and limitations of Gas welding.	**U**	**CO1**
2.	Write the steps involved in making a mould	**U**	**CO2**
3.	Describe the various types of pattern with neat sketch.	**R**	**CO4**
4.	Describe the specification of lathe machine.	**R**	**CO3**
5.	Discuss advantages and limitations of Gas welding.	**U**	**CO6**

SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**

4.	Describe the function of main parts of lathe machine.List some of the operation that can be done on the lathe machine and perform any one operation in lathe machine	**U**	**CO3**
5.	To make a single piece cylindrical (solid) pattern from the given dimensions.	**App**	**CO5**
6.	To make a square fitting from the given mild steel piece and the dimensions.	**App**	**CO5**
7.	Short note of Turning, Facing, Runner.	**U**	**CO1**
SECTION (Answer All) (2 x 15= 30)			
8.	To make a single 'V' butt joint between two metal plates by using ARC welding.	**U**	**CO6**
9.	Describe the various types of allowance in moulding operation.	**U**	**CO2**

Year- I

Semester-II

MTH11502	Engineering Mathematics II	L	T	P	C
Version 1.0		3	1	0	4
Pre-requisites/Exposure	12^{th} level Mathematics & Engineering Mathematics I				
Co-requisites	--				

Course Objectives

1. To help the student to understand the basic concepts of matrix theory with its uses inengineering science.
2. To give emphasis about concepts of Eigen value and Eigen vector, vector space and linear transformation and enable students to apply these topics for analysing the engineering problems.
3. To help the student to understand the use of vector calculus in engineering.
4. To give the students a perspective to learn about functions of complex variables, pole, and residues and their importance in advanced study of engineering science.
5. To enable students to acquire the knowledge of different transformation techniques and their applications in engineering science.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Highlight the knowledge of matrix theory for finding solution of a related engineering problem	Remember (L1)
CO2	Express the Eigen value(s) and Eigen vector(s) of a matrix	Understand (L2)
CO3	Apply the concept of vector space and linear transformation between the vector spaces	Applying (L3)
CO4	Analyze the knowledge of vector calculus and apply it for solving related problems	Analyzing (L4)
CO5	Evaluate the concept of complex variable and its application	Evaluating (L5)
CO6	Compose transformation technique for solving differential equation or difference equation	Creating (L6)

Course Description

For any engineering program, Mathematics is the backbone. With a sound knowledge in fundamental mathematics, an engineering student can become a very skilful engineer. In this course, the focus will be on learning Mathematics in depth, which will motivate students to grow their thinking ability in different fields of engineering. Students will be able to applythis knowledge to tackle almost all kinds of problems in engineering and science successfully.Class participation is a fundamental aspect of this course. Students will be encouraged to actively takepart in all group activities (Problem solving, presentation etc.).

Course Content

Unit I: Sequences and Series [15H]

Sequences and their limits, convergence of series, Convergence Test (comparison test, Ratio test, Root test), Absolute and conditional convergence, Alternating series, Power series

Periodic functions, Definition of Fourier series, Euler's formulae, Dirichlet conditions, Change of interval, Even and odd functions, half range Fourier Sine & Cosine series

Unit II: Complex Variables [15H]

Limit, continuity, differentiability and analyticity of complex functions, Cauchy-Riemann equations, derivatives of analytic functions, line integrals in complex plane, Cauchy's integral theorem, independence of path, existence of indefinite integral, Cauchy's integral formula, Taylor's series, Laurent's series, zeros and singularities, Residue theorem

Unit III: Ordinary Differential Equations [20H]

Formation of ODE, order and degree, First order ODE, Method of separation of variables, Exact and non-exact equations, linear and Bernoulli's form, second order differential equations with constant coefficients, Complementary functions and Particular Integral, D-operator, method of variation of parameters, general linear differential equations with constant coefficients, Cauchy-Euler's equations, Simultaneous differential equations

Unit IV: Vector Calculus [10H]

Ordinary Integrals of Vectors, Line, surface and volume integrals of Vector fields, Gauss' divergence theorem, Green's and Stokes Theorems and their applications

References:

1. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons
2. B.V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill
3. David C. Lay, Linear algebra and its application, (Latest edition), Pearson publication, New Delhi
4. B. S. Grewal, Higher Engineering Mathematics, Khanna Publications
5. C B Gupta, S R Singh, and Mukesh Kumar, Engineering Mathematics, Mc Graw Hill Publication
6. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, Narosa Publishing House

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	MTE	Internal Assessment	ETE
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO3	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO4	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	2	-	-	-	-	-	-	-	-	-
CO6	3	2	-	-	2	-	-	-	-	-	-	-	-	-
Average	3	2	-	-	2	-	-	-	-	-	-	-	-	-

Model Question Paper

Name: **Enrolment No:**	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: MTH11502– Engineering Mathematics-II

Program: B.Tech. (CE) **Time: 03 Hrs.**
Semester: II **Max. Marks: 50**

Instructions:
Attempt All Questions from **Section A** (Each Carrying 1Marks); any **Three Questions** from **Section B** (Each Carrying 5Marks)**.** Any **Two Questions from Section C** (Each Carrying 10 Marks)**.**

	SECTION-A (Answer All Questions) (5 x 1 = 5)		
1.a	Calculate the inverse z-transform of the function $F(z) = \frac{1}{z-2}$.	**Ap**	**CO7**
b	Find the polar form of $-1+i$.	**R**	**CO5**
c	What is the Laplace transform of $f(t) = t^2 e^{-at}$?	**R**	**CO7**
d	Write down the Fourier series representation for an odd function $f(x)$in the interval $-\pi \leq x \leq \pi$.	**U**	**CO6**
e	If $A = \begin{pmatrix} 0 & 2 \\ 0 & 4 \end{pmatrix}$, Write A as a sum of a symmetric and skew symmetric matrices.	**U**	**CO1**
	SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
2.	Verify Cayley-Hamilton theorem for $A = \begin{pmatrix} 0 & 0 & 1 \\ 3 & 1 & 0 \\ -2 & 1 & 4 \end{pmatrix}$.	**U, Ap**	**CO1** **CO2**
3.	Determine the Fourier sine integral representation of $f(x) = \begin{cases} 1 & for\ 0 \leq x \leq \pi \\ 0 & for\ \ x > \pi \end{cases}$ and hence evaluate $\int_0^\infty \frac{1-\cos \pi\lambda}{\lambda} \sin \lambda x \, d\lambda$.	**U**	**CO6**
4.	Define Harmonic function. Prove that $H(x,y) = e^{-y} Sin\, x$ is a harmonic function.	**R**	**CO5**
5.	Find the inverse Z-transform of $F(z) = \frac{(3z^2 - z)}{(z-2)(z-3)(z-4)}$, using partial fraction method.	**R**	**CO7**
	SECTION (Answer Any Two Questions) (2 x 15 = 30)		
6.	(i) Determine the analytic function $f(z) = u + iv$, if $u = e^x(x\, Cosy - y \sin y)$. (ii) Evaluate the line integral $\int_i^{2-i} (3xy + iy^2) dz$along the line $x + y = 1$. **7.5+7.5**	**U**	**CO4** **CO5**
7.	(i) Evaluate the integration using Residue theorem $\int_c \frac{dz}{(z-1)(z-2)(z-3)}$ where, c: $\lvert z \rvert = \frac{5}{2}$ (ii) Compute the Laplace transform of the following function $f(t) = \frac{e^{-at} - cosbt}{t}$ **7.5+7.5**	**U, Ap**	**CO5** **CO6**
	(i) Let V be the set of all ordered pairs of real numbers with vector addition defined as $(x,y) + (x',y') = (x + x' + 1, y + y' + 1)$ Show that the first five axioms for vector addition are satisfied. Clearly mention the zero vector and additive inverse. (ii) Summarize the conditions for which the system	**U**	**CO3**

	$$x+y+z=1$$ $$x+2y-z=k$$ $$5x+7y+az=k^2$$ Admits (i) No solution (ii) Only one solution (iii) Infinitely many solution. **7.5+7.5**		

DGS11002	**Design Thinking & Prototyping**	**L**	**T**	**P**	**C**
Version 1.0	**Contact Hours - 45**	1	0	2	3
Pre-requisites/Exposure	Knowledge of analyzing society problems and product usage problems and a zeal to improve the current situation, in addition to knowing to using laptop/computers, internet, social media interaction, file sharing and uploading, email and communication etiquettes.				
Co-requisites	--				

Course Objectives

1. To enable students to acquire knowledge, imagination and be more assertive on opinions on problems in society.
2. To enable students to learn basics of research, data collection, analysis, brainstorming to find solutions to issues.
3. To make them understand Design Thinking methodologies to problems in field of study and other areas as well.
4. To help students to understand future Engineering positions with scope of understanding dynamics of working between inter departments of a typical OEM.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Understand What Is Design Thinking?	Remember (L1)
CO2	Understand the Design Thinking Model and various stages of the same.	Understand (L2)
CO3	Understanding stages of Discovery, Defining a real time problem through primary and secondary research and discovery canvas.	Applying (L3)
CO4	Attempting to find solutions through concept development and simple prototyping.	Analyzing (L4)
CO5	Testing the developed prototype and iterating to perfect out the solutions for chosen problem.	Evaluating (L5)
CO6	Apply Design Thinking for solving real-world challenges	Creating (L6)

Catalog Description

Design thinking course is a completely online course offered to the first year UG programs across all streams. This course is designed to help understand the steps followed in the process of designing a solution to a problem.

Course Content

Unit I: 2 Lecture Hours
WHAT IS DESIGN THINKING: Designers seek to transform problems into opportunities. Through collaboration, teamwork, and creativity, they investigate user needs and desires on the way to developing human-centered products and/or services. This approach is at the very heart of design thinking.

Unit II: 2 Lecture Hours
THE DESIGN THINKING MODEL: A tool that helps guide you along a design thinking path. The model does this by providing a series of activities that that will help you effectively design a product, service or solution to a user's need. The model presents the approach as a process, allowing us to look at each step – or phase – along the journey to the development of a final design.

Unit III: 4 Lecture Hours
PHASE 1: DISCOVER: Begin the design thinking process with the Discover phase, where you will identify the specific problem your design is intended to solve, as well as important usability aspects from those who will use your design. Discovery can be performed through a variety of different research methods which you will learn in this module.

Unit IV: 4 Lecture Hours
PHASE 2: DEFINE: In the Define phase, you come to understand the problem. We often refer to this as framing the problem. You can do this by using a variety of tools, including storytelling, storyboarding, customer journey maps, personas, scenarios, and more.

Unit V: 4 Lecture Hours
PHASE 3: DEVELOP: Turn your attention to solving the problem. In this phase you brainstorm custom creative solutions to the problems previously identified and framed. To do this, you conceptualize in any way that helps, putting ideas on paper, on a computer, or anywhere whereby they can be considered and discussed.

Unit VI: 4 Lecture Hours
PHASE 4: DELIVER: This phase is all about testing and building concepts. Here you take all of the ideas that have been discussed to this point and bring them a little closer to reality by building a concept; something that makes it easier for a user to experience a design. This concept is referred to as a prototype.

Unit VII: 4 Lecture Hours
PHASE 5: ITERATE: You will test the prototype of your design solution, collecting and acting on feedback received. These actions may mean minor or major revisions to your design, and are repeated as often as necessary until a solution is reached. Tools such as focus groups and questionnaires are used to help you collect feedback that can help with your final design.

Unit VIII: 2 Lecture Hours
BEYOND DESIGN THINKING: The Design Thinking Model is a tool that helps guide you along a design thinking path. The model does this by providing a series of activities that that will help you effectively design a product, service or solution to a user's need. The model presents the approach as a process, allowing us to look at each step – or phase – along the journey to the development of a final design.

Reference Books

1. Brown, Tim. "What We Can Learn from Barn Raisers." Design Thinking: Thoughts by Tim Brown. Design Thinking, 16 January 2015. Web. 9 July 2015.
2. Knapp, Jake. "The 8 Steps to Creating a Great Storyboard." Co.Design. Fast Company & Inc., 21 Dec. 2013. Web. 9 July 2015.
3. van der Lelie, Corrie. "The Value of Storyboards in the Product Design Process." Journal of Personal and Ubiquitous Computing 10.203 (2006): 159–162. Web. 9 July 2015. [PDF].
4. Millenson, Alisson. "Design Research 101: Prototyping Your Service with a Storyboard." Peer Insight. Peer Insight, 31 May 2013. Web. 9 July 2015.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term Examination
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	2	2	2	1	1	-	1	1	1	3	-	-
CO2	-	-	2	2	2	2	1	-	1	1	1	3	-	-
CO3	1	1	3	2	2	1	3	1	2	2	3	3	-	-
CO4	-	-	3	3	3	3	3	1	2	2	2	3	-	-
CO5	1	-	2	1	1	2	1	1	1	1	1	2	-	-
CO6	-	-	-	2	1	3	-	2	2	-	2	1	-	-
Average	-	-	2	2	2	1	1	-	1	1	1	3	-	-

Model Question Paper

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech Semester: I Stream: CSE
PAPER TITLE: Design Thinking
PAPER CODE: DGS11001
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 12 Total No of Pages: 01

Instruction for the Candidate:
1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

	Section A (Answer All the Questions) (5 x 1 = 5)		
1.	List the steps involved in Design Thinking.	**U**	**CO1**
2.	Enumerate the basic elements of Design Thinking.	**U**	**CO2**
3.	Define Napkin Pitch.	**R**	**CO3**
4.	What is Assumption testing?	**R**	**CO4**
5.	Give the principles of Ethnography.	**U**	**CO2**
	SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
6.	Briefly explain the importance of ethnography in design thinking?	**U**	**CO2**
7.	What are the successive steps for concept development?	**Ap**	**CO3**
8.	Elucidate the different types of concept development strategies.	**Ap**	**CO3**
9.	Explain with Example: surface keys for Assumption Testing.	**Evaluate**	**CO4**
	SECTION (Answer Any Two Questions) (2 x 10 = 20)		
10.	Explain in detail about importance of prototyping in Design Thinking.	**U**	**CO4**
11.	Write an importance of involving stakeholders in developing new concepts and Plan for conducting experiments within short time and inexpensively.	**Create**	**CO3**
12.	Distinguish between design thinking and visualization of a problem.	**An**	**CO1**

PHY13201	Applied Science	L	T	P	C
Version 1.0	Contact Hours - 45	2	0	2	3
Pre-requisites/Exposure	12^{th} level Physics, Chemistry, and Mathematics				
Co-requisites	--				

Course Objectives

1. Introduce students to fundamental concepts in Vector Calculus, Mechanics, and Electromagnetic Theory.
2. Provide insights into Modern Physics, including atomic structure, quantum mechanics, and nuclear physics.
3. Develop a strong understanding of Thermodynamics and its applications in physical and chemical systems.
4. Explore the kinetics of chemical reactions and theories of catalysis.
5. Enhance experimental skills through hands-on Physics and Chemistry laboratory experiments.
6. Bridge theoretical understanding with real-world applications in applied science.

Course Outcomes

At the end of the course, the student will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Recall** the fundamental principles of vector calculus, mechanics, and basic laws of electromagnetism.	Remember (L1)
CO2	**Explain** the concepts of modern physics, including quantum mechanics, atomic structure, and nuclear phenomena.	Understand (L2)
CO3	**Apply** thermodynamic principles to solve problems involving heat, work, and energy in physical and chemical systems.	Applying (L3)
CO4	**Analyze** the kinetics of chemical reactions and determine reaction mechanisms using experimental data.	Analyzing (L4)
CO5	**Evaluate** experimental observations to determine physical parameters such as viscosity, dielectric constant, and Planck's constant.	Evaluating (L5)
CO6	**Create** experimental reports with accurate data analysis and draw conclusions by correlating theoretical concepts with practical outcomes.	Creating (L6)

Catalog Description

The course introduces essential concepts in Applied Science, combining theoretical physics and chemistry fundamentals with hands-on laboratory experiments.

- Physics Modules cover Vector Calculus, Mechanics, Electromagnetic Theory, Modern Physics, and Thermodynamics, enabling students to understand physical laws and their practical implications.

- Chemistry Modules emphasize Reaction Kinetics and analytical methods for determining physical and chemical properties.
- Laboratory experiments in both domains complement theory, enhancing measurement, observation, and analytical skills.

Course Content

Module 1: Vector Calculus and Mechanics [Lecture Hours: 6]

Scalar and Vector, Vector Operations, Gradient, Divergence and Curl, Solenoidal and Rotational Vector, Conservative and non-conservative forces. Conservation laws of energy & momentum. Central and non-central forces, Gravitation, Kepler's Laws, Angular Velocity and Torque, Moment of Inertia, SHM, Damped, Undamped and forced Oscillations

Module 2: Electromagnetic Theory [Lecture Hours: 5]

Gauss's Law in Electrostatics, Dielectrics, Continuity equation, Biot-Savart Law and its applications, Ampere's Law, Faraday'sLaw of Induction, Maxwell's equations (differential and integral forms), Wave Equation for Electromagnetic Waves, Poynting vector, Poynting Theorem (Statement only).

Module 3: Elements of Modern Physics [Lecture Hours: 4]

Planck's Hypothesis, Photoelectric Effect, Wave Particle Duality, Schrodinger Equation (Basic Concept), Bohr Model of Atom, Quantum Number, Electron Configuration, Structure of Nucleus, Radioactivity, Nuclear Reactions and Energy, Crystal Structure, Band Theory of Solids, Semiconductors: Intrinsic and Extrinsic

Module 4: Thermodynamics [Lecture Hours: 9]

Importance and scope, definition of system and surroundings: type of systems (isolated, closed and open); extensive and intensive properties; steady state versus equilibrium state; concept of thermal equilibrium and the zeroth law of thermodynamics; thermodynamic coordinates, state of a system, equation of state, state functions and path functions; concept of heat and work (IUPAC convention), process: isothermal and adiabatic process; first law of thermodynamics, internal energy (U) as a state function; enthalpy as a state function; heat changes at constant volume and constant pressure; relation between Cp and Cv using ideal gas; Thermodynamics of Chemical Processes, Thermochemistry, Concept of entropy, 2nd law of thermodynamics, Equilibrium conditions for closed systems.

Module 5: Reaction Kinetics [Lecture Hours: 6]

Rate laws, 1stOrder reaction & 2ndorder reaction, Arrhenius equation, Mechanism and Theories of reaction rates, kinetic and thermodynamic control of reaction; idea of rate determining step; steady-state approximation; Theories of Catalysis, Characteristics and types of Catalyst.

Experiments: Physics (Any Five)

1. Determination of Young's Modulus of a Beam by travelling microscope by FLEXURE method.

2. Carry Foster's Method to Determine Resistance of a Given Coil.
3. Determination of the Coefficient of viscosity of water by Poiseulle's Capillary Flow method.
4. To determine the wavelength of sodium light by forming Newton's Ring.
5. Determination of Rigidity Modulus by dynamical method.
6. Determine the Plank's constant using photocell.
7. To verify Stefan's law by electrical method.
8. To study the temperature dependence of reverse saturation current in a junction diode and hence to determine the Band gap.
9. Determination of specific charge(e/m) of electron by J.J. Thomson's method.
10. Determination of the Rydberg constant by studying hydrogen or helium spectrum.
11. Determination of dielectric constant of a given dielectric material.
12. Determination of Hall coefficient of Semiconductor.
13. Study current – voltage characteristic load response of photovoltaic solar cells.

Experiments: Chemistry (Any Five)

1. Determination of total hardness of water by complexometric titration method.
2. Determination of carbonate and bicarbonate in water.
3. Estimation of iron by permanganometry.
4. Estimation of ferrous ion in Mohr salt.
5. Dissolved oxygen by Winkler's method. Conductometric titration (acid-base)

Textbooks and References

1. "Fundamentals of Physics" by Halliday, Resnick, and Walker.
2. "University Physics" by Sears and Zemansky.
3. "Introduction to Electrodynamics" by David J. Griffiths.
4. "Modern Physics" by Kenneth S. Krane.
5. "Concept of Modern Physics"by Arthur Beiser, S Rai Choudhury, Shobhit Mahajan.
6. "Engineering Chemistry" (Cambridge University Press-Ist Edition) – Shikha Agarwal.
7. "Engineering Chemistry" (Pearson Ed.)-K. Sesha Maheswaramma and MridulaChugh.
8. "Advanced Practical Chemistry", The world press private ltd. Subhas C Das.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term Examination
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2

Course Outcomes														
CO1	3	1	-	-	-	-	-	-	-	-	-	1	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	1	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	1	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	2	-	-	-	-	-	-	-	-	-	1	-	-
CO6	3	2	-	-	-	-	-	-	-	-	-	1	-	-
Average	3	2	-	-	-	-	-	-	-	-	-	1	-	-

Model Question Paper

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: JULY 2020

Name of the Program: B. Tech   Semester: I/II   Stream: CSE
PAPER TITLE: Applied Science   PAPER CODE: PHY11201
Maximum Marks: 40   Time duration: 3 hours
Total No of questions: 14   Total No of Pages: 02

Instruction for the Candidate:

1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.
2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Section A (Answer All the Questions) (5 x 1 = 5)			
1.	**Define** polarization of light.	**R**	**CO2**
2.	**State** Faraday's law of Electromagnetic induction.	**R**	**CO3**

3.	**Define** Gauss's divergence theorem.	**R**	**CO1**
4.	**Define** internal energy of a thermodynamics system	**R**	**CO4**
5.	**State** Arrhenius relation between rate constant and temperature	**R**	**CO5**
	SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
6.	A cubical block of side L and density d is floating in a water of density ρ(ρ>d). The block is slightly depressed and released. **Show that** it will execute simple harmonic motion and hence **determine** the frequency of oscillation.	**Ap**	**CO1**
7.	**Show** that intensity distribution for diffraction in a single slit is given by, $$I = I_0 \frac{(\sin^2 \alpha)}{\alpha^2}$$ Where $= \frac{\pi a}{\lambda} \sin\theta$, a is the width of the slit, λ is the wavelength of light and θ is the angle of diffraction.	**U**	**CO2**
8.	**Explain** Maxwell's modification on Ampere's law.	**Evaluate**	**CO3**
9.	Show that $C_P - C_V = [p + \left(\frac{\delta U}{\delta V}\right)_T] \left(\frac{\delta V}{\delta T}\right)_P$. Hence find the value for an ideal gas. Comment on the value of (C_P-C_V) for a solid or a liquid.	**Ap**	**CO4**
10	(a) When order and molecularity of reaction can be same? (b) Why does order can be fractional but molecularity cannot? (c) Write the units of rate constants for zero and second order reaction.	**U**	**CO5**
	SECTION (Answer Any Two Questions) (2 x 10 = 20)		
11.	(a) **Find** out the condition for maximum and minimum intensity in Young's Double slit experiment for Interference of Light. **Show** that Energy remains constant in this phenomena. [3+1] (b) In an interference experiment,'d' is the distance between the two coherent sources of light with wavelength λ and D is the distance between source to screen. **Show** that the separation between the two consecutive dark bands is given by β=λD/d. [4] (c) In Newton's Rings experiment the diameter of the 5th dark ring is 0.336 cm. and the diameter of the 15th dark ring is 0.590 cm. **Find** the radius of the plano-convex lens if the wavelength of the light used is 5890 A. [2]	**R** **U** **U** **R**	**CO2**
12.	(a) **Derive** equation of continuity for current. **Show** that for steady current it reduces to $\nabla.\vec{J}$=0. [4] (b) **Compare** the electrostatic force and Gravitational force between a proton and electron in a hydrogen atom. Given $e = 1.6 \times 10^{-19} c, m_e = 9.1 \times 10^{-31} kg, m_p = 1.7 \times 10^{-27} kg\ and\ G = 6.67 \times 10^{-11} Nm^2 kg^{-2}$. [3] (c) Five equal charges of 40 nC each are placed at five vertices of a regular hexagon of 6 cm side. The sixth vertex is free. **Determine** the electric field at the centre of the hexagon due to the distribution. [3]	**Create, U** **U** **Evaluating**	**CO3**
13.	(a) dU=C_V dT Is this valid for all systems? State the conditions under which the equation is valid. [2]	**U**	**CO-4**

	(b) Show that PV^{γ}= constant for an adiabatic process of a gas. State all the assumptions. [4] (c) I mole of an ideal gas is allowed to expand freely under adiabatic condition to double of its volume. The initial temperature of the gas is 300 K and the initial pressure is 1 atm. Find the final temperature, final pressure of the gas. Also calculate $\Delta U+\Delta H$ for the process. [4]	**U** **Evaluating**	
14.	(a) What effect does temperature has on the rate of chemical reactions? Explain it on the basis of Arrhenius equation. [4] (b) Initial rate of a first order reaction increases three fold when temperature changes from 400 K to 420 K. If the half-life period of the reaction at 400 K is 10 min, calculate the time required for 20 % conversion of the reactant at 420 K and the activation energy. [4] (c) What is the significance of activation energy? [2]	**U** **Evaluating** **U**	**CO-5**

CSE11001	**Introduction to Programming**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	10+2 Level Mathematics, Knowledge of Basics of Computer				
Co-requisites	Knowledge of Logical Reasoning and Analysis				

Course Objectives

1. To understand the nature of programming as human activity.
2. To practice the programming construct to solve multi-dimensional problems.
3. To relate and implement mathematical concepts through programming in order to solve computational problems.
4. To enable students to acquire structure and written expression required for their profession.
5. To understand the principles of data storage and manipulation.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Remember basics concepts of programming structure and implement the basics concepts of Programming.	Remember (L1)
CO2	Understand various problems using programming language and select the best solution.	Understand (L2)
CO3	Apply modularized solution and design such programs to appraise the solution	Applying (L3)
CO4	Analyze the basic usage of memory and construct such memory in terms of array in a program.	Analyzing (L4)
CO5	Evaluate different data structures for various collection of data.	Evaluating (L5)
CO6	Create a 'C program' to solve a real life problem	Creating (L6)

Catalog Description

Programming skills are mandatory for designing or solving problems through digital device. It is the language through which computational/digital devices are communicated rather interfaced. To develop any software programming language is a must. In present era almost, all aspect of life is somehow largely related to virtualization and digital data/information. Devices from smartphones to other handheld devices, drones, cameras, medical instruments etc. all needs programming at some part. In engineering it has become quintessential for the students/research scholars to learn programming. In this course, students will learn how to solve problems in various domains through a programming language. This course enables students with the basic skills of C Programming Language. Five Different related modules comprise this course. First Unit familiarizes students with basics of computers, algorithmic method to solve problem, introduction to generic programming construct. Basics of C Programming is upto iterative structure is depicted in Unit II. In Unit III students will learn about modularization using functions and one advance concept of C Programming, Pointers. Unit IV will cover one of the most important concepts in C Programming, Array and Strings. Unit V will accomplish this course with the advance concept like Structure, Union and File Handling. After this course students will grow their analytical ability to solve problem and logical skill. Also, this course effectively creates the ability to grasp any other Programming Language in easier manner.

Course Content

Unit I: 4 lecture hours

Basic Concepts of Programming: Introduction to components of a Computer System (disks, memory, processor, where a program is stored and executed, operating systems, compilers, etc.), Idea of Algorithm: steps to solve logical and numerical problems, Representation of Algorithms: Flowchart/Pseudo code with examples, From Algorithms to Programs; source code, variables and memory locations, Syntax and Logical Errors in compilation, Object and Executable code

Unit II: 10 lecture hours

Basics of C Programming : Characters used in C, Identifiers, Keywords, Data type & sizes, Constants &Variables, Various Operators used such as Arithmetic Operators, Relational & Logical Operators, Increment & Decrement Operators, Assignment Operators, Conditional or Ternary Operators, Bitwise Operators & Expressions; Standard Input & Output, formatted input scanf(), formatted output printf( ); Flow of Control, if-else, switch-case, Loop Control Statements, for loop, while loop, do-while loop, nested loop, break, continue, goto, label and exit() function

Unit III: 10 lecture hours

Functions and Pointers: Definition of Function, Declaration or Prototype of Function, Various types of Functions, Call by Value, Call by Reference, Recursion, Tail Recursion, Definition of Pointer, Declaration of Pointer, Operators used in Pointer, Pointer Arithmetic, Functions with Pointer

Unit IV 17 lecture hours

Arrays and String: Definition, Single and Multidimensional Arrays, Representation of Arrays - Row Major Order, and Column Major Order, Application of arrays – searching and sorting, Sparse Matrices and their representations. Definition of a String, Declaration of a String, Initialization of a String, Various String Handling Functions with example

Structures and Unions: Definition of a Structure, Declaration of a Structure & Structure Variable, Initialization of a Structure, Operators used in Structure, Structure within Structures, Union, Difference between a Structure and a Union

Files: Types of File, File Processing, Handling Characters, Handling Integers, Random File Accessing, Errors During File Processing

Unit V **4 lecture hours**

Overview of Stacks and Queues: Introduction to Stack, Primitive operations on Stack, Real-life applications of Stack, Introduction to Queues, Primitive operations on Queues, Real-life applications of Queues.

Text Books

1. Balagurusamy, E., n.d. Programming In ANSI C. 5th ed. Bangalore: mcgraw-hill.
2. Gotfreid (196) *Schaum's Outline of Programming with C*, 2 edn., USA: McGraw-Hill
3. Brian W. Kernighan, Dennis Ritchie (1988) *C Programming Language*, 2 edn., : Prentice Hall.

Reference Books

1. Al Kelley, Ira Pohl (1988) *A Book on C*, 4 edn,: Addision Wesley Longman

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Scheme:

Components	Internal Assessment	MTE	ETE
Weightage (%)	**30**	**20**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2		1						1			
CO2	3	2	2		1						1			
CO3	3	2	2		1						1			
CO4	3	2	2		1						1			
CO5	3	2	2		1						1			

CO6	3	2	2		1						1			
Average	3	2	2		1						1			

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION**		
Name of the Program:	B.Tech (CSE,ME,EE,ECE,CE)	**Semester:**	II
Paper Title:	Introduction to Programming	**Paper Code:**	CSE11001
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	03
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	What is the return type of strcmp ( ) function?	**R**	**CO4**
2	What is the purpose of comma operator in C?	**R**	**CO1**
3	How does the type float differ from double in C language?	**R**	**CO1**
4	How pointer will reduce the program execution time.	**R**	**CO3**

5	Find out the errors, if any, in the following programs:
	main( )
	{
	int array[6] = { 1, 2, 3, 4, 5, 6 } ;
	int i ;
	for (i = 0 ; i <= 25 ; i++)
	printf ("\n%d", array[i]) ;
	}
		R	**CO4**

	Group B **Answer Allthe Questions (5 x 2 = 10)**		
6 a)	i) What is an array variable and how it is different from ordinary variable? [1] ii) How does a structure differ from a union? [1]	**R**	**CO4**

(OR)			
6 b)	i) Explain implicit and explicit type conversions with examples. ii) Develop a C program to accept an integer number and print the digits using words (for example 356 is printed as Three Five Six) [1+1]	**E, Creating**	**CO2**
7 a)	Design the flowchart which depicts the admission procedure in B.Tech.	**Creating**	**CO1**
(OR)			
7 b)	Create the algorithm for the admission procedure in B.Tech.	**Creating**	**CO1**
8 a)	Which of the following expressions are valid? Give reasons. (i) +a +b (ii) a++ - - b (iii) a % 10 / - b (iv) a++ + ++b	**R**	**CO1**
(OR)			
8 b)	Utilize continue keyword writes the program in C to find the even numbers.	**Applying**	**CO2**
9 a)	What is the meaning of 3<j && j<5? Is it equivalent to (3<j)&& (j<5)? Explain	**R**	**CO1**
(OR)			
9 b)	Distinguish between entry- control and exit-control loops with an example.	**Analyzing**	**CO2**
10 a)	Develop a 'C' program to remove duplicate elements from a given array.	**Applying**	**CO4**
(OR)			
10 b)	What are the values of control variables and number of the iterations in the following for loops? (i) for(x=1.0 ; x>=0.5; x - = 0.1) (ii) for(ch= 'A' ; ch != 'F' ; ++ch)	**R**	**CO2**
Group C **Answer Allthe Questions (7 x 5 = 35)**			
11 a)	i) What is the importance of # include? Explain. ii) Give various modes of operating a file. [3+2]	**R, U**	**CO1,CO5**
(OR)			
11 b)	i) What are the two types of operators used for accessing members of a structure? ii) Develop a C program to print file contents on the screen. [3+2]	**R, Applying**	**CO4,CO5**
12 a)	Develop a C program to copy the contents of one array into another in the reverse order using function.	**Applying**	**CO4**
(OR)			
12 b)	How to compile and execute a C program explain using a block diagram?	**R**	**CO1**
13 a)	A library charges a fine for every book returned late. For first 5 days the fine is 50 paise, for 6-10 days fine is one rupee and above 10 days fine is 5 rupees. If you return the book after 30 days your membership will be cancelled. Create a C program to accept the number of days the member is late to return the book and display the fine or the appropriate message.	**Creating**	**CO2**
(OR)			
13 b)	What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart.	**R**	**CO1**
14 a)	Design a menu driven program which has following options: 1. Factorial of a number. 2. Prime or not 3. Odd or even 4. Exit	**Creating**	**CO2**
(OR)			

14 b)	What is fall through problem in switch case and how to solve it show with an example.	**R**	**CO2**
15 a)	A cashier has currency notes of denominations 10, 50 and 100. If the amount to be withdrawn is input through the keyboard in hundreds, **Determine** the total number of currency notes of each denomination the cashier will have to give to the withdrawer.	**Evaluating**	**CO2**
(OR)			
15 b)	What is the need of the iterations and selection? Explain each of the statements with examples.	**R**	**CO2**
16 a)	Create a structure to specify data on students given below: Roll number, Name, Department, Course, Year of joining. Assume that there are not more than 450 students in the collage. (a) Write a function to print names of all students who joined in a particular year. (b) Write a function to print the data of a student whose roll number is given.	**Creating**	**CO5**
(OR)			
16 b)	What is the main reason for using structure? What special keyword is used in defining a structure? Give syntax for structure	**R**	**CO5**
17 a)	What is algorithm? Explain the steps involved in the development of C algorithms.	**R**	**CO1**
(OR)			
17 b)	Distinguish between local and global variable. How to return multiple values in function using global variable show with an example.	**Analyzing**	**CO1**

ENG11053	English Communication	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	12th level English				
Co-requisites	--				

Course Objectives

1. To know the importance and techniques of communication skills in order to improve professionalskills
2. To enhance the knowledge of the students on vocabulary, syntax, and grammatical skills
3. To improve writing skills by applying writing techniques, tools in practice sessions
4. To achieve an overall enhancement in terms of reading, listening and speaking

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	To have a basic understanding of communication processes and to know the practical implications and its challenges at the workplace	Remember (L1)
CO2	To know the practical uses of English grammar and to use grammar correctly and unambiguously	Understand (L2)
CO3	To be familiar with different formats of business communication like reports, letters, and other technical writings	Applying (L3)
CO4	To acquire competence in speaking, reading, listening, and writing in English.	Analyzing (L4)
CO5	To be familiar with English pronunciation and use neutral accent successfully	Evaluating (L5)
CO6	To be able to comprehend different other accents of spoken English	Creating (L6)

Catalog Description

Effective communication is one of the basic requirements of a successful career. Both verbal and nonverbal communication is important to exchange ideas among the employees within the organisation and outside the organisation as well. In this course, the focus will be on improving LSRW skills, i.e. listening, speaking, reading and writing. Students will learn how to communicate effectively through prescribed syllabus. Classroom activities will be designed to encourage students toplay an active role in the construction of their own knowledge and in the design of their own learning strategies. We will combine traditional lectures with other active teaching methodologies, such as group discussions, role play, small skit enactments, analysis of video scenes and debates. Class participation is a fundamental aspect of this course. Students will be encouraged to actively take partin all group activities and to give an oral group presentation. Students will be expected to interact withmedia resources, such as, web sites, videos, DVDs, and newspapers etc.

Course Content

Module I: **6 lecture hours**

Communication: Basics of Communication, Means of Communication, Barriers of Communication

Module II: **6 lecture hours**

Grammar and Syntax: Tense: types and uses, Idioms, One Word Substitutes, Discussion on the use of Articles and related exercises, Discussion on the use of Prepositions and related exercises, Exercises on Sentence –Making (Syntax), Practice exercises on Voice change, Class Exercises on Synonyms and Antonyms.

Module III: **6 lecture hours**

Reading and Listening Skills: Introduction to listening skills: purposes and practice, Discussion on types of listening: difference between listening and hearing, Active listening: introduction listening exercises, Elementary level listening exercise, Intermediate level listening exercise, Advance level listening exercise, Introduction to Reading Skills, Strategies of reading, Skimming, Scanning and Summarizing, Comprehension exercises.

Module IV: **6 lecture hours**

Speaking Skills Level: Introduction to Speaking Skills: Mother tongue influence, Discussion on various kinds of narrative styles and techniques: Welcome speech, Vote of Thanks, Farewell Speech, Debate and Elocution, Class Exercises on Descriptive narration, Practical Exercises on Narration styles, Presentation of small skits, Practicing Extempore in the class, Mock practices of Group discussion, Practicing speaking in pairs, Mock practice of job interviews.

Module V: **6 lecture Hours**

Writing Skills Level: Business letters: definition, types and format, Practice exercises, Business reports: definition, types and format, Practice exercises, CV and Application letters: types and formats, Practice exercises, Compositions: Essays, precis paragraph writing

Text Books:

1. Kaul Asha. Effective Business Communication. PHI Learning Pvt Ltd. 2014.
2. Wren and Martin. High School Grammar And Composition. S. Chand, 1995.
3. Gupta, A. English Reading Comprehension. Ramesh Publishing House, 2009.

Reference Book:

1. Lewis, Norman. Word Power Made Easy. Anchor: 2014.
2. Riordan, Daniel G & Pauley Steven A. :Technical Report Writing Today. 2004.
3. Hamp-Lyons and Heasely, B . Study Writing; A Course in Written English. For Academic and Professional Purposes, Cambridge Univ. Press, 2006.
4. Quirk R., Greenbaum S., Leech G., and Svartik, J. A Comprehensive Grammar of the Englishlanguage, Longman:London, 1985.

5. Balasubramaniam, T. A Textbook of English Phonetics for Indian Students. Macmillan: 2012.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	3	-	-
Average	-	-	-	-	-	-	-	-	-	3	-	3	-	-

EIC11001	**Venture Ideation**	L	T	P	C
Version 1.0		2	0	0	2
Pre-requisites/Exposure	Basic knowledge of English and computer applications such as Internet Explorer and MS Office				
Co-requisites	--				

Course Objectives

1. To help the students understand the way to be an Entrepreneur
2. To identify the right business opportunity
3. To empower students to perform a technical feasibility study and therebydeveloping a prototype
4. To help students in identifying their customers using primary and secondaryresearch methods.
5. Expose students to various factors of market and competition with the help ofmarket feasibility study, forecasting techniques, business model canvass and insights about financial statements.
6. To prepare students with finalizing their entrepreneurial Portfolio

Course Outcomes

On completion of this course, the students will be able to:

CO1. Assess personal capacity in the context of the entrepreneurial process

CO2. Assess characteristics of successful entrepreneurs and entrepreneurial formsand processes

CO3. Apply resources, research and tools for Entrepreneurial ventures

CO4. Analyze and apply opportunity identification techniques, feasibility, terminology, processes and models

CO5. Develop Ideation and planning documents for entrepreneurial venture

Catalog Description

Over the last decade, the core of our economy has been transitioning from one of industrial might, large monolithic corporations and mass production towards one of networks, flexible enterprises comprising many smaller units and unique value. This new economy is based on innovation originating in creativity and design; it is also disrupting long-standing and established employment patterns and bringing to the fore the importance of entrepreneurship. This core unit will bring together creativity, design and entrepreneurship at the conceptual and more practical level. It aims to explore the nature, determinants and consequences of creativity, design and entrepreneurship as well as the interaction between them.

Course Content

Unit 1. Introduction 6 hours

Preview of the Course, Introduction to the Course, Guest Lecture with U.S. Secretary of Commerce Penny Pritzker – Meaning of Innovation, Entrepreneurial opportunities, Factors influencing the feasibility of an innovation, Innovation strategy: technology- push or market-pull, Product-market fit, How to develop a business model,

Walkthrough of the business model canvas, Welcome to Innovation for Entrepreneurs: From Idea to Marketplace.

Unit 2. Customer Discovery and Validation 6 hours

Customer types, Customer archetypes, Customer segments and business models,Customer segments, value propositions, product features, value mapping, interviewing customer, insights of your customers.

Unit 3: Product Understanding and Marketing. 6 hours

Customer value, The DNA of customer-centricity, Crossing the chasm, Qualitative and quantitative marketing research, importance and methods of market segmentation,Focusing on the target market, Beyond the chasm, Strategic implications of beyond thechasm, E-commerce: The internet as a selling platform.

Unit 4. Prototyping and Testing. 6 hours

Planning for prototyping, Rapid prototyping and development, Lean startup MVPs, Choosing a wire framing/UX prototyping tool, Anatomy of an experience map, What you'll learn from user testing, Analytics and insight, Troubleshooting your customer discovery, Levels of a product/service.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Components	**Mid Term**	**Presentation/Assignment**	**End Term**
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	3	3	1	2	-	-	-	-	-	-	2
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	2	-	-	-	-	-	-	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-
CO5	3	-	3	-	-	-	-	-	-	-	-	2
Average	3	3	3	1	2	-	-	-	-	-	-	2

CSE12002	Programming Lab	L	T	P	C
Version 1.0		0	0	3	2
Pre-requisites/Exposure	10+2 Level Mathematics, Knowledge of Basics of Computer				
Co-requisites	Knowledge of Logical Reasoning and Analysis				

Course Objectives

1. To comprehend the practical nature of programming by solving through computer systems.
2. To practice the programming construct to solve multi-dimensional problems.
3. To relate and implement mathematical concepts through programming in order to solve computational problems.
4. To enable students to acquire structure and written expression required for their profession.
5. To understand the principles of data storage and manipulation.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	List and memorize various Unix commands. Also, students be able to construct various basic programs and appraise them.	Remember (L1)
CO2	Design and execute iterative statement in a program. Also, students be able to differentiate among different iterative structure.	Understand (L2)
CO3	Construct such programs that used to define user defined functions and to design library functions.	Applying (L3)
CO4	Implement array concept in 1-Dimensional and 2-Dimensional construct. Hence be able to design string functions to cater to various character array related problem.	Analyzing (L4)
CO5	Implement the concept of Stack, Queue, and Linked List and appraise them in different cases.	Evaluating (L5)
CO6	Simulate real life problems	Creating (L6)

Catalog Description

Practical Programming skills are mandatory for designing or solving problems through digital device by implementation. To develop any software the behaviour of a programming language is a must through problem solving. In present era almost, all aspect of life is somehow largely related to virtualization and digital data/information. Devices from smartphones to other handheld devices, drones, cameras, medical instruments etc. all needs programming at some part. In engineering it has become quintessential for the students/research scholars to learn programming. In this course, students will learn how to solve problems in various domains through a programming language. This course enables students with the basic skills of C Programming Language. Five Different related modules comprise this course. First Unit familiarizes students with basics of computers, algorithmic method to solve problem, introduction to generic programming construct. Basics of C Programming is upto iterative structure is depicted in Unit II. In Unit III students will learn about modularization using functions and one advance concept of C Programming, Pointers. Unit IV will cover one of the most important concepts in C Programming, Array and Strings. Unit V will accomplish this course with the advance concept like Structure, Union and File Handling. After this course students will grow their analytical ability to solve problem and logical skill. Also, this course effectively creates the ability to grasp any other Programming Language in easier manner. In all these modules related programming problems are practiced to understand the syntactical and semantical correctness of a program. Gradually students become more comprehensive through the progress of the course.

Course Content

Experiments:

1. Familiarization with LINUX commands and vi editor.
2. Programs to demonstrate Decision Making, Branching and Looping, Use of break andcontinue statement etc.
3. Implementation involving the use of Arrays with subscript, String operations and pointers.
4. Implementation involving the use Functions and Recursion.
5. Implementation involving the use Structures and Files.
6. Implementation based on Stack Queues and Linked List for example Insertion and Deletion.

Text Books

1. Balagurusamy, E., n.d. Programming In ANSI C. 5th ed. Bangalore: McGraw-hill.
2. Gotfreid (196) *Schaum's Outline of Programming with C*, 2nd ed., USA: McGraw-Hill
3. Brian W. Kernighan, Dennis Ritchie (1988) *C Programming Language*, 2nd ed., : Prentice Hall.
4. Das Sumitabha, UNIX Concepts and Applications, 4th Ed., New Delhi, Tata McGraw-Hill

Reference Books

1. Al Kelley, Ira Pohl (1988) *A Book on C*, 4th ed. Addision Wesley Longman

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Internal Assessment	ETE
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	2	1	-	3	-	-	1		
CO2	2	2	2	3	1	1	3	-	3	-	-	1		
CO3	3	1	3	2	1	1	3	-	1	-	-	1		
CO4	3	3	2	2	1	3	3	-	2	-	-	3		

CO5	3	2	1	1	2	2	1	-	2	-	2	2		
CO6	3	2	1	1	2	2	1	-	2	-	2	2		
Average	3	2	1	1	2	2	1	-	2	-	2	2		

Model Question Paper

Course: CSE12002– Programming Lab

Program: B.Tech (CE) **Time: 03 Hrs.**
Semester: II **Max. Marks: 50**

Instructions:
Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks)**. Three Questions from Section C** (Each Carrying 10 Marks)**.**

SECTION-A (Answer All Questions) (5 x 1 = 5)			
1.a	What do you understand data types?	**R**	**CO1**
b	Define array?	**R**	**CO2**
c	How user defined function reduces the no. of lines in a large program?	**R**	**CO3**
d	Why pointer is advantageous than array?	**U**	**CO4**
e	What is the size of an integer variable?	**R**	**CO5**
SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**			
2.	What is dimension of an array. How many types of array are there? Can you store integer values and float type values in a single array, if not why? What you need to do to store such different types of values in an single array?	**U, Ap**	**CO4**
3.	Write an user defined function in c that would return multiple values in main() function.	**U**	**CO3**
4.	Suppose a paragraph is stored in a 2-D character array. Find a specific sentence in that paragraph using a c program.	**Ap**	**CO2/ CO4**
5.	State the types of data types and memory occupies. What are the ways to convert from one data type to another data type with suitable example?	**R, U**	**CO1**
SECTION C (Answer All) (3 x 10 = 3)			
6.	Is it possible to take input in a 2-D array using a single for loop? Make it possible using a suitable program in c.	**Ap**	**CO4**
7.	Write a program in c to determine that a text is written in English or in any other language. If the text is written in any other language convert every character in its nearest English alphabets.	**U, Ap**	**CO5**
8.	Write a program to create a pointer to an integer. Allocate memories for 50 elements into that pointer using both malloc() and calloc() function. Display the significance difference of using those two functions to allocate memory. Also state the specific needs of these two functions.	**U**	**CO5**

CEE12001	Engineering Drawing & CAD	L	T	P	C
Version1.0		0	0	4	2
Pre-requisites/Exposure					
Co-requisites	--				

Course Objectives

1.To comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views.

2.To understand the application of industry standards and techniques applied in engineering drawing.

3.To apply auxiliary or sectional views to most practically represent engineered parts.

4.To Dimension and explain two-dimensional engineering drawings.

5.To employ freehand 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the conventions of engineering graphics such as types of lines, dimensioning, method of projection etc.	Remember (L1)
CO2	Demonstrate understanding of fundamental concepts of engineering graphics.	Understand (L2)
CO3	Apply knowledge of orthographic and isometric projections to solve problems related to points, lines, planes and solids.	Applying (L3)
CO4	Develop and model basic mechanical components.	Analyzing (L4)
CO5	Review the drawings made in various types of projection methods.	Evaluating (L5)
CO6	Create 2D drawing of solid objects.	Creating (L6)

Catalog Description

In this fundamental course, students will be introduced to the basics of engineering drawing. Terms and definitions used in industries, such as manufacturing and construction, may also be covered. Specific skills introduced in this course may include sketching, geometric construction, auxiliary drawing, computing dimensions and lettering. Students will be also introduced to computer-aided drawing (CAD) software or techniques.

Course Content

Module 1 **Contact Hr. 9**

Introduction to Engineering Drawing covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales.

Module 2 **Contact Hr. 9**

Orthographic Projections covering, Principles of Orthographic Projections Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes.

Module 3 **Contact Hr. 8**

Projections of Regular Solids covering, those inclined to both the Planes- Auxiliary Views.

Module 4 **Contact Hr. 9**

Sections and Sectional Views of Right Angular Solids covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone.

Module 5 **Contact Hr. 10**

Isometric Projections covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions

Reference Books

1. Engineering Drawing, N. D. Bhat, Charotar Publishing House (2012).
2. Shah, M.B. & B.C. Rana (2008), Engineering Drawing and Computer Graphics, Pearson Education.
3. Engineering Drawing & Graphics using Autocad, T. Jeyapoovan, Vikas Publishing House Pvt. Ltd.-Noida; Third edition (2010).
4. https://nptel.ac.in/courses/112103019/

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2				1	1	1	1		1		1	3	3
CO2	2				1	1	1	1		1		1	3	3
CO3	2		3		1	1	1	1		1		1	3	3
CO4		3	3	2	1	1	1	1		1		1	3	3
CO5			3	2	1	1	1	1		1		1	3	3
CO6			3	2	1	1	1	1		1		1	3	3
Average	2	3	3	2	1	1	1	1		1		1	3	3

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	II
Paper Title:	Engineering Drawing & CAD	**Paper Code:**	CEE12001
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	10	**Total No of Pages:**	1
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Instructions to the Students: Attempt at least 1 Question from each CO.

	Follow the instruction given by Lab Instructor during the exam		
1	A water tank of size 27 m^3 was represented in the drawing by 216 cm^3 size. Construct a vernier scale for the same to measure up to 5 metre. Also show on it the distance of 3.75 m, 0.27 m and 0.04 m.	**CO1**	**U**
2	A rectangular plot of land measuring 2.56 hectors is represented on a map by a similar rectangle of 16 sq. cm. Calculate RF of the scale. Draw a diagonal scale to read single meter. Show a distance of 368 m on it. (1 hector = 10^4 sq. meter)o	**CO1**	**R**
3	A point R is on HP and 35 mm in front of VP. Another point M is on VP and below HP. The line joining their front views make an angle of 30 deg to the reference line, while the line joining their top views makes an angle of 45 deg with the reference line. Find the distance of the point Q from HP.	**CO2**	**U**
4	Two points A and B are on HP. The point A is 35 mm in front of VP, while B is 50 mm behind VP. The line joining their top views makes an angle of 40 deg with XY. Find the horizontal distance between the two projectors.	**CO2**	**App**
5	Draw the projections of a regular hexagon of 25 mm sides, having one of its side in the H.P. and inclined at 60º to the V.P. and its surface making an angle of 45º with the H.P.	**CO3**	**U & App**
6	A cone of 40 mm diameter and 50 mm axis is resting on one generator on HP, which makes 30 deg inclinations with VP. Draw its projections.	**CO3**	

			U & App
7	A cylinder 40 mm diameter and 50 mm axis is resting on one point of a base circle on VP while it's axis makes 45^0 with VP and FV of the axis 35^0 with HP. Draw projections.	**CO4**	**R**
8	A square pyramid 30 mm base side and 50 mm long axis is resting on it's apex on HP, such that it's one slant edge is vertical and a triangular face through it is perpendicular to VP. Draw its projections.	**CO4**	**U & App**
9	A pentagonal pyramid of base side- 30 mm, and axis length- 60 mm is resting on HP on its base with a side of base perpendicular to VP. Draw the isometric projections.	**CO5**	**U & App**
10	A frustum of cone base diameter-50 mm, top diameter- 25 mm and height-50 mm is placed centrally on a cylindrical slab of diameter-100 mm and thickness-30 mm. HP on its base with a side of base perpendicular to VP. Draw the isometric projection of the combination.	**CO5**	**U & App**

Year- II

Semester-III

MTH11529	Engineering Mathematics IIIA	L	T	P	C
Version 1.0		3	1	0	4
Pre-requisites/Exposure	Engineering Mathematics I & II				
Co-requisites					

Course Objectives

1. To enhance the fundamental knowledge in integral transform and method of solving differential equations which will arise in their practical field.
2. To acquire concept of partial differential equation (PDE) and to gain the knowledge of solution procedure of linear, non-linear, homogeneous and non-homogeneous PDEs.
3. To understand the calculation and interpretation of errors in numerical methods,
4. To gain the knowledge of solution procedure of numerical solutions of algebraic equations, transcendental equations, simultaneous linear algebraic equations.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Explain** solution to differential equations and boundary value problems using Laplace Transform.	Remember (L1)
CO2	**Illustrate** the solutions to first order linear and nonlinear partial differential equations with two or more independent variables using Lagrange's and Charpit's method, second order partial differential equations.	Understand (L2)
CO3	**Solve** one dimensional wave equation and heat equations, and two dimensional Laplace equation using separation of variables method.	Applying (L3)
CO4	**Illustrate** the solution procedure of transcendental equations and system of linear algebraic equations.	Analyzing (L4)
CO5	**Develop** the basic knowledge of finite differences, interpolation and demonstrate the concept of numerical differentiation and integration	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The main objective of this course is to train the students to use different mathematical tools, which are commonly applied to understand and analyze real-life problems. This course deals with integral transform and differential equations, which will help a student to solve many engineering problems where transformations of domain is required and also to solve many initial value problems and boundary value problems.

A major emphasis is given on the fundamental knowledge of probability and statistics where students will learn random variables with their distributions, linear regression and hypothesis testing.

Course Content

Unit I

Laplace Transform: Definition, Linearity, shifting & scaling properties, Transform of elementary functions, Transform of derivatives and integrals, Multiplication by t & division by t. Inverse Laplace transform, Convolution theorem, Transform of periodic functions, Unit step function, Dirac delta function, Initial value & final value theorems and its application to solution of ordinary differential equations. **[18L]**

Unit II

Partial Differential Equation: Introduction, classification, construction of first order partial differential equations (PDE), method of characteristic and general solution of first order PDE, canonical form of first order PDE, Langrange's method, solution of non-linear first order partial differential equation by Charpit's method. Linear second order homogeneous and non-homogeneous PDE with constant coefficients, method of finding the complementary function and particular integral for homogeneous and non-homogeneous PDE, solution of heat conduction, wave equation and Laplace equation. **[25L]**

Unit III

Numerical methods for solving equations: Introduction, Concept of Errors, Bisection Method, False Position Method, Secant Method, Newton-Raphson Method, Successive Approximation Method, Gauss elimination method, pivoting, ill conditioned equations, Gauss Seidel and Gauss Jacobi iterative methods. **[10L]**

Unit IV

Interpolation: Interpolation, Calculus of difference, Newton's Forward Interpolation Formula and Backward Interpolation Formula, Lagrange's method.

Numerical differentiation and integration: Differentiation formulae based on polynomial fit, trapezoidal, Simpson's and Weddle's formulae. **[7L]**

Reference Books:

1. Higher Engineering Mathematics, B V Ramana, Tata McGraw Hill.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics, Erwyn Kreyszig, John Wiley and Sons.
4. B.S. Grewal; Numerical methods in engineering and science, 42 Edition, Khanna *Publishers*. S Dey and S Gupta; Numerical Methods ,Tata McGraw-Hill Education, 2013.

Modes of Examination: Assignment/Quiz/Project/Presentation/Written Examination

Scheme:

Components	**Mid term**	**Class Assessment**	**End Term**
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name:

Enrolment No:

Course: MTH11529 - Engineering Mathematics- III A

Program: B. Tech. in CE | **Time: 03 Hrs.**

Semester: III | **Max. Marks: 50**

Instructions:

Attempt any three questions from **Section A** (each carrying 5 marks); any **Two Questions** from **Section B** (each carrying 10 marks)**. Section C** is Compulsory (carrying 15 marks)**.**

Section A (Attempt **any Three)**

1.	**Show** that Laplace transform of the function t^n , $1 < n < 0$ exists and is not a function of class A. **4**	**U**	**CO1**
2.	**Show** that the differential equation of all cones which have their vertex at origin is $px + qy = z$. Verify that $yz + zx + xy = 0$ is a surface satisfying the above equation.**4**	**U**	**CO2**
3.	The distribution function F(x) of a random variate X is defined as follows $$F(x) = \begin{cases} A\,, -\infty < x < -1 \\ B\,, \quad -1 \le x < 0 \\ C\,, \qquad 0 \le x > 2 \\ D\,, \qquad 2 \le x < \infty \end{cases}$$ **Find** the value of the constants A, B, C, D given that $P(X = 0) = \frac{1}{6}$ and $(X > 1) = \frac{2}{3}$. **4**	**U**	**CO4**
4.	**Find** the rank correlation coefficient for the following data: A B C D E F G Judge I: 2 1 4 5 3 7 6 Judge II: 3 4 2 5 1 6 7 **4**	**R**	**CO5**

SECTION B (Attempt any **Two Questions)**

5.	a) **Show** that $L\{t\,\mathrm{erf}(2\sqrt{t})\} = \frac{3s+8}{s^2(s+4)^{\frac{3}{2}}}$. **4** b) **Find** the solution of the partial differential equation $(\boldsymbol{D^2 - 4D'^2})\boldsymbol{z} = \boldsymbol{\frac{4x}{y^2} - \frac{y}{x^2}}$ **4**	**U**	**CO1, CO2**
6.	A tightly stretched string with fixed end point $x = 0$ and $x = l$ is initially at rest in a position given by $u = u_0 \sin^3 \frac{\pi x}{l}$. If it is released from rest , **Construct** the displacement $u(x, t)$. **8**	**App**	**CO3**
7.	A sample of 900 members has a mean 3.4 cms and s.d. 261 cms. **Construct** a model to verfy if the sample from a large population of mean 3.25 cms and s.d.	**App**	**CO5**

	2.61 cms.? If the population is normal and its mean is unknown, find 95% and 98% confidential limits of true mean.**8**		
	SECTION C is Compulsory		
8.	a) If a random variable X follows normal distribution such that $P(9.6 \leq X \leq 13.8) = 0.7008$ and $P(X \geq 9.6) = 0.8159$ where $\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{0.9} e^{-\frac{t^2}{2}}dt = 0.8159$, $\frac{1}{\sqrt{2\pi}}\int_{-\infty}^{1.2} e^{-\frac{t^2}{2}}dt = 0.8849$, **find** mean and variance of X. **8** b)The means of two single large samples of 1,000 and 2,000 members are 67.5 inches and 68.0 inches respectively. **Construct** a model to verify if the samples be regarded as drawn from the same population of standard deviation 2.5 inches? Test at 5% level of significance. **4**	**U** **App**	**CO4** **CO5**

CEE13001	Applied Geology	L	T	P	C
Version 1.0		**2**	**0**	**2**	**3**
Pre-requisites/Exposure	Geography (10th standard)				
Co-requisites					

Course Objectives:

1. To study and identify different types of natural materials like rocks & minerals and soil.
2. To understand the various natural dynamic processes their influence on the surficial features, natural material and their consequences.
3. To know the physical, chemical & optical properties of rocks & minerals.
4. To know the importance of geological maps and language helpful for Civil Engineering projects.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	The basic knowledge about natural material like rocks and minerals and their usage as well as their availability.	Remember (L1)
CO2	Get acquainted with natural dynamic processes and their actions.	Understand (L2)
CO3	Understand the influence of natural processes and geological factors on civil structures and help them to take decision while planning, design and execution stage of the structures in their professional life.	Applying (L3)
CO4	Know the significance of geological investigations for civil engineering projects and site selection as well as for the preparation of feasibility reports and others.	Analyzing (L4)
CO5	To understand the geological maps and language for the discussion on geological reports to resolve civil engineering issues.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Catalogue:

Based on lectures and exercises

• Students will be able to conduct basic engineering geological assessments and analyzes and to interpret formation and understand the properties of different rocks, minerals.
• Students should be familiar with the main analyzes and methods in the lab and in the field and should have an understanding of the importance of engineering geology related to technical issues during construction.
• Student is able to perform basic engineering geological assessments and analyses, and to understand the relevance of engineering geology in complex projects in and on rock and soils.

Course Content:

Unit-I: **10 Lecture Hours**

Introduction:

Branches of geology useful to civil engineering, Importance of geological studies in various civil engineering Projects.

Internal Structure of the Earth
Internal structure of the Earth and use of seismic waves in understanding the interior of the earth
General and Physical Geology –
Agents modifying the earth's surface, study of weathering and its significance in engineering properties of rocks like strength, water tightness and durability etc.

Brief Study of Geological Action of River –
Brief study of geological action of river, wind, glacier, ground water and the related land forms created by them.

Volcano
Central type and fissure type, products of volcano, volcanic land forms.

Earthquake

Unit-II: 15 Lecture Hours
Petrology
Study of igneous, sedimentary and metamorphic rocks. distinguishing properties among these three rocks to identify them either in the Lab or in the field.

- Mode of formation, Texture and structure, Classifications,
- Study of common occurring igneous rocks.

Metamorphic

- Mode of formation, agents and types of metamorphism,
- Metamorphic minerals, rock cleavage, structures and textures of metamorphic rocks,
- Classification and study of commonly occurring metamorphic rocks.

Sedimentary

- Mode of formation, agents and types
- Classification and study of commonly occurring sedimentary rocks.

Unit-III: 5 Lecture Hours
Structural Geology
Structural elements of rocks, dip, strike, outcrop patterns unconformities, outliers and inliers, study of joints. Faults and folds, importance of structural elements in engineering operations.

Unit-IV: 8 Lecture Hours
Geological Investigation

- Preliminary Geological Investigation and their importance to achieve safety and economy of the projects supporting dams and tunnel projects ,
- Methods of surface and subsurface investigations, excavations-Trial pit, trenches etc.
- Electrical Resistivity method,
- Seismic method and their applications.

Unit-V: 7 Lecture Hours
Geology of Dam & Reservoir Site and Tunneling

- Strengths, stability, water tightness over the foundation rocks and its physical characters against geological structures at dam sites,

- Favourable and unfavourable conditions for locating dam sites.
- Importance of geological considerations while choosing tunnel sites and alignments of the tunnel, safe and unsafe geological and structural conditions, Difficulties during tunnelling and methods to overcome the difficulties.
- Geological studies for selection of tunnels and underground excavations.

A. Text Books & Reference Books:

1. Mukharjee, P. K., A text book of Geology, The World Press Pvt. Ltd.
2. Kesavulu, C., Textbook of Engineering Geology, Macmillan India Ltd, 1993, NewDelhi
3. Bangar, K. M, Principles of Engineering Geology, Standard Publishers Distributors, 1995, New Delhi 4. Billings, M.P., Structural Geology, Prentice-Hall India, 1974, New Delhi
5. Blyth, F. G. H and de Freitas, M. H. Geology for Engineers, ELBS, 1974London
6. Gokhale, KVG. K and Rao, D. M., Experiments in Engineering Geology, Tata-McGraw Hill, 1981, New Delhi
7. Reddy, V. Engineering Geology for Civil Engineers; Oxford & IBH, 1997, New Delhi

B. Web Materials:

1. http://nptel.iitm.ac.in/video.php?subjectId=105105106
2. http://nptel.iitm.ac.in/courses.php?branch=Civil,
3. http://nptel.iitm.ac.in/video.php?courseId=1055&p=1
4. http://nptel.iitm.ac.in/video.php?courseId=1055&p=3
5. http://nptel.iitm.ac.in/video.php?courseId=1055&p=4

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-

CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Name:

Enrolment No:

ADAMAS UNIVERSITY
PURSUE EXCELLENCE

Course: CEE13001– Applied Geology

Program: B.Tech. (CE) **Time: 03 Hrs.**
Semester: III **Max. Marks: 50**

Instructions:
Attempt All Questions from **Section A** (Each Carrying 1Marks); any **Three Questions** from **Section B** (Each Carrying 5Marks)**.** All the **Questions from Section C** (Each Carrying 10 Marks)**.**

SECTION-A (Answer All Questions) (5 x 1 = 5)

1.a	Name the structural drawbacks within the foundation rock where dam has to be placed as far as possible to avoid shearing,	**R**	**CO1**
b	What is the name of the earthquakes originating due to volcanic eruptions or landslides?	**U**	**CO2**
c	What is the texture called when large-sized crystals are embedded in fine grained matrix?	**U**	**CO3**
d	Foliation is a primary structure of which type of rock?	**U**	**CO4**
e	Draw the structural framework of talc.	**R**	**CO5**

SECTION B (Attempt any **Three Questions)**

2.	What is the silica tetrahedron structural difference between pyroxene and amphibole? In which silicates, olivine family belong? What is its structure? What are the two end-members of the plagioclase series?	**U, R**	**CO1**
3.	What are various structures of sedimentary rocks? Describe any two in detail.	**U**	**CO2**
4.	Compare and contrast the following pairs:	**U**	**CO3**

	(a) Lava and Magma (b) Plutonic and Volcanic rocks.		
5.	Write short notes (**any Two**) from the followings (draw neat sketch wherever required) a) Arch dam b) Drag fold c) Porphyritic texture d) Thermal Metamorphism e) Translational and Rotational faults f) Earth dam	**U**	**CO4/ CO5**
SECTION-C (Attempt **all the Questions)(3 x 10 = 30)**			
6.	Describe tabular classification of igneous rocks based on depth of formation and silica saturation.	**U**	**CO1/CO2**
7.	What are the different purposes for which tunnel are made? What are the different tunnels? On the basis of geological background, discuss the suitability and unsuitability of common igneous, sedimentary and metamorphic rocks for tunnelling.	**U, Ap**	**CO3/CO4**
8.	"The knowledge of geology is essential at the planning stage, design phase and construction phase of any major civil engineering project". Justify your statements write in bullet form.	**U, R**	**CO5**

	Structural Mechanics-I	L	T	P	C
Version 1.0		3	1	0	4
	Engineering Mechanics				
Co-requisites	-------------------------------------				

Course Objectives

1. To introduce basic principles of Structural Mechanics, need of analysis of structures, different techniques of analysis.
2. To apply principles of basic and engineering sciences in analysis, design and operation of civil engineering systems.
3. To expose students to the challenges involved in analysis of structures through examples, numerical problems
4. To enrich the knowledge and skills of engineers to proactively anticipate problems faced in structural engineering and resolve them effectively with best-practices
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Determination of stresses and strains on plain and oblique sections.	Remember (L1)
CO2	Calculation of Shear Force and Bending Moment and drawing of S.F., B.M. diagram of determinate beams.	Understand (L2)
CO3	Computation of Bending Stresses on beams.	Applying (L3)
CO4	Determination of Buckling Loads of columns.	Analyzing (L4)
CO5	Calculation of stresses in thick and thin cylinders and computation of deflection in beams.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Structural Mechanics is the determination of the effects of loads on physical structures and their components. This course includes specific activities like computing a structure's deformations, internal forces, stresses, support reactions, accelerations, and stability. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: 12 Lecture Hours

Simple Stress & Strain: Types of external loads, normal and shear stresses & strain, Hooke's law, Poisson's ratio, relationship between elastic constants, working stress, stress-strain diagrams, elongation of bars of constant and varying sections, statically indeterminate problems in tension and compression, Temperature and Pre-strain effects.

Analysis of stress and strain on oblique sections: Stress on inclined planes for axial and biaxial stress fields, principal stress & strain, Mohr's circle of stress.

Unit II: 12 Lecture Hours

Bending Moment & Shear force: Different types of beams, various types of loading, Relationship connecting intensity of loading, shearing force and bending moment, shear force diagrams for cantilever beams, bending moment diagrams for cantilever beams, shear force diagrams for Simply supported beams, bending moment diagrams for Simply supported beams, shear force diagrams for Overhanging beams, bending moment diagrams for Overhanging beam.

Unit III: 12 Lecture Hours

Stresses in Beam: Theory of simple bending, assumptions and limitations, Normal stresses in beams, Stresses in non-prismatic beams, moment of resistance, beams of uniform strength, beams of two materials, strain energy due to bending, shearing stresses in beams, Unsymmetrical bending and shear centre, Doubly symmetric beams with skew loads, pure bending of unsymmetrical beams, Generalized theory of pure bending, shear centre of thin walled open cross sections.

Unit IV: 12 Lecture Hours

Theory of columns: Direct and bending stresses in short columns, Kern of a section, Buckling and stability, Euler's buckling/crippling load for columns with different end conditions, Rankine's formula, Eccentric loads and the Secant formula, Imperfections in columns.

Torsion: Torsion of solid and hollow circular shafts, Pure shear, strain energy in pure shear and torsion, Close coiled helical springs, open coiled helical springs.

Unit V: 9 Lecture Hours

Thin and Thick Cylinders: Stresses in thin cylinders, thick cylinders, Lame's equation, stresses in thick cylinders due to internal and external pressures, Wire wound pipes and cylinders, compound Cylinders, shrink fit.

Deflection of beams: Differential equation of the elastic curve, Method of successive integration, Macaulay's method.

Reference Books

1. S. P. Timoshenko & D. H. Young, Elements of Strength of Material, EWP Pvt. Ltd.
2. E. P. Popov, Engineering Mechanics of Solids, Pearson Education.
3. R. Subramanian, Strength of Materials, Oxford University Press.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

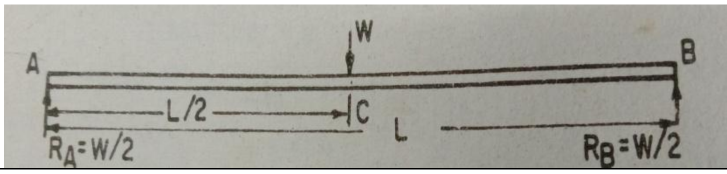
Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

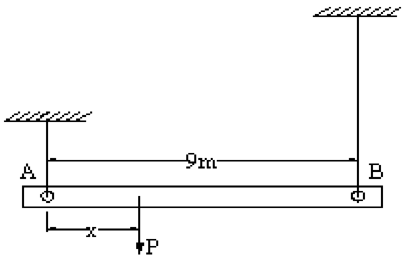
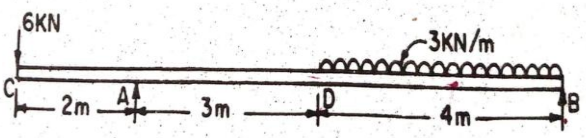
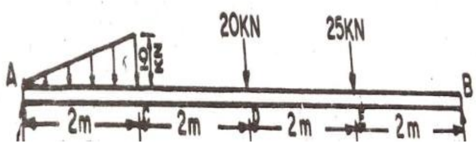
Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session:)		
Name of the Program:	B.TECH	**Semester:**	III
Paper Title:	STRUCTURAL MECHANICS-I	**Paper Code:**	CEE11005
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	1.At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	The radius of Mohr's circle for two equal but unlike principal stresses of magnitude 'σ' is (a) σ / 4 (b) σ / 2 (c) σ (d) None of above.	**U**	**CO1**
2	Bending moment at supports in case of simply supported beams is always (a) Less than unity (b) more than unity (c) zero (d) none of the above	**R**	**CO2**
3	Which of the following is an assumption for pure bending of a beam? (a) the section is symmetrical about the axis of bending, (b) the section is unsymmetrical about the axis of bending, (c) the section is symmetrical about the plane of bending, (d) the section is unsymmetrical about the plane of bending.	**R**	**CO3**
4	Euler's buckling load for a column of length 'l', fixed at one end and hinged at the other will be given by: (a) $\pi^2EI/(2l^2)$ (b) $\pi^2EI/(4l^2)$ (c) $4\pi^2EI/l^2$ (d) $2\pi^2EI/l^2$	**R**	**CO4**
5	Two closed thin vessels, one cylindrical and the other spherical, with equal internal diameter and wall thickness are subjected to	**U**	**CO5**

	equal internal fluid pressure. The ratio of hoop stresses in the cylindrical vessel to that of spherical one is: (a) 4 (b) 2 (c) 1 (d) 0.5		
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	When a bar of certain material, 4cm x 4cm in cross-section, is subjected to a pull of 160 kN the extension on a gauge length of 20cm is 0.01cm and decrease in each side of the section is 0.0005cm. Calculate the Poisson's ratio "μ" of the material.	**An**	**CO1**
(OR)			
6 b)	A mild steel specimen tested in tension has the following data: Diameter = 2 Cm, Gauge Length = 20 Cm, extension under 10 kN load = 0.0032 cm, Yield point load = 82 kN, maximum load 133 KN, length after facture = 25.2 cm, diameter at neck = 1.26 cm, Calculate Young's modulus.	**U**	**CO1**
7 a)	A beam ABC (AB=6m and BC =2m), is simply supported at 'A' and continuous over the simple support at 'B' with the overhanging part BC. The beam ABC is subjected to uniformly distributed load of 5kN/m over the entire length from A to C. Draw shear force & Bending moment diagrams for the beam.	**An**	**CO2**
(OR)			
7 b)	Draw SFD & BMD of the Beam given below. 	**U**	**CO2**
8 a)	A beam of circular cross-section of diameter "d" is simply supported on a span of 8m. A load of 2 kN is applied at a distance of 3m from one end. Determine the diameter of the section if maximum bending stress developed in the beam is 90.54 Mpa.	**U**	**CO3**
(OR)			
8 b)	A beam of square cross-section is simply supported on a span of 6 m. Two equal concentrated loads are applied at a distances of 2m from each support. Determine the dimension of the beam cross-section if maximum bending stress developed in the beam is 100 Mpa.	**R**	**CO3**
9 a)	With suitable assumptions derive Secant formula for an eccentric load 'P'.	**Ev**	**CO4**
(OR)			
9 b)	With suitable assumptions derive the formula for Euler's buckling load for a column of length *l*, hinged at both ends, wherein E = Young's modulus of elasticity and *I* = least moment of Inertia of the column section.	**U**	**CO4**
10 a)	From the equation of elastic curve, relate between External load & Slope.	**R**	**CO5**
10 b)	A Cantilever is of length 3 m.The moment of inertia of the section is $2.25x10^8$ mm^4. The Cantilever carries a UDL of 1.2 kN/m over the	**U**	**CO5**

	entire length. Calculate slope in degree & deflection in mm at the free end. Take, $E=2x10^5$ N/mm^2.		
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	A rigid bar AB, 9m long, is suspended by two vertical rods at its ends and hangs in a horizontal position under its own weight as shown below: The rod at A is of brass; length 3 m, cross – sectional area 10 cm^2, modulus of elasticity 1 X 10^5 Mpa, The rod at B is steel, length 5m, cross – sectional area 4.55 cm^2, modulus of elasticity 2 X 10^5 Mpa. At what distance x from A may a vertical load 'P' be applied if the bar is to remain horizontal after the load is applied?  	**U**	**CO1**
(OR)			
11 b)	A hollow steel cylinder of 30cm length, 15cm inside diameter & 3mm uniform wall thickness is filled with concrete and compressed between two rigid parallel parts by a load P = 500 kN. (a) Calculate the compressive stress in each material and total shortening of the cylinder if E_s = 2 X 10^5 Mpa and E_c = 2 X 10^4 Mpa. Assume both materials obey Hook's law. (b) If the permissible stresses in concrete & steel are 7 Mpa and 150 Mpa. Find the safe maximum compressive load that may be applied.	**R**	**CO1**
12 a)	Draw SFD & BMD of the Beam given below. Find also 'Point of contraflexure'.  	**R**	**CO2**
(OR)			
12 b)	Draw SFD & BMD of the Beam given below.  	**An**	**CO2**
13 a)	A I-section has an overall depth of 200 mm. One flange has a width of 100 mm and a thickness of 30 mm & other flange has a width of 120 mm and a thickness of 50 mm. The web is 30 mm thick and has a depth of 120mm. The beam is 8 m long. Find the UDL if maximum	**App & An**	**CO3**

	permissible bending stress in tension is limited to 30 MN/ m^2 & in compression is limited to 45 MN/ m^2 .		
(OR)			
13 b)	A T-section has an overall depth of 400 mm. The flange at top has a width of 200 mm and a thickness of 20 mm. The web is 20 mm thick and has a depth of 380mm. If permissible bending tensile and compressive stresses of the material are respectively 120 Mpa and 80 Mpa what is the safe value of maximum bending moment the section can resist? Draw the distribution of bending stress for this maximum bending moment. Also calculate the safe maximum value of central concentrated transverse load if this T-section is used as a simply supported beam of span 6m.	**App & An**	**CO3**
14 a)	A solid circular shaft is required to transmit a twisting moment of 4.5 kN-m. If the maximum shear stress is not to exceed 80 Mpa and the angle of twist is not to exceed one degree in 20 times diameter of its length, determine the diameter of the shaft if the modulus of rigidity of the material is 8 x 10^4 Mpa.	**An**	**CO4**
(OR)			
14 b)	A steel column is of length 6 m with both ends fixed. The cross-section of the column is T-section having the following dimensions: Flange = 160 mm x 40 mm Web = 200 mm x 20 mm Take 'E' as 200 Gpa, find the critical load.	**An**	**CO4**
15 a)	A column of circular section has 150 mm dia. & 3 m length with both ends fixed. The column carries a load of 100 kN at an eccentricity of 15 mm from the geometrical axis of the column. Find the maximum compressive stress on the column section. Take, E=10^5 Mpa.	**U**	**CO4**
(OR)			
15 b)	A shaft is required to transmit 300 kW power at 240 rpm under running condition. The starting torque is 22.5% higher than main torque. Shear stress in the shaft should not exceed 40 Mpa & twist of 1 degree per metre length. Determine the diameter of the shaft if (a) the shaft is solid (b) the shaft is hollow with external diameter twice the internal diameter.	**Ev**	**CO4**
16 a)	A Cantilever beam 3 m long carries an UDL of 2 kN/m over its entire Span & a point load of 10 kN at a distance of 3 m from fixed end. Find Slope & deflection at the free end. Given, E=200 Gpa & I=2.3x10^8 mm^4.	**U**	**CO5**
(OR)			
16 b)	A thin cylindrical pressure vessel of diameter 1.5 m, thickness of metal 15 mm & the efficiency of longitudinal joint is 70%. If the maximum tensile stress of the plate is 80 Mpa, calculate the permissible stream pressure in the vessel. Calculate also the circumferential stress in the	**U**	**CO5**

	solid plate section & longitudinal stress in the plate section through the joint if efficiency of the circumferential joint is 60%.		
17 a)	A cylindrical shell is 3 m long, 1.5 m internal diameter & 20 mm thickness. Calculate the intensity of the maximum shear stress induced & also the change in dimensions of the shell if it is subjected to an internal pressure of 2 MPa. Take, E=0.2 x10^6 MPa & 1/m=0.3.	**R**	**CO5**
(OR)			
17 b)	A Simply supported steel beam of 6 m long having hollow circular cross-section 15 cm external diameter & 1 cm thick. Find out the maximum point load 'W' can be placed at the middle of the beam so that maximum deflection of the beam does not exceed 1.2 cm. Calculate also the slope at the support ends. Take, E=2x10^5 N/mm^2.	**U**	**CO5**

CEE11004	**Prof. Core – II:** **Fluid Mechanics and Hydraulic Machinery**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Engineering Mechanics				
Co-requisites	Prof. Core Lab – I: Fluid Mechanics and Hydraulic Machinery Lab				

Course Objectives

1. To learn the importance, application and interrelationship of various properties of fluid.
2. To determine the forces on planes and curved surfaces in a fluid at rest and the concepts of buoyancy and meta-centre.
3. To evaluate the properties of moving fluid like velocity, acceleration and the forces on fluid through the continuity equation, Euler's and Bernoulli's equation.
4. To develop the concept of flow measurements and flow through pipes.
5. To study the fundamentals of dimensional analysis and model analysis.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand fundamental properties of fluid and its application on floating body.	Remember (L1)
CO2	Analyze hydrostatic pressure and the discharge through pipes and over notches and weir.	Understand (L2)
CO3	Determine characteristics of flow, various types of energy losses for the application in pipenetwork problem.	Applying (L3)
CO4	Construct a model, solve open channel flow problems through the selection and use ofappropriate equation.	Analyzing (L4)
CO5	Evaluate the performance characteristics of different hydraulic machines.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Fluid Mechanics and Hydraulic Machinery is that branch of physics which deals with the behaviour of fluid flow and measurement of different fluid parameters. Fluid mechanics can be separated into three categories: fluid statics which cover the study of fluid at rest, fluid kinematics which deals with the fluid flow in motion and fluid dynamics which is the study of the effect of forces on fluid motion. Hydraulic machines on the other hand are the field of application of fluid mechanics. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: **9 Lecture Hours**

Fluid Properties: Fluid - definition, difference between solids and fluids, Various fluid properties - density, specific weight, specific volume, specific gravity, viscosity, adhesion, cohesion, surface tension and capillarity. Newton’s Law of viscosity.

Pressure and its Measurement: Pressure-definition, Pascal's law, Hydrostatic law, Types of pressure, Measurement of pressure using simple, differential and inclined manometers, Introduction to mechanical and electrical pressure measuring devices.

Buoyancy and Flotation: Buoyancy, Meta-center and Meta-centric height, Conditions of equilibrium of floating body and submerged body.

Unit II: **9 Lecture Hours**

Hydrostatics Forces on Surfaces: Determination of total pressure and center of pressure on vertical and inclined plane surface submerged in liquid.

Kinematics of Flow: Velocity and acceleration, Classification of fluid flow, Continuity equation, Streamline, pathline, streakline, and streamtube, Velocity potential function and Stream function.

Dynamics of Fluid Flow: Euler's and Bernoulli's equation of motion, Practical application of Bernoulli's equation- venturimeter, orificemeter and pitot tube.

Notches and Weirs: Classification of notches and weir, Discharge through different types ofnotches and weirs.

Unit III: **9 Lecture Hours**

Viscous Flow: Flow of viscous liquid through circular pipe and between two parallel plates, Kinetic energy and momentum correction factors, Head loss due to friction in viscous flow.

Turbulent Flow: Shear stress & velocity distribution in turbulent flow, Hydro-dynamically smooth and rough boundaries.

Flow Through Pipes: Major and minor losses in pipe, Darcy-Weisbach equation for friction loss in pipes, H.G.L and T.E.L line, Pipes in series, pipes in parallel, Pipe networks, Water hammer.

Unit IV: **9 Lecture Hours**

Flow in Open Channels: Basic concepts of open channel flow, Discharge through open channel by Manning’s and Chezy's formula, Most Economical sections, Non-uniform flow through open channels - Specific energy and condition of maximum discharge for a given value of specific energy, Gradually varied flow, Hydraulic jump, Derivation for conjugate depth, water surface profiles.

Dimensional and Model Analysis: Units and dimensions**,** Dimensional Homogeneity, Rayleigh's Method and Buckinghum's pi theorem, Dimensionless numbers, Hydraulic similitude and Model analysis.

Unit V: **9 Lecture Hours**

Hydraulic Machines: Turbines - Water turbines: impulse turbine and reaction turbine, Pelton wheel, Francis and Kaplan Turbine, Construction and working, velocity triangles, Draft tube theory, Specific speed, cavitation, selection of turbines.

Pumps: Centrifugal pumps, performance characteristic graph – design flow rate, Working principles of positive displacement pumps, Reciprocating and Vane pumps.

Reference Books

1. R.K.Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications Ltd.
2. R.K.Rajput, A Textbook of Fluid Mechanics and Hydraulic Machines, S.Chand & Co, New Delhi, 2006 edition.
3. P.N.Modi, S.M.Seth, Hydraulics and Fluid Mechanics including Hydraulics Machines, Rajsons Publications Pvt. Ltd.
4. S.K.Som, Gautam Biswas, S. Chakraborty, Introduction to Fluid Mechanics and Fluid Machines, Mc Graw Hill Education

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	III
Paper Title:	Fluid Mechanics and Hydraulic Machinery	**Paper Code:**	CEE11004
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	1.At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2.All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3.Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	**What** is the dimension of absolute viscosity?	**R**	**CO1**
2	**Define** Reynold's number.	**R**	**CO5**
3	**What** is the relation between specific energy and critical height?	**R**	**CO4**
4	**Define** specific speed of turbine.	**U**	**CO3**
5	**Write** down the relation between centre of pressure and centre of gravity of a submerged body.	**U**	**CO2**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Calculate the dynamic viscosity of oil, which is used for lubrication between a square plate of size 0.8mx0.8m and an inclined plane with angle of	**U**	**CO1**

	inclination 30°. The weight of the square plate is 300N and it slides down the inclined plane with a uniform velocityof 0.3m/s. The thickness of oil film is 1.5mm.		
(OR)			
6 b)	Write a short note on the stability of floating body	**R**	**CO1**
7 a)	An inverted U-tube manometer is connected to two horizontal pipes A and B through which water is flowing. The vertical distance between the axes of these pipes is 30cm. When an oil of specific gravity 0.8 is used as a gauge fluid, the vertical heights of water columns in the two limbs of the inverted manometer when measured from respective centre line of pipes are found to be same and equal to 35cm. **Determine** the difference in pressure between pipes.	**Ev**	**CO2**
(OR)			
7 b)	Derive an expression for the discharge through V-notch.	**U**	**CO2**
8 a)	Explain hydro-dynamically smooth and rough boundaries.	**U**	**CO3**
(OR)			
8 b)	Derive an expression for the head loss due to sudden expansion in pipe.	**R**	**CO3**
9 a)	250 litres/s of water is flowing in a pipe having a diameter of 300mm. If the pipe is bentby 135° (i.e. change from initial direction to final direction is 135°), find the magnitude and direction of the resultant force on the bend. The pressure of water flowing is 39.24 N/cm^{2}.	**Ev**	**CO4**
(OR)			
9 b)	Explain the specific energy curve in detail.	**U**	**CO4**
10 a)	Define-a) Hydraulic efficiency b) Mechanical efficiency and c) Volumetric efficiency	**R**	**CO5**
(OR)			
10 b)	What is the significance of draft tube?	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	A pipe of diameter 400 mm carries water at a velocity of 25 m/s. Pressure at point A & B is 29.43 N/cm^2 & 22.563 N/cm^2 respectively	**Apply**	**CO2**

	while datum head at A & B are 28 m and 30 m. Find the head loss between A & B.		
(OR)			
11 b)	A rectangular plain surface is 2 m wide and 4 m deep. It lies in vertical plane in water. Determine the total pressure force and position of centre of pressure on the plane surface when its upper edge is horizontal and (i) coincides with water surface and (ii) 2.5 m below the free surface.	**Apply**	**CO2**
12 a)	A solid cylinder having 1.5m diameter and 2m height is floating in water with its axis vertical. If the specific gravity of material of cylinder is 0.85, calculate metacentric height and state whether the equilibrium is stable or unstable.	**Apply**	**CO1**
(OR)			
12 b)	i) The pressure intensity at a point in a fluid is given by 5 N/cm^2. Find the corresponding height of fluid when fluid is an oil of specific gravity 0.80. ii) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to the atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left limb from the centre of pipe is 15 cm below.	**Apply**	**CO1**
13 a)	Two sharp ended pipes of diameter 60 mm and 100 mm respectively, each of length 150 m are connected in parallel between two reservoirs which have a difference of level of 15m. If co-efficient of friction of each pipe is 0.08, calculate the rate of flow for each pipe and also the diameter of a single pipe 150m long which would give the same discharge if it were substituted for the original two pipes.	**U**	**CO3**
(OR)			
13 b)	Briefly explain how the water flow get affected when it flows through a pipe.	**U**	**CO3**
14 a)	The pressure difference Δp in a pipe of diameter D and length l due to turbulent flow depends on the velocity V, viscosity μ, density ρ and roughness k. Using Buckingham'sπ theorem, obtain an expression for Δp.	**U**	**CO4**
(OR)			
14 b)	What do you understand by the most economical section? Derive the expression for the most economical triangular section.	**U**	**CO4**

15 a)	A sluice gate discharges water into a horizontal rectangular channel with a velocity of 8m/s with a depth of flow 0.5m. The width of channel is 6m. Determine whether hydraulic jump will occur, if so; find its height and energy loss.	**Apply**	**CO4**
(OR)			
15 b)	Derive the differential equation of gradually varied flow with assumptions made in it.	**U**	**CO4**
16 a)	A Pelton wheel has a mean bucket speed of 10 m/s with a jet of water flowing at the rate of 700 l/s under a head of 30m. The buckets deflect the jet through an angle of 160^{o}. Calculate the power given by water to the runner and the hydraulic efficiency of the turbine. Assume co-efficient of velocity as 0.98.	**Apply**	**CO5**
(OR)			
16 b)	Compare centrifugal pump and reciprocating pump.	**Analyze**	**CO5**
17 a)	The external and internal diameters of inward flow reaction turbines are 1.20m and 0.6mrespectively. The head on the turbine is 22m and velocity of flow through the runner is constant and equal to 2.5m/s. The guide blade is given as 10^{o} and the runner vanes are radial at inlet. If the discharge at outlet is radial, determine: i) The speed of the turbine, ii) The vane angle at outlet of the runner and iii) Hydraulic efficiency.	**Ev**	**CO5**
(OR)			
17 b)	Explain the working principle of centrifugal pump.	**U**	**CO5**

ECE11062	Prof. Core- III: Surveying & Geomatics	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	11^{th} level Physics				
Co-requisites	Prof. Core Lab – II: Surveying Practice Lab				

Course Objectives

1. To help in acquiring preliminary knowledge about different earlier methods of Surveying like Chain, Compass and Plain Table Surveying.
2. To know the basics of levelling, contouring and theodolite survey in elevation and angular measurements.
3. To understand the basics and elements of different types of curves on roads and theirfield setting out processes.
4. To measure area of a land by conventional methods and determine volume of an earthwork.
5. To get introduced to modern advanced surveying techniques involved such as Remotesensing, Total station, GPS, Photogrammetry etc

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Demonstrate** the use of earlier conventional different surveying instruments like Chain, Compass, Plain Table and their use.	Remember (L1)
CO2	**Measure** differences in elevation for any Engineering Projects and setting out various curves in Highway and Railway Projects.	Understand (L2)
CO3	**Determine** the area and earthwork for different works by using conventional surveying instruments.	Applying (L3)
CO4	**Make use of** Theodolite in plotting a traverse by Co-Ordinate method and **apply** the concept of Tacheometry for surveying in difficult and hilly areas to obtain the topographical map of an area.	Analyzing (L4)
CO5	**Outline** surveying with advance instrument like Total Station, Remote Sensing and GPS etc.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Surveying is the technique, profession, art and science of determining the terrestrial or three-dimensional positions of points and the distances and angles between them. These points are usually on the surface of the Earth, and they are often used to establish maps and boundaries for ownership, locations, such as building corners or the surface location of subsurface features, or other purposes required by government or civil law, such as property sales. It has been an element in the development of the human environment since the beginning of recorded history. The planning and execution of most forms of construction require it. It is also used in transport, communications, mapping, and the definition of legal boundaries for land ownership. It is an important tool for research in many other scientific disciplines.

Classroom activities will be planned to encourage students to understand both the conventional and the advanced method of Surveying and play an active role building of their strategies during field work. Class participation is an elemental aspect of this course to build up knowledge during practical work.

Course Content

Module 1 Lecture Hr. 9

Introduction: Objectives and Classification of surveying, uses and necessity of plane and geodetic surveying, principle of surveying.

Chain Surveying: Basic principle of chain surveying, Methods of measuring distance, Different types of chain & other accessories for chaining, Methods of ranging, Errors in chain survey, Offsets.

Compass Surveying: Definitions, Principle of Compass Surveying, Methods of traversing, Types of compass, Local Attraction, Example, Field procedure of compass traversing, Adjustment of closing error, Sources of errors and Precautions.

Plane Table Surveying: Principle, Accessories, Orientation & Procedure of setting up table over a station, Methods of Plane tabling- Radiation, intersection & traversing, Resection- Two point and three point problem

Module 2 Lecture Hr. 9

Levelling: Object and use of levelling, Definitions, Description of different types of levelling instruments, Temporary & permanent adjustment of level, Types of levelling, Corrections, Reciprocal Levelling, Methods of calculation of reduced level, Example.

Contouring: Definitions, Uses of contour map, Characteristics of contours, Methods of contouring

Curves: Types of horizontal curves, Properties of simple circular curve, Horizontal curve setting by different methods, Rankine's method of horizontal curve setting.

Module 3 Lecture Hr. 9

Measurement of Area: Area of an irregular figure by trapezoidal rule, average ordinate rule, Simpson's 1/3 rule, various coordinate methods. Planimeter: types including digital planimeter, area of zero circle, uses of planimeter.

Measurement of Volume: Computation of volume by Trapezoidal and Prismoidal formula, volume from spot levels, volume from contour plans.

Module 4 Lecture Hr. 9

Theodolite Surveying: Definition, Description of Transit Theodolite, Temporary adjustment of theodolite, Method of measuring horizontal angle & vertical angle, Method of measuring deflection angle & measurement of magnetic bearing, Sources of error in theodolite, Computation of Latitude and departure, Closing error and its limitation, Procedure for traverse survey with theodolite & permanent adjustment of theodolite.

Tacheometric Surveying: Basic principle of stadia tachometry, Instruments, Analytic lens, Stadia Method.

Module 5 Lecture Hr. 9

Geomatics: Electromagnetic distance measurement (EDM) – Principle & Types. Total station. Photogrammetry- Terrestrial and Aerial photograph – Photo interpretation, Remote Sensing – Basics and Principle. Remote Sensing Platforms and Sensors. Characteristics of Sensors. Introduction to GPS, GPS Segment, Principles of Working, GPS Application.

Text Books

1. Surveying and Levelling. N.N. Basak,1st Edition, Tata McGraw Hill, 6^{TH} EDITION , 2017
2. Surveying and Levelling, Vol I Kanetkar and Kulkarni, 24th edition, Pune VidyarthiGriha, Pune.
3. Surveying and Levelling, Vol II, Kanetkar and Kulkarni, 24th edition, Pune VidyarthiGriha, Pune.

Reference Books

1. Surveying, R Agor, Khanna Publishers.4TH EDITION,2017
2. Surveying & Levelling (2nd Edition) R.Subramanian, Oxford University Press

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	III
Paper Title:	Surveying & Geomatics	**Paper Code:**	CEE11062

Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	1.At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2.All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3.Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	State the Function of reflecting mirror in prismatic compass.	**U**	**CO1**
2	What do you mean by “Electromagnetic distance measurement”?	**R**	**CO5**
3	What are the characteristics of a “Transition Curve”?	**R**	**CO2**
4	Demonstrate the use of Planimeter.	**R**	**CO3**
5	Illustrate the term ‘Swinging of Telescope’.	**U**	**CO4**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	What are the advantages of ‘Plain Table Surveying’?	**An**	**CO1**
(OR)			
6 b)	Explain the following terms: i) Base line, ii) Check line.	**U**	**CO1**
7 a)	Determine the chainage of initial and final tangent point of a simple circular curve if chainage of the intersection point is 526 m. Assume radius of the curve is 110 m and intersection angle as 145°.	**An**	**CO2**
(OR)			
7 b)	Explain the following terms: (i) Contour Interval, (ii) Reciprocal Levelling.	**U**	**CO2**
8 a)	Compare between ‘Trapezoidal Rule’ and ‘Simpson’s 1/3rd rule’ in the measurement of Area.	**U**	**CO3**
(OR)			
8 b)	How measurement of volume can be done by ‘Spot Height Method’?	**R**	**CO3**
9 a)	The Following Reading were taken with a Tacheometer on to a vertical staff, Calculate Tacheometric constants. <table><tr><th>Horizontal Distance (m)</th><th colspan="3">Stadia Reading (m)</th></tr><tr><td>45</td><td>0.885</td><td>1.110</td><td>1.335</td></tr><tr><td>60</td><td>1.860</td><td>2.160</td><td>2.460</td></tr></table>	**Ev**	**CO4**
(OR)			
9 b)	Write down four uses of Tachometry.	**U**	**CO4**
10 a)	Write down the uses of a Total Station.	**R**	**CO5**
(OR)			
10 b)	Differentiate between ‘Active Remote Sensing’ and ‘Passive Remote Sensing’.	**U**	**CO5**
Group C			

<table>
<tr><th colspan="4">Answer All the Questions (7 x 5 = 35)</th></tr>
<tr><td>11 a)</td><td>Explain fly levelling with its procedure and purpose.</td><td>U</td><td>CO2</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>11 b)</td><td>State five personal and five instrumental errors in leveling.</td><td>R</td><td>CO2</td></tr>
<tr><td>12 a)</td><td>Demonstrate with diagram about the method ‘Intersection’ in the context of Plain Table Surveying.</td><td>R</td><td>CO1</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>12 b)</td><td>The following bearings were observed with compass.
Calculate the interior angles.
<table>
<tr><th>Line</th><th>Fore Bearing</th></tr>
<tr><td>MN</td><td>60°30′</td></tr>
<tr><td>NO</td><td>122°00′</td></tr>
<tr><td>OP</td><td>46°00′</td></tr>
<tr><td>PQ</td><td>205°30′</td></tr>
<tr><td>QM</td><td>300°00′</td></tr>
</table></td><td>An</td><td>CO1</td></tr>
<tr><td>13 a)</td><td>A Planimeter was used to measure the area from a plan drawn to a scale of 1 cm = 100 m. The tracer arm was set to natural scale and the anchor arm was kept outside the figure. Initial reading = 6.973; final reading = 2.921. For the natural scale, M = 100 and the zero of the disc passed the index mark once in a clockwise direction. Find the area of the ground represented by the plan.</td><td>App &An</td><td>CO3</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>13 b)</td><td>A 35 m length of earthwork volume for a proposed road has a constant cross section of cut and fill, in which the cut area equals the fill area. The level formation is 12 m wide. The transverse ground slope is 27° and the side slope in cut is 0.9 horizontal to 1 vertical. Calculate the volume of the excavation in 35 m length.</td><td>App &An</td><td>CO3</td></tr>
<tr><td>14 a)</td><td>Calculate latitudes and departures for the traverse whose details are as shown aside:
<table>
<tr><th>Line</th><th>Length (m)</th><th>WCB</th></tr>
<tr><td>AB</td><td>89.31</td><td>45°10′</td></tr>
<tr><td>BC</td><td>219.76</td><td>72°05′</td></tr>
<tr><td>CD</td><td>151.18</td><td>161°52′</td></tr>
<tr><td>DE</td><td>159.10</td><td>228°43′</td></tr>
<tr><td>EA</td><td>232.26</td><td>300°42′</td></tr>
</table></td><td>An</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>14 b)</td><td>A staff held vertically at a distance of 50 m and 100m from the center of the theodolite with a stadia hair, the staff intercept with the telescope is 0.500 and 1.000 respectively. The instrument was then setup over a station P of RL 1850.95 m and the total height of instrument was 1.475m. The hair reading on a staff held vertically at station Q were 1.050, 1.900 and 2.750 with the line of sight horizontal. Calculate the horizontal distance of PQ and RL of Q point.</td><td>An</td><td>CO4</td></tr>
<tr><td>15 a)</td><td>Explain the temporary adjustments of a Theodolite. Use sketch whenever necessary.</td><td>U</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>15 b)</td><td>A Tacheometer has a diaphragm with three cross hairs spaced at a distance of 1.15mm. The focal length of the object glass is</td><td>Ev</td><td>CO4</td></tr>
</table>

	23 cm and the distance of the object glass from the trunnion axis is 10 cm. Calculate the Tacheometric constants.		
16 a)	Briefly discuss the steps involved in Remote Sensing Process.	**U**	**CO5**
(OR)			
16 b)	Explain the all possible Scattering processes involved in the interaction of Electromagnetic Radiation through Atmosphere.	**U**	**CO5**
17 a)	Briefly describe various segments of GPS along with their individual functions.	**R**	**CO5**
(OR)			
17 b)	Using rough sketch, describe the method “Trilateration”.	**U**	**CO5**

CEE12063	Prof. Core Lab – I Fluid Mechanics and Hydraulic Machinery Lab	L	T	P	C
Version 1.0		0	0	1	1
Pre-requisites/Exposure	Engineering Mechanics				
Co-requisites	Prof. Core – II: Fluid Mechanics and Hydraulic Machinery				

Course Objective

1. To interpret the actual behaviour of real fluids as discussed in lecture
2. To be acquainted with the standard measurement techniques of fluid mechanics problems
3. To develop idea about writing technical report
4. To operate hydraulics machines

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Determine** the coefficient of discharge using Orifice meter.	Remember (L1)
CO2	**Evaluate** the coefficient of discharge using V- Notch.	Understand (L2)
CO3	**Measure** water surface profile for flow over Broad crested weir.	Applying (L3)
CO4	**Understand** water surface profile for a hydraulic jump.	Analyzing (L4)
CO5	**Determine** the efficiency of a Centrifugal pump, Reciprocating pump, Pelton wheel Turbine,Francis turbine and Hydraulic ram.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Fluid Mechanics Lab is performed in conjunction with Fluid Mechanics and Hydraulic Machinery theory course (ECE42105) where experiments are conducted to determine properties of fluid, behaviour of fluid flow, force exerted by fluid at rest and also in motion. The experimental set up to perform all the laboratory experiments are made available to students. All experiments run closely in caliber with the theoretical topics covered in the class room lectures and also according to the needs of practical field

Course Content

Sl. No.	Name of the experiment
1	Calibration of Orifice meter.
2	Calibration of Venturi meter.
3	Calibration of V- Notch
4	Measurement of water surface profile for flow over Broad crested weir
5	Measurement of water surface profile for a hydraulic jump
6	Determination of efficiency of a Centrifugal pump
7	Determination of efficiency of a Reciprocating pump

8	Determination of efficiency of a Pelton wheel Turbine
9	Determination of efficiency of a Francis Turbine
10	Determination of efficiency of a Hydraulic Ram

Reference Books

1. R.K.Bansal, Fluid Mechanics and Hydraulic Machines, Laxmi Publications Ltd.
2. P.N.Modi, S.M.Seth, Hydraulics and Fluid Mechanics including Hydraulics Machines,Rajsons Publications Pvt. Ltd.
3. S.K.Som, Gautam Biswas, S. Chakraborty, Introduction to Fluid Mechanics and FluidMachines, Mc Graw Hill Education

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Internal Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name: Enrolment No:	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: CEE12063 – Fluid Mechanics Lab

Program: B.Tech. (CE) **Time: 03 Hrs.**
Semester: III **Max. Marks: 50**
Instructions:
Attempt any one question from **Section A** (each carrying 40 marks)

Section A (attempt anyone)

1.	Determine the coefficient of discharge using Orifice meter and Venturi meter.	**Evaluate**
2.	Estimate the coefficient of velocity and discharge of water flowing through the V - notch	**Evaluate**
3.	Measurement of water surface profile for flow over Broad crested weir	**U**
4.	Show the profile of surface flow of water for a hydraulic jump	**R**
5.	Calculate the efficiency of the Centrifugal pump.	**Evaluate**
6.	Determine the discharge and also the efficiency of a Reciprocating pump.	**Evaluate**
7.	Illustrate the working principle of the Pelton wheel turbine.	**U**
8.	Evaluate the efficiency of the Francis turbine.	**Evaluate**
9.	Measure the efficiency of a Hydraulic Ram.	**U**

		L	T	P	C
CEE12011	Prof. Core Lab II- Surveying Practice Lab	L	T	P	C
Version1.0		0	0	2	1
Pre-requisites/Exposure	Prof. Core –III- Surveying & Geomatics				
Co-requisites	--				

Course Objectives

1. To help in data collection methods and prepare field notes during conventional methods of surveying, like, Chain, Compass and Plane Table Surveying.
2. To give the students a detailed idea about the methods of levelling and contouring and procedure of recording field data during progression of field work.
3. To make students expert in finding horizontal and vertical angles.
4. To prepare students in setting out of simple curves.
5. To train students in handling modern equipments over conventional methods of surveying.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Utilize** field data for preparing map and respective land area by Chain Surveying.	Remember (L1)
CO2	**Measure** bearing of line for preparing Gale's Table.	Understand (L2)
CO3	**Demonstrate** the accessories and methods of plane table surveying.	Applying (L3)
CO4	**Conduct** levelling for cutting and filling and preparing contour map.	Analyzing (L4)
CO5	**Determine** horizontal, vertical and deflection angle using theodolite and total station accessories.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Surveying is the technique, profession, art and science of determining the terrestrial or three-dimensional positions of points and the distances and angles between them. These points are usually on the surface of the Earth, and they are often used to establish maps and boundaries for ownership, locations, such as building corners or the surface location of subsurface features, or other purposes required by government or civil law, such as property sales. It has been an element in the development of the human environment since the beginning of recorded history. The planning and execution of most forms of construction require it. It is also used in transport, communications, mapping, and the definition of legal boundaries for land ownership. It is an important tool for research in many other scientific disciplines.

Laboratory activities will be planned to encourage students to play an active role building of their strategies during field work. Participation in these sessions is an elemental aspect of this course to build up knowledge during practical work.

Course Content

Surveying Practice Lab	CEE12011
Experimentno.1	Distance between two inaccessible points by chain, Ranging, Preparation of map.
Experimentno.2	Getting outline of the structures and calculation of area.
Experimentno.3	Preparation of field book from field data.
Experiment no. 4	Measurement of bearing; closed traversing using compass and application of Bowditch Rule. Preparation of Gale's Table.
Experiment no. 5	Temporary adjustments of plane table, Radiation method, Intersection, Traversing and Resection methods of plane tabling.
Experiment no. 6	Temporary adjustment of Dumpy level, Differential levelling, Profile leveling and plotting the profile, Longitudinal and cross sectioning.
Experiment no. 7	Direct contouring, Indirect contouring– Block levelling, Indirect contouring–Radial contouring, Demonstration of minor instruments.
Experiment no. 8	Temporary and permanent adjustment of theodolite, Observations of vertical, horizontal and deflection angle using Vernier Transit Theodolite.
Experiment no. 9	Observations of vertical, horizontal and deflection angle using Total Station, Plotting of an area in AutoCad from Total Station Data.
Experiment no. 10	Study of Global Positioning System and Accessories

Text Books:
1. Surveying and Levelling.N.N.Basak,1st Edition, Tata McGraw Hill, 6th Edition, 2017
Reference Books:
1. Surveying, RAgor, Khanna Publishers. 4th Edition, 2017
2. Surveying & Levelling (2nd Edition) R. Subramanian, Oxford University Press

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-

CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	III
Paper Title:	Surveying Practice Lab	**Paper Code:**	CEE12011
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	10	**Total No of Pages:**	1
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Follow the instruction given by Lab Instructor during the exam		
1	**Find** bearing of 5 given points in the field with a prismatic compass and plot a traverse. Correct the traverse by Graphical Method (Bowditch's Rule) **Show** the corrected bearing of the plotted Traverse.	**CO2**	**U**
3	**Show** a map in your sheet using a field book and chain surveying.	**CO1**	**R**
5	**Illustrate** the outline of an irregular structure and calculate its area using Chain Surveying.	**CO1**	**U**

6	**Determine** the distance between two points if a building comes between those points.	**CO1**	**App**
7	**Show** the orientation process in Plane Tabling using by Back sighting Method. **Determine** the distance of a given inaccessible point using Plane Table.	**CO3**	**U & App**
8	**Determine** the longitudinal leveling of an undulating ground by taking a peg interval of 10 m. **Show** a Contour map of the same ground using Dumpy Level.	**CO4**	**U & App**
9	**Find** the horizontal angle between 2 given points by repetition method using a Vernier Theodolite.	**CO5**	**R**
10	**Determine** topographical area of a given site using the retrieved data from a Total Station.	**CO5**	**U & App**

MTH12531	Numerical Techniques Lab	L	T	P	C
Version 1.0	Contact Hours- 45	0	0	2	1
Pre-requisites/Exposure	Numerical Techniques and C/MATLAB Programming Language				
Co-requisites	--				

Course Objectives

The primary objective of this course is to provide students hands on experience of implications of the various techniques used in numerical computations through understanding algorithms and writing computer programs. These techniques include solving non-linear equations and system of linear equations, computing numerical interpolation and numerical integrations, and solving ordinary differential equations. The ultimate goal of this course is to enhance the skill to critically think, model and solve any mathematical problems.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Numerically solve non-linear equations related to univariate problems	Remember (L1)
CO2	Numerically solve system of linear equation related to multivariate problems	Understand (L2)
CO3	Obtain interpolated value of a function that is known at a finite number of points	Applying (L3)
CO4	Numerically compute values of any definite integrals	Analyzing (L4)
CO5	Solve initial value problems representing systems with spatial/temporal variations	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Description

Numerical computations play a crucial role in solving simple to complex problems in science and engineering. Growing power and efficiency of the modern computers has made the numerical computations more sophisticated, accurate and powerful. Practical knowledge of numerical computation techniques is very essential for modern science and engineering. This lab course is designed for under graduate students to provide them comprehensive knowledge and practical experience of solving various mathematical problems using suitable numerical techniques. In this course students will learn algorithms and write computer programs for the numerical techniques towards solving problems. The course includes techniques for solving non-linear equations and system of linear equations, computing interpolations and integrations of functions, and solving ordinary differential equations.

Course Content

Write a C / MATLAB program to execute the following:

1. The root of non-linear equation using Bisection method.
2. The root of non-linear equation using false position method.
3. The root of non-linear equation using Newton Raphson method.
4. Interpolate values using Newton‘s forward Interpolation method.
5. Interpolate values using Newton‘s backward Interpolation method.
6. Interpolate values using Lagrange‘s interpolation method.
7. Solve a system of linear equation using gauss-elimination method.
8. Solve a system of linear equation using gauss-seidel method.
9. Evaluate the integral using different numerical integration rules.
10. Solve an ordinary differential equation using different numerical methods.

Text Books

1. **Cleve Moler,** *Numerical Computing with MATLAB, Electronic edition:* **The MathWorks, Inc., Natick, MA, 2004, http://www.mathworks.com/moler. Print edition: SIAM, Philadelphia, 2004.http://ec-securehost.com/SIAM/ot87.html**
2. T. Veerarajan, T. Ramachandran , Numerical Methods with Programs in C , Tata McGraw-Hill Publications.
3. S. Dey, S. Gupta , Numerical Methods, McGraw Hill Education.

Reference Books

1. B.S. Grewal, Numerical Methods in Engineering & Science: with Programs in C & C++, 11th Ed., Khanna Publishers, 2013.
2. R. Garg, R. S. Goel, Numerical techniques: Computing with C and MATLAB, CBS publishers, 2018.

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1

CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER PRACTICAL EXAMINATION**		
Name of the Program:	B.Tech Civil Engineering/Mechanical Engineering /Electrical Engineering	**Semester:**	IV
Paper Title:	Numerical Techniques Lab	**Paper Code:**	MTH12531
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	12	**Total No of Pages:**	2
Answer any two questions from any one section only	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Section A

Answer Any Two Questions (2 x 20 = 40 marks) + Viva (10 marks)

<table>
<tr><td>1</td><td>Explain the Bisection method and then find a real root of the non-linear equation
$xe^x - 1 = 0$ between 0 and 1 correct to three decimal places by Matlab program.</td><td>U</td><td>CO1</td></tr>
<tr><td>2</td><td>Explain the Gauss elimination method for solving a system of linear equations and then find the solution of the following system by Matlab program:
$$\begin{aligned} 2x + y + 4z &= 12 \\ 8x - 3y + 2z &= 20 \\ 4x + 11y - z &= 33 \end{aligned}$$</td><td>U</td><td>CO2</td></tr>
<tr><td>3</td><td>Derive the Newton's forward interpolation formula and then find the value of $f(1.6)$ by Matlab program for the following table:
<table>
<tr><td>x</td><td>1</td><td>1.4</td><td>1.8</td><td>2.2</td></tr>
<tr><td>$f(x)$</td><td>3.49</td><td>4.82</td><td>5.96</td><td>6.5</td></tr>
</table></td><td>R</td><td>CO3</td></tr>
<tr><td>4</td><td>Derive the formula of Trapezoidal rule and then find the following integration by Matlab program (Take 10 number of intervals between 0 to 6):
$$\int_0^6 \frac{1}{1+x^2} dx$$</td><td>R</td><td>CO4</td></tr>
<tr><td colspan="4" align="center">OR</td></tr>
<tr><td colspan="4" align="center">Section B
Answer Any Two Questions (2 x 20 = 40 marks) + Viva (10 marks)</td></tr>
<tr><td>5</td><td>Explain the Regula-Falsi method and then find a real root of the non-linear equation
$x \log_{10} x = 1.2$ correct to three decimal places by Matlab program.</td><td>U</td><td>CO1</td></tr>
<tr><td>6</td><td>Explain the Gauss-Seidel method for solving a system of linear equations and then find the solution of the following system by Matlab program:
$$\begin{aligned} 10x + y + z &= 12 \\ 2x + 10y + z &= 13 \\ 2x + 2y + 10z &= 14 \end{aligned}$$</td><td>U</td><td>CO2</td></tr>
<tr><td>7</td><td>Derive the Newton's backward interpolation formula and then find the value of $f(1.28)$ by Matlab program for the following table:</td><td>R</td><td>CO3</td></tr>
</table>

	<table><tr><td>x</td><td>1.15</td><td>1.20</td><td>1.25</td><td>1.30</td></tr><tr><td>$f(x)$</td><td>1.0723</td><td>1.0954</td><td>1.1180</td><td>1.1401</td></tr></table>		
8	Derive the formula of Simpson's 1/3rd rule and then find the following integration by Matlab program (Take 10 number of intervals between 0 and 1): $$\int_0^1 \frac{x^2}{1+x^3}dx$$	**R**	**CO4**

(OR)

Section C

Answer Any Two Questions (2 x 20 = 40 marks) + Viva (10 marks)

9	Explain the Newton-Raphson method for solving a non-linear equation and then find a positive real root of $x^4 - x = 10$ correct to three decimal places by Matlab program.	**U**	**CO1**
10	Derive the Lagrange's interpolation formula and then find the value of $f(9)$ by Matlab program for the following table: <table><tr><td>x</td><td>5</td><td>7</td><td>11</td><td>13</td><td>17</td></tr><tr><td>$f(x)$</td><td>150</td><td>392</td><td>1452</td><td>2366</td><td>5202</td></tr></table>	**R**	**CO3**
11	Explain the Euler's method for solving an ordinary differential equation and then find an approximate value of y corresponding to $x=1$ of the following initial value problem by Matlab program: $$\frac{dy}{dx} = x + y;\ \ y(0) = 1$$	**U**	**CO5**
12	Explain the Runge-Kutta 4th order method for solving an ordinary differential equation and then find approximate values of y corresponding to $x = 0.2,\ 0.4$ of the following initial value problem by Matlab program: $$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2};\ \ y(0) = 1$$	**U**	**CO5**

IDP14001	Interdisciplinary Project	L	T	P	C
Version 1.0		-	-	5	3
Pre-requisites/Exposure	Knowledge of Basic English				
Co-requisites	Knowledge of Basic Computer Skills				

Course Objectives

1. Interdisciplinary nature of knowledge and understanding
2. Importance and value of integrating knowledge and perspectives from multiple disciplines asa means to evaluating and understanding complex topics, problems, issues, phenomena, and events
3. Competencies learned during the educational process and to apply these competencies in areal-world application

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Identify the unique advantages of integrative research and learning	Remember (L1)
CO2	Understand the fundamentals of research methods and practices of various academicdisciplines	Understand (L2)
CO3	Demonstrate an understanding of current issues and concerns	Applying (L3)
CO4	Understand the importance of ethics in research process	Analyzing (L4)
CO5	Understand the inter-disciplinary systems of research documentation**.**	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

After discussion with the Project Advisor(s), each student shall prepare an initial outline of their assigned project indicating the major sections of discussion, list the principal research sources for each section, and explain the overall objective of the project, including a justification of the interdisciplinary nature of the work.
Each student shall meet with the Project Advisor(s) regularly as per the weekly Time-Table. Other meetings may be scheduled at the discretion of the Project Advisor(s) at mutually agreed upon timings. Typically, the progress will include a combination of industrial and academic mentoring , self study sessions, case studies, trend studies, presentation by students, interactive sessions, industrial visits etc. Regular submission of progress reports shall be required of each student-group as notified through the Project Advisor(s) from time to time.

Modes of Examination: Assignment/Quiz/Project/Presentation/Written Examination Scheme:

Components	Interactive & continuous	Team presentation
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

SOC14100	Community Service	L	T	P	C
Version 1.0		-	-	-	1
Pre-requisites/Exposure	Knowledge of Basic English				
Co-requisites	Knowledge of Basic Computer Skills				

Course Objectives

1. To familiarize the students on the concept 'giving back to the society'.
2. To acquaint the students on the issues faced by marginalized communities.
3. To provide an experiential platform to the students on any one or two issues as an internship.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the concept of social responsibility through an internship.	Remember (L1)
CO2	Apply hands on experience in 'giving back to the society' through the concept of social responsibility through an internship	Understand (L2)
CO3	Demonstrate an understanding of current issues and concerns	Applying (L3)
CO4	Understand the importance of ethics in the society	Analyzing (L4)
CO5	Understand the social systems.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Along with Intelligent Quotient, it is important for students to enhance their Emotional Quotient as well. The Social Internship offers opportunity to the student to be empathetic towards social issues facing our society. To help and support the affected community / cause through a field internship is the essence of the course in 'giving back to the society'.

Course Content

Unit I:

Introduction to the course. A brief on social issues facing the society with both global and Indian examples.

Unit II:

Minimum 24 hours of field work on a social issue and helping the marginalized / affected community / cause with photographs and testimonies.

Unit III:

Submission of individual reflection on the social service rendered.

The benefits that accrue to the students are

A.) Subjective

1. Psychosomatic benefits: Volunteering increases overall life satisfaction and also helps to relive stress and acts as an anti-depressant.
2. Intellectual benefits: Enhances knowledge through new experiences, and develops communication skills.
3. Career benefits: Enhances career prospects by acquisition of work-related skills, builds good references for employers and provides a forum to network with future potential employers. Italso The experience allows gained helps students to take up leadership positions. Letters of recommendation can also be easily sought. Research shows that students who indulge in volunteer word perform better in studies as it invigorates their passion for learning.
4. Personal benefits: Real world skills like leadership, problem-solving, collaboration withothers, time management and communication skills, learn patience and empathy.
5. Connect learning to real world and enables deeper and lifelong learning.

B.) **Community**

1. Collective benefits: Strong interpersonal bonds are created, and leads to increased civicand social awareness and responsibility.

Further Reading :

1. Tadevosyan, Gohar & Schoenhuth, Michael. Participatory Research Approach : Principles, Challenges and Perspectives. http://ysu.am/files/01G_Tadevosyan_M_Schoenhuth.pdf
2. Bergold, Jarg & Thomas Stefan. Participatory Research Methods: A Methodological Approach in Motion http://www.qualitative-research.net/index.php/fqs/article/view/1801/3334

Plan of Work

1. Reading on social issues facing the society with both global and Indian examples.
2. Selecting an issue where the student wishes to contribute and wants to make adifference.
3. Areas - The internship may be broadly completed by getting in touch with NGO in your city / town / Police / Municipal Corporation / Local Gram Panchayat / Hospital /State Health Department / Women & Child Development Centre / CSR departments of Corporates /school / Old Age Home / Orphanage / Literacy Drive / Aanganwadi Centres / etc.
4. **Online Discussion –** Through discussion, students elaborate their preferred area of work with reference to the Global Scenario and India. Reason for choosing that area also needs and resources of the people in their area of Social Internship and also submit the testimonials, which include signature of the authority where studentsinitiated their work, or the signature of the authority in whose area students are currently working or photographs of work (photographs must include students working).
5. **Final Report Submission** - Submission of theTestimonials include signatures of the

authorities you have worked with, or the signature of the authority in whose area you have worked or photographs of your work (photographs must include you working). Students' accomplishment in their area of operation along with the major successes student experienced and major challenges faced.

6. Students will submit the complete elaborated report along with testimonials and completion certificate in the form of signed Template

- The registration for all students will open twice, during winter and summer breaks.They may enroll for the internship in either of the two breaks.
- The student will have to submit a continuous record of their 10 to 15 days internshipin the form of photographs and testimonies (wherever required).

Mode and Scheme of Online Evaluation:

Modes of Evaluation: Online – Quiz / Assignment / Discussions / Case Studies Examination Scheme:

Components	Internal Assessment (Discussion+ Initiating Internship Template) Mid Term	End Term (Detailed Report Submission + Testimonials Photographs / Student Experience Sharing Video)
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Year- II
Semester-IV

CEE11008	Soil Mechanics	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics I				
Co-requisites					

Course Objectives

1. To introduce the principles which govern the use and applications of soil as an engineering material in various Civil Engineering project.
2. To gain technical conception and proficiency in the classification of soils and understand the engineering properties of soil.
3. To understand behavior of soil under stress, its permeability, compaction and consolidation behavior.
4. To evaluate the strength of the soil and its usefulness quantitatively.
5. To achieve the skill in selecting and applying design parameters of soil required for any construction work.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Illustrate the constituents of soil, phase system of soil, its index properties, soil classification and clay mineralogy.	Remember (L1)
CO2	Evaluate the effective stresses and neutral pressures in soil, permeability of soil, coefficient of permeability, flow nets, seepage parameters to understand the flow of water through soil for any constructional work.	Understand (L2)
CO3	Determine the stress distribution in soil under various load conditions; and define the compaction properties of soil with different laboratory and field based methods.	Applying (L3)
CO4	Estimate the consolidation and compressibility characteristics of soils.	Analyzing (L4)
CO5	Compute the shear strength of soil through various test conditions; Introduce Sensitivity, Thixotropy of clay.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Soil Mechanics is a very important discipline in Civil Engineering and it involves study of the behavior, strength and other properties of soil, which helps in understanding the applications of soil as an engineering material in Civil Engineering works. Soil mechanics also contributes to solve problems related to geology and geophysical engineering. This course contains the study of different properties of soil, types of soil based on formation, soil composition, classification based on standard systems, soil water system, flow of water through soil mass, permeability and seepage analysis. It also includes stress distribution in soil due to various load conditions, compaction, consolidation and compressibility characteristics of soil and application of hydraulic principles to deal with issues related to hydraulic structures, other constructional works, sediments and other deposits. This course on Soil Mechanics also has the objective to illustrate about consistency of soil, swelling and shrinkage properties, and very significantly its shear strength (under various conditions) for defining the implications of soil in designing structures, like - different types of foundations, embankments, dams, tunnels etc.

Course Content

Unit I: **8 Lecture Hours**

Introduction and Index properties of soil: Types of soil based on formation, Soil as three phase system, phase relationships; Definitions of - water content, density, unit weights, voids ratio, porosity, degree of saturation, specific gravity, density index and their functional relationships; Consistency of soil - Atterberg's limits; Particle size distribution of soil - sieve analysis, sedimentation analysis, particle size distribution curve.

Classification of soil and Soil structure: Classification of soil – particle size classification, textural classification, USCS and ISCS; Soil structures, atomic and molecular bonds in soil, clay mineralogy.

Unit II: **6 Lecture Hours**

Stress conditions in soil: Modes of occurrence of water in soil, slaking of clay, bulking of sand, frost action, effective stresses and neutral pressures in soil for different conditions, capillary siphoning.

Permeability and seepage analysis: Permeability - one dimensional flow, Darcy's Law, discharge velocity and seepage velocity, factors affecting permeability of soil, coefficient of permeability, laboratory and field determination of coefficient of permeability, permeability of stratified soil deposits; Seepage through soils – two dimensional flow, seepage pressure, seepage force, flow nets, uplift pressure, piping, quick sand condition, critical hydraulic gradient.

Unit III: **8 Lecture Hours**

Stress Distribution: Stresses due to self-weight, Boussinesq equations, pressure distribution diagrams, vertical pressure under different loads, Newmark's chart, Westergaard's analysis.

Compaction of soil: Principles of compaction, Standard proctor test and Modified proctor test, factors affecting compaction, effects of compaction on soil, zero air voids line, field compaction methods.

Unit IV: **11 Lecture Hours**

Consolidation and Compressibility characteristics of soils: Spring analogy, Terzaghi's theory of one dimensional consolidation, Compression index, Coefficient of compressibility and volume change, Coefficient of consolidation, Degree & rate of consolidation, Laboratory method of one dimensional consolidation test, Determination of consolidation parameters, Secondary consolidation.

Unit V: **12 Lecture Hours**

Shear Strength of Soil: Basic concepts of Mohr's stress circle, Mohr-Coulomb failure theory, relation between major and minor principal stresses, Determination of shear parameters - Direct shear test, Triaxial test, Unconfined compression test, Vane shear test, sensitivity, thixotropy of clay, shear strength of different cohesive soils under several drainage paths.

Reference Books

1. Dr. B. C. Punmia, A. K. Jain, A. K. Jain, Soil Mechanics and Foundation Engineering, Laxmi

Publications Pvt. Ltd.
2. B. M. Das, Principles of Geotechnical Engineering, Thomson.
3. VNS Moorthy, Principles of soil Mechanics & Foundation Engineering, UBS Publication.
4. Gopal Ranjan & A.S.R. Rao, Basic & Applied Soil Mechanics, Wiley Eastern Ltd.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
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CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	IV
Paper Title:	Soil Mechanics	**Paper Code:**	CEE11008
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Define void ratio of soil.	**Remember**	**CO1**
2	What do you mean by coefficient of permeability for soil?	**Remember**	**CO2**
3	What is Optimum moisture content in compaction of soil?	**Remember**	**CO3**
4	Define coefficient of compressibility of soil.	**Remember**	**CO4**
5	Explain sensitivity of clay.	**Understand**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Compare Liquidity index and Consistency index of soil.	**Analyze**	**CO1**
(OR)			
6 b)	Explain “particle size classification” of soil.	**Understand**	**CO1**
7 a)	What is Capillary siphoning? Discuss with suitable diagram.	**Remember**	**CO2**

	(OR)		
7 b)	Identify the factors which will affect the permeability of soil.	**Apply**	**CO2**
8 a)	Explain zero air voids line in compaction curve of soil with suitable diagram.	**Understand**	**CO3**
	(OR)		
8 b)	Compare Standard proctor test with Modified proctor test.	**Analyze**	**CO3**
9 a)	Solve the following problem: An undisturbed sample of a clay stratum having 2 m thickness was tested in laboratory and the average value of coefficient of consolidation was found to be 2×10^{-4} cm^2/s. If a structure is built on the clay stratum, how long (in days) will it take to attain half of the ultimate settlement under the load of the structure? Assume double drainage.	**Apply**	**CO4**
	(OR)		
9 b)	What is compression index and what is coefficient of consolidation?	**Remember**	**CO4**
10 a)	Identify the **advantages of tri-axial test for soils?**	**Apply**	**CO5**
	(OR)		
10 b)	Explain about Thixotropy of clay.	**Understand**	**CO5**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	Explain Falling head permeability test with suitable diagram and mention the expression for calculating coefficient of permeability of soil through this test.	**Remember & Understand**	**CO2**
	(OR)		
11 b)	Briefly discuss about the components and applications of a flow net in case of seepage analysis.	**Understand**	**CO2**
12 a)	Solve the following problem: A soil sample is having a porosity of 40% and the specific gravity of soil solids is 2.65. Calculate void ratio, dry unit weight, unit weight at 50% saturated soil condition and unit weight of completely saturated soil.	**Apply**	**CO1**
	(OR)		

12 b)	Solve the following problem: An undisturbed soil sample has a volume of 100 cm^3 and mass of 200 g. after oven drying for 24 hours, the mass is reduced to 150 g. Calculate the water content, voids ratio and degree of saturation of the soil. Consider the specific gravity of soil grains is 2.7.	**Apply**	**CO1**
13 a)	Explain the factors affecting compaction of soil with suitable diagrams.	**Understand**	**CO3**
(OR)			
13 b)	Solve the following problem: Calculate the intensity of vertical pressure and horizontal shear stress at a point 5 m directly below a 25 kN concentrated load acting at a horizontal ground surface. Also calculate the vertical pressure and shear stress at a point 2 m horizontally away from the axis of loading at a same depth of 5 m.	**Apply**	**CO3**
14 a)	Illustrate about the assumptions considered in Terzaghi's theory of one dimensional consolidation?	**Understand**	**CO4**
(OR)			
14 b)	Illustrate about the Spring analogy for consolidation process of soil.	**Understand**	**CO4**
15 a)	5. Explain about Secondary consolidation of soil briefly.	**Understand**	**CO4**
(OR)			
15 b)	Analyze different components of compression curve for any soil sample with suitable plot.	**Understand & Analyze**	**CO4**
16 a)	Illustrate about Vane shear test for determination of shear strength of cohesive soils**.**	**Understand**	**CO5**
(OR)			
16 b)	Explain Mohr- Coulomb's failure theory for shear strength of soil with suitable diagrams of failure envelopes.	**Understand**	**CO5**
17 a)	Discuss briefly about Direct shear test **for soils.**	**Understand**	**CO5**
(OR)			
17 b)	Discuss briefly about Unconfined compression test **for soils.**	**Understand**	**CO5**

CEE11064	**Construction Engineering Materials**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basic Civil & Mechanical Engineering, Structural Mechanics I				
Co-requisites	Construction Engineering Materials Lab				

Course Objectives

1. To introduce students to various materials commonly used in civil engineering construction and their properties.
2. To understand the properties of concrete along with its application.
3. To acquire knowledge about new materials used in construction.

Course Outcomes

On completion of this course the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Compare** the properties of common aggregates and bricks used in construction work.	Remember (L1)
CO2	**Understand** the typical and potential applications of lime, cement.	Understand (L2)
CO3	**Know** the properties of fresh concrete.	Applying (L3)
CO4	**Identify** the applications of timbers and other materials.	Analyzing (L4)
CO5	**Illustrat**e the use of modern material in construction.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The course provides basic knowledge of the properties and application of essential materials, especially aggregates, cement, concrete, wood, paints and other modern material. After completion the student should be able to learn the basic theory about important building materials. This course deals with fundamental idea about different materials that are used frequently in building construction. This course also includes various testing methods to determine the properties of materials and allowable values as per standards. Classes will be conducted by lectures as well as power point presentation as per the requirements. Discussions related to various testing of materials will be done according to the guidelines provided by Indian Standards. Students will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Unit I: **9 Hours**

Aggregates & Bricks: Aggregates as building material, Criteria for selection, river sand, crushed stone sand, properties, coarse Aggregates, Crushing strength, Impact strength, Flakiness Index, Elongation Index, Abrasion Resistance, Grading

Bricks, Classification, Manufacturing of clay bricks, Tests on bricks, Compressive Strength, Water Absorption, Efflorescence, Bricks for special use.

Unit II: **9 Hours**

Lime, Cement, Mortar: Lime, Preparation of lime mortar, Cement, Ingredients, Manufacturing process, Types and Grades, Properties of cement and Cement mortar, Hydration, Compressive strength, Tensile strength, Fineness, Soundness and consistency, setting time.

Unit III: **12 Hours**

Concrete: Concrete, Ingredients, Manufacturing Process, batching plants, mixing, transporting, placing, compaction of concrete, curing and finishing, Ready mix Concrete, Test of Concrete, Mix specification.

Unit IV **9 Hours**

Timber and Other Materials: Timber, Industrial timber, Plywood, Thermocol, Panels of laminates, Steel, Aluminum and Other Metallic Materials, Composition, Aluminum composite panel, Paints, Varnishes, Distempers, Bitumen.

Unit V: **6 Hours**

Modern Materials: AAC Blocks, Ceramics, Fibre glass reinforced plastic, fiber reinforced concrete, Composite materials, Types, Applications of laminar composites, Geotextiles for earth reinforcement.

TEXT BOOKS:

1. Varghese.P.C, "Building Materials", PHI Learning Pvt. Ltd, New Delhi, 2015.
2. Rajput. R.K., "Engineering Materials", S. Chand and Company Ltd., 2008.
3. Gambhir.M.L., "Concrete Technology", 3rd Edition, Tata McGraw Hill Education, 2004
4. Duggal.S.K., "Building Materials", 4th Edition, New AgeInternational,2008.

REFERENCES:

1. Jagadish. K.S, "Alternative Building Materials Technology", New Age International, 2007.
2. Gambhir. M.L., & Neha Jamwal., "Building Materials, products, properties and systems", Tata McGraw Hill Educations Pvt. Ltd, New Delhi, 2012.
3. IS456-2000: Indian Standard specification for plain and reinforced concrete, 2011
4. IS4926-2003: Indian Standard specification for ready–mixed concrete, 2012
5. IS383-1970: Indian Standard specification for coarse and fine aggregate from natural Sources for concrete, 2011
6. IS1542-1992: Indian standard specification for sand for plaster, 2009

7. IS 10262-2009: Indian Standard Concrete Mix Proportioning–Guidelines, 2009

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written ExaminationScheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	III
Paper Title:	Construction Engineering Material	**Paper Code:**	CEE11064
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Define specific gravity.	**U**	**CO1**
2	What are the compositions of cement.	**R**	**CO2**
3	What is W/C ratio?	**R**	**CO3**
4	What is rotting of timber?	**R**	**CO3**
5	Define ply wood.	**U**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	What is Flakiness and elongation index?	**U**	**CO1**
(OR)			
6 b)	Summarize characteristics of good bricks.	**U**	**CO1**
7 a)	Compare between slaking of fat lime and hydraulic lime	**An**	**CO2**
(OR)			

7 b)	What in consistency of cement?	**U**	**CO2**
8 a)	What is slump of concrete?	**R**	**CO3**
	(OR)		
8 b)	Explain workability of concrete.	**R**	**CO3**
9 a)	Draw a cross section of timber showing all its important layers.	**R**	**CO4**
	(OR)		
9 b)	What is distemper?	**U**	**CO4**
10 a)	What is composite material?	**R**	**CO5**
	(OR)		
10 b)	What is Geotextiles?	**U**	**CO5**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	Explain how the fineness modulus of coarse and fine aggregate is determined	**U**	**CO1**
11 b)	Explain about classification of stone.	**R**	**CO1**
12 a)	Write a short note on type of cements.	**R**	**CO2**
	(OR)		
12 b)	Write about the dry process of cement production.	**An**	**CO2**
13 a)	Describe the test procedure of compacting factor.	**App & An**	**CO3**
	(OR)		
13 b)	What are the different type curing procedure? Explain.	**App & An**	**CO3**
14 a)	Discuss about classification of Timber and characteristics of good timber	**An**	**CO4**
	(OR)		
14 b)	Explain the seasoning procedure of timber	**U**	**CO4**
15 a)	Write a short note on the components of paint and their role.	**U**	**CO4**

(OR)			
15 b)	Explain the quality of good paint.	**An**	**CO4**
16 a)	Write a short note on AAC bricks.	**U**	**CO5**
(OR)			
17 a)	Write a short note fiber reinforced concrete.	**U**	**CO5**
(OR)			
17 b)	Write a short note on advantages of fiber reinforced concrete over conventional concrete.	**An**	**CO5**

CEE11007	Structural Mechanics-II	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics-I				
Co-requisites	------------------------------				

Course Objectives

1. To introduce principles of Structural Mechanics, need of analysis of structures, different techniques of analysis of determinate and indeterminate structures.
2. To apply principles of science and engineering in analysis, design and operation of civil engineering structures.
3. To expose students to the challenges involved in analysis of structures through examples, numerical problems and practical problems.
4. To enrich the knowledge and skills of engineers to proactively anticipate problems faced in structural engineering and resolve them effectively with best-practices.
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Computation of Strain Energy.	Remember (L1)
CO2	Determination of slope and deflection of determinate beams and analysis of trusses.	Understand (L2)
CO3	Analysis of statically indeterminate structures.	Applying (L3)
CO4	Calculation of forces and moments in three hinged arches and cable structures.	Analyzing (L4)
CO5	Computation of S.F. and B.M. of beams under rolling load and drawing of influence line diagram.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Structural Mechanics is the determination of the effects of loads on physical structures and their components. This course includes specific activities like computing a structure's deformations, internal forces, stresses, strain energy, support reactions, accelerations, and stability for determinate and indeterminate structures. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator.

Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: 10 Lecture Hours

Introduction: General Concept of Static Equilibrium of Structures, Concept of Free Body Diagram. Support and connection, Elastic and linear behaviour of structure, Principal of superposition.

General Theorem relating to elastic structure: Principal of virtual work, Strain energy stored due to axial loading. , Maxwell's reciprocal deflection theorem, Betti's law, Castigliano's 1st theorem.

Unit II: 10 Lecture Hours

Analysis of statically determinate structures: Analysis of Statically Determinate Trusses, Moment Area Theorem, Conjugate Beam Method, Maxwell Betti's Theorem, Method of Superposition, Application of Energy Methods to Statically Determinate Beams, Rigid Frames.

Unit II: 8 Lecture Hours

Analysis of statically indeterminate structures: Introduction to Analysis of Statically Indeterminate Trusses, beams- Continuous, propped cantilever, fixed beam, frames-symmetric, unsymmetrical using Energy Methods.

Unit IV: 10 Lecture Hours

Analysis of Arches and cable structures: Analysis of Three hinged arch, Cable equation of the cable, Horizontal tension in the cable supported at different levels, Length of cable support at the same level and different levels, Effect on cable due to temperature change, Three hinged stiffening girder.

Column and Struts: Theory of bucking , Euler's theory of struts for different support conditions , Struts subjected to axial loads , Euler's and Rankine's design formula, Struts subjected to eccentric and lateral loading , struts with initial curvature.

Unit V: 10 Lecture Hours

Analysis of Rolling Loads and Influence Line Diagram: Analysis of bendingmoment, shear force subjected to a concentrated, series of rolling load , Analysis of bending moment and shear force subjected to a UDL rolling load, Maximum bending moment and absolute bending moment concepts.

Reference Books

4. S. P. Timoshenko & D. H. Young, Theory of Structures, Tata McGraw Hill.
5. C. K. Wang, Intermediate Structural Analysis, Tata McGraw Hill.
6. R. C. Hibbler, Structural Analysis, Pearson publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

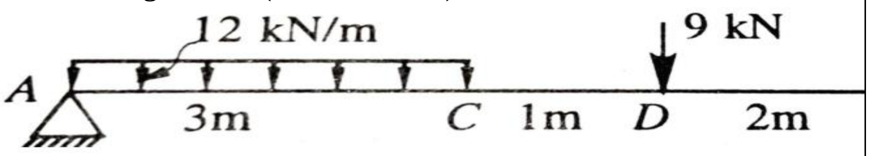
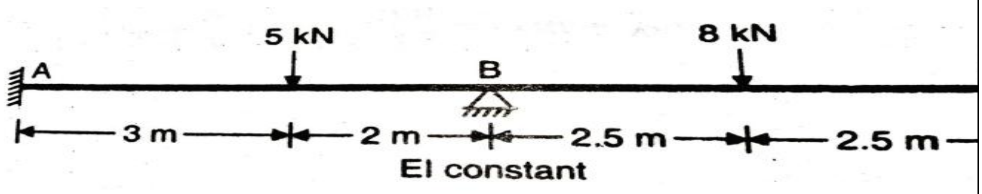
Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

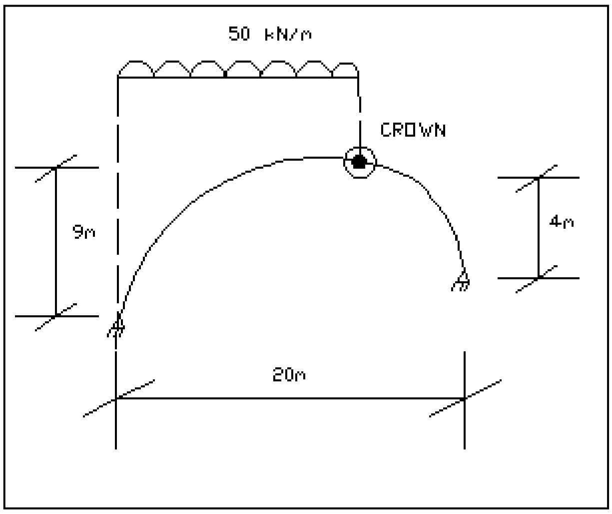
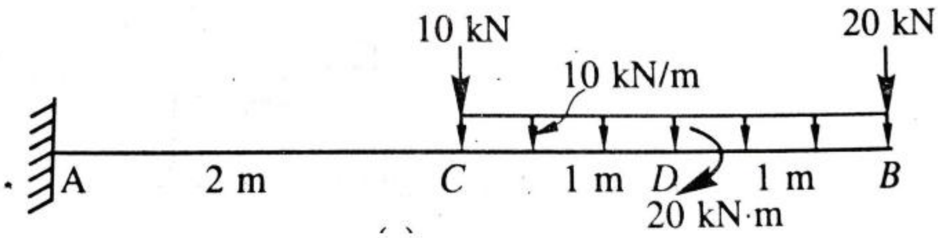
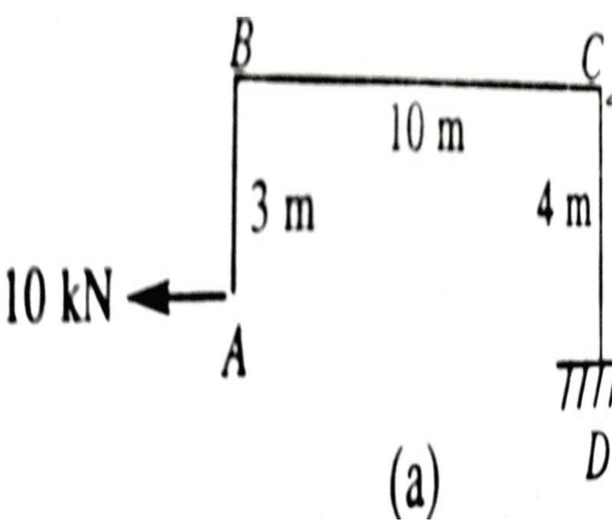
Model Question Paper

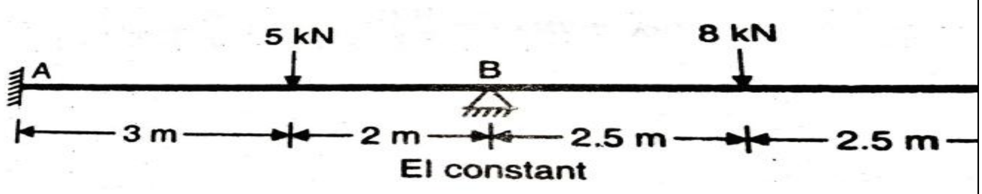
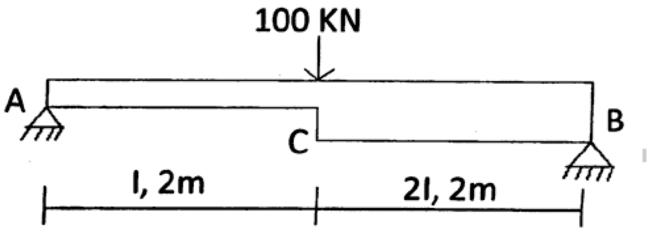
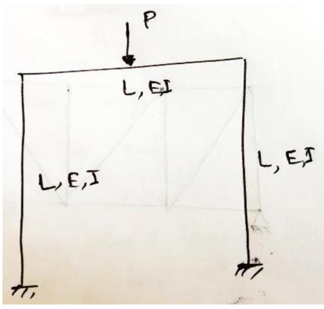
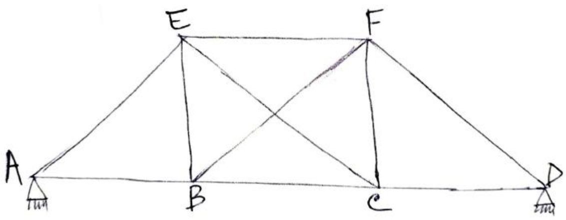
ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session:)		
Name of the Program:	B.TECH	**Semester:**	III
Paper Title:	STRUCTURAL MECHANICS-II	**Paper Code:**	CEE11007
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.		

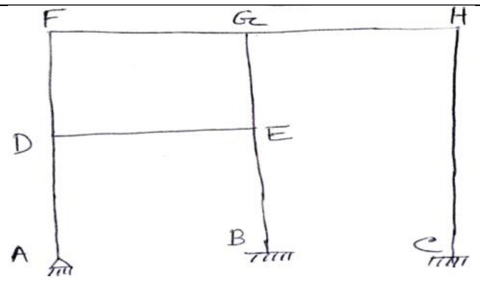
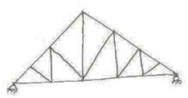
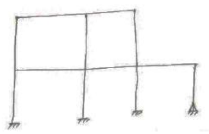
	Assumptions made if any, should be stated clearly at the beginning of your answer.

Group A **Answer All the Questions (5 x 1 = 5)**			
1	A three-hinge arch is a) Statically determinate because of central hinge. b) Determinate springing are at same level. c) Statically determinate. d) Statically determinate or indeterminate depending upon loading.	**U**	**CO1**
2	The slopes at the ends of a simply supported beam of span *'l'* under a uniformly distributed load 'w'per unit length is a) $wl^3/8EI$ c) $wl^3/16EI$ b) $wl^3/24EI$ d) $wl^3/48EI$	**R**	**CO2**
3	In a cantilever beam of space '*l*' and flexural rigidity 'EI' the total strain energy under a concentrated load 'W' is a) $W^2l^3/6EI$ c) $W^2l^4/3EI$ b) $W^2l^4/8EI$ d) $W^2l^4/6EI$ c)	**R**	**CO3**
4	The degree of static indeterminacy of a propped cantilever beam is a) 0 c) 2 b) 1 d) 3	**R**	**CO4**
5	Degree of kinematic indeterminacy of a beam fixed at both ends is a) 0 c) 2 b) 1 d) 3	**U**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	What is Degree of Freedom?	**An**	**CO1**
(OR)			
6 b)	Calculate Degree of Redundancy for Propped cantilever beam.	**U**	**CO1**
7 a)	Calculate Degree of Freedom for Fixed beam.	**An**	**CO2**
(OR)			

7 b)	Depict the principle of Unit load Method.	**U**	**CO2**
8 a)	Depict Castigliano's second theorem.	**U**	**CO3**
	(OR)		
8 b)	Calculate Degree of Freedom for Propped cantilever beam.	**R**	**CO3**
9 a)	What is Degree of Redundancy?	**Ev**	**CO4**
	(OR)		
9 b)	Calculate Degree of Redundancy for Fixed beam.	**U**	**CO4**
10 a)	Calculate the total strain energy under a concentrated load 'W' for a cantilever beam of length '*l*' and flexural rigidity 'EI'.	**R**	**CO5**
	(OR)		
10 b)	Depict Castigliano's first theorem.	**U**	**CO5**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	Determine the slope at A and deflection at C in the beam by Unit load method shown in Fig. below (EI is constant).  	**U**	**CO1**
	(OR)		
11 b)	Determine BM diagram for the following structure by Moment distribution method.  	**R**	**CO1**
12 a)	Calculate the horizontal thrust & the reactions at the hinges and the maximum bending moment anywhere on the arch shown in Fig. below.	**R**	**CO2**

			
(OR)			
12 b)	By Moment area method, determine the slopes and the deflection at B in the beam shown in Fig. below. Given also EI is constant. 	**An**	**CO2**
13 a)	Determine the horizontal, vertical and rotational displacements at A in the rigid jointed frame shown in Fig.(a) below (EI is constant). 	**App & An**	**CO3**
(OR)			

13 b)	Determine BM diagram for the following structure by Moment distribution method. 	App & An	CO3
14 a)	Find out the deflection at point *C* under the load by Strain energy method. (I = 50 X 10^6 mm^4, E = 200 X 10^6 KN/m^2) 	An	CO4
(OR)			(OR)
14 b)	Determine BM diagram for the following structure by slope deflection method. 	An	CO4
15 a)	Determine Statically indeterminacy for the following structures. 	U	CO4

			
	(OR)		(OR)
15 b)	Derive the equation of Horizontal thrust for Two hinged arch as stated below. (All notations are as usual) $H = \dfrac{\int \mu \, . y \, dx}{\int y^2 dx}$	**Ev**	**CO4**
16 a)	A cantilever beam 4 m long with constant EI is subjected to two 20 kN loads, one at 2 m from fixed end another at free end respectively. Compute deflection at the free end using Conjugate Beam Method.	**U**	**CO5**
	(OR)		(OR)
16 b)	Determine Static indeterminacy for the following structures.  	**U**	**CO5**
17 a)	Determine the horizontal thrust for a two hinged parabolic arch loaded by a concentrated load ‘P’ at its crown. The curvature of the parabolic arch follows $y = \frac{4h}{L^2} x(L - x)$ Where, h = height of arch, L =span of the arch	**R**	**CO5**
	(OR)		(OR)
17	What is rotation factor? How can we find rotation factor for a continuous beam?	**U**	**CO5**

b)			

CEE11010	**Prof. Core – VII: Water Resources Engineering**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Prof. Core – II: Fluid Mechanics and Hydraulic Machinery				
Co-requisites	Prof. Core – IV: Soil Mechanics				

Course Objectives

1. To study in detail about the various process involved in hydrologic cycle and to understand the concept of flood hydrograph. gather information about importance of Indian water resources management and development and knowledge about irrigation systems required for farms and other sectors as per standards.
2. To study about the different aspects of ground water and understand about various wells for ground water irrigation and usage.
3. To understand importance of irrigation in India and the concept of soil-moisture relationship.
4. To gather information about the flood and drought scenario in India and to study the different methods to mitigate them.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Explain the concept of hydrologic cycle and calculate the mean precipitation, infiltration rate, capacity, runoff and peak flood flow from a catchment.	Remember (L1)
CO2	Explain the importance of ground water and the details of saturated formation.	Understand (L2)
CO3	Explain the irrigation types and water distribution techniques for irrigation and also plan measures and suggest methods for reclamation of water logged lands.	Applying (L3)
CO4	Estimate the water requirement of various crops by calculating the field capacity and consumptive use.	Analyzing (L4)
CO5	Estimate design flood for the design of hydraulic structures and explain various measures for water conservation to battle drought.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course covers the basic concepts of engineering hydrology related to various process of hydrologic cycle, hyetograph and hydrograph and groundwater hydrology. This course also covers basic concepts of irrigation engineering related to distribution systems, techniques, water requirements of crops, concept of using ground water for irrigation and its movements, aquifers with the help of wells. It also covers the study about water loggedsoils, flood and drought management as well as water harvesting. Demonstration of various irrigation systems and other elements will be provided by pictorial representations as per requirements. Numerical problems will be solved in connection with the several aspects of water resources engineering. Classes will be conducted by lectures as well as power point presentation asper the requirements. Discussions related to development of various empirical equations regarding water resources engineering will be done as well. Students will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Unit I: 12 Lecture Hours

Hydrologic Cycle: Introduction, Water budget equation, Precipitation - forms, classification, measurement, selection of rain-gauge station, data analysis of precipitation; Evaporation and its measurement, Evapotranspiration; Infiltration - factors affecting infiltration, measurement, infiltration indices: w-index and ø-index, Horton's equation and Green-Ampt method.

Hyetograph and Hydrograph Analysis: Hyetograph, Runoff - drainage basin characteristics, Hydrograph concept, runoff computation, flood discharge calculation; Unit Hydrograph - assumptions and limitations of unit hydrograph, derivation of unit hydrograph, numerical on unit hydrograph, S-curve Hydrograph, numerical, Flow duration curve.

Unit II: 8 Lecture Hours

Ground water and Well Hydrology: Importance of ground water, Ground water resources, Occurrence of ground water, Movement of ground water, Aquifers and their types, Confined and unconfined aquifers, perched aquifer, Theim's equilibrium formula for unconfined and confined aquifers, Ground water for Irrigation through wells and tube wells, Classifications of Wells - Open Wells, Yield of well, Efficiency of well, Tube wells—Types of tube wells,Yield of tube-wells.

Unit III: 7 Lecture Hours

Introduction to Irrigation: Definition, Necessity of irrigation in India, Benefits and ill-effects of irrigation, social and environmental consideration, Types of irrigation, Techniques of water distribution in the farms, Types of irrigation schemes, Irrigation development in India.

Water Logging: Causes, Reclamation, Drainage principles and practices.

Unit IV: 8 Lecture Hours

Water Requirement of Crops: Soil-water-plant relationship, field capacity, wilting point, available moisture, Consumptive use, Irrigation requirement - net irrigation requirement, field irrigation requirement, gross irrigation requirement, Soil moisture extraction pattern, Frequency of irrigation, Principle crops in India, Gross command area, culturable command area, Intensity of irrigation, Duty, Delta, Base-period, Relation between them, Irrigation efficiency, Assessment of irrigation water.

Unit V: 10 Lecture Hours

Flood Management: Indian Rivers and flood, Causes of flood, Alleviation, leeves and flood walls, Floodways, Channel improvement, Flood damage analysis.

Hydrologic Analysis: Design flood, Flood estimation, Frequency analysis, Flood routing through reservoirs and open channels.

Drought Management: definition, causes of drought, measures for water conservation and augmentation, drought contingency planning.

Water Harvesting: Rain water collection, Small dams, Runoff enhancement, Runoff collection, ponds and tanks.

Reference Books

1. K. Subramanya, Engineering Hydrology, Tata McGraw Hill Pub. Co. New Delhi.
2. Ven Te Chow, D.R. Maidment and L.W Mays, Applied Hydrology, McGraw Hill International Edition, New York
3. S K Garg, Irrigation Engineering & Hydraulic Structures, Khanna Publishers.
4. G L Asawa, Irrigation Engineering, Wiley Eastern
5. R.K. Linsley, J.B. Franzini, D.L. Freyberg and G. Tchobanoglous, Water Resources Engineering, McGraw Hill Singapore.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)

Name of the Program:	B.Tech in CE	**Semester:**	IV
Paper Title:	Water Resources Engineering	**Paper Code:**	CEE11010
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	3
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	**What** is the name of instrument that measure Evapotranspiration?	**R**	**CO1**
2	**How** an aquifer can be identified?	**U**	**CO2**
3	**Define** irrigation engineering.	**R**	**CO3**
4	**What** do you understand by field capacity?	**R**	**CO4**
5	**Define** drought.	**R**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	**Explain** the various factors which affect the storm hydrograph.	**U**	**CO1**
(OR)			
6 b)	**What** is hydrologic cycle? Briefly **explain** its various process.	**U**	**CO1**
7 a)	**Explain** the various types of saturated geological formation giving an example for each type.	**U**	**CO2**
(OR)			
7 b)	**Compare** confined and unconfined aquifer with the help of a neat and clean diagram.	**An**	**CO2**
8 a)	**Show** the advantages and disadvantages of irrigation.	**U**	**CO3**
(OR)			
8 b)	**Define** water logging. **Explain** its various effects on the irrigation field.	**R, U**	**CO3**
9 a)	**Derive** the relation between duty, delta and base period.	**U**	**CO4**

<table>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>9 b)</td><td>What is consumptive use of crops? What are the factors affecting it?</td><td>U</td><td>CO4</td></tr>
<tr><td>10 a)</td><td>Give a short note on rain water harvesting.</td><td>R</td><td>CO5</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>10 b)</td><td>Explain the flood scenario in North-East India.</td><td>An</td><td>CO5</td></tr>
<tr><td colspan="4">Group C
Answer All the Questions (7 x 5 = 35)</td></tr>
<tr><td>11 a)</td><td>A 30 cm diameter well penetrates 25 m below the static water table. After 24 hours of pumping @ 5400 liters/minute, the water level in a test well at 90 m is lowered by 0.53 m, and in a well 30 m away the drawdown is 1.11 m. Determine the drawdown in the main well.</td><td>App</td><td>CO2</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>11 b)</td><td>Derive Thiem’s equilibrium equation for unconfined aquifer with the help of a neat diagram. Also, mention the various assumptions made in deriving the equation.</td><td>U</td><td>CO2</td></tr>
<tr><td>12 a)</td><td>The ordinates of 6 hr unit hydrograph are as under:
<table>
<tr><th>Time (from the begining of rainfall) in hours</th><th>Ordinate of the Unit Hydrograph in cumecs</th></tr>
<tr><td>0</td><td>0</td></tr>
<tr><td>6</td><td>20</td></tr>
<tr><td>12</td><td>50</td></tr>
<tr><td>18</td><td>150</td></tr>
<tr><td>24</td><td>120</td></tr>
<tr><td>30</td><td>90</td></tr>
<tr><td>36</td><td>70</td></tr>
<tr><td>42</td><td>50</td></tr>
<tr><td>48</td><td>30</td></tr>
<tr><td>54</td><td>20</td></tr>
<tr><td>60</td><td>10</td></tr>
<tr><td>66</td><td>0</td></tr>
</table>
If two storms, each of unit rainfall excess in 6 hours duration, reach the catchment in succession, then draw the hydrograph resulting from these two storms. The stream may be assumed to have a uniform base flow of 2 cumecs.</td><td>App</td><td>CO1</td></tr>
<tr><td colspan="4">(OR)</td></tr>
</table>

<table>
<tr><td>12 b)</td><td>The ordinates of a 3 hr unit hydrograph of a catchment are as under:
<table>
<tr><td>Tine (h)</td><td>0</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td><td>21</td></tr>
<tr><td>Ordinates of 3 h U.H (m^3/s)</td><td>0</td><td>10</td><td>20</td><td>16</td><td>12</td><td>8</td><td>4</td><td>0</td></tr>
</table>
Derive the flood hydrograph at the catchment outlet due to a storm shown below:
<table>
<tr><td>Time from start of storm (h)</td><td>0</td><td>3</td><td>6</td><td>9</td></tr>
<tr><td>Accumulated rainfall (cm)</td><td>0</td><td>3.9</td><td>4.7</td><td>7.6</td></tr>
</table>
Assume ϕ_{index} of the catchment as 0.3 cm/h and a constant base flow of 10 m^3/s.</td><td>App</td><td>CO1</td></tr>
<tr><td>13 a)</td><td>Estimate the water application efficiency when 10 m^3/s of water is diverted to 32 hectare field for 4 hours. Soil probing after irrigation showed that 0.3 m of water had been stored in the root zone.</td><td>App</td><td>CO3</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>13 b)</td><td></td><td></td><td>CO3</td></tr>
<tr><td>14 a)</td><td>A rice crop is to be irrigated in a field covering an area of 2400 hectare, the duty and base period of rice are given as 860 ha/cumec and 120 days respectively. Estimate volume of water required in the field.</td><td>App</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>14 b)</td><td>Determine the field capacity of the soil for the following data:
i. Depth of root zone = 1.8 m
ii. Existing moisture = 8%
iii. Dry density of soil = 1450 kg/m^3
iv. Quantity of water applied to the soil = 650 m^3
v. Water lost due to deep percolation and evaporation = 10%
Area to be irrigated = 1000 m^3</td><td>App</td><td>CO4</td></tr>
<tr><td>15 a)</td><td>Explain the process of flood routing through reservoirs.</td><td>U</td><td>CO5</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>15 b)</td><td>What is rain water harvesting? Explain the various methods of roof top rainwater harvesting.</td><td>U</td><td>CO5</td></tr>
<tr><td>16 a)</td><td>Estimate net irrigation requirement per metre depth of soil using following data: Field capacity = 20%, permanent wilting point = 10%, permissible depletion of availablesoil moisture = 50%, dry unit weight of soil = 15kN/m^3, effective rainfall = 50 mm.</td><td>App</td><td>CO3</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>16 b)</td><td>Discuss about soil profile related to soil moisture irrigation relationship.</td><td>U</td><td>CO3</td></tr>
<tr><td>17 a)</td><td>In a 140 min storm, the rainfall rates observed in successive 20-min intervals are given in the table below. Assuming Φ- index value as 3 mm/hour and an</td><td>App</td><td>CO1</td></tr>
</table>

	initial loss of 0.8 mm, determine the total rainfall, surface runoff and W-index for the storm.		

Time Period (Minutes)	20	20	20	20	20	20	20
Rainfall Rate (mm/hr)	6.0	6.0	18.0	13.0	2.0	2.0	12.0

(OR)			
17 b)	Define evapotranspiration. Explain the various factors affecting evaporation.	**U**	**CO1**

CEE11015	**Prof. Core – VIII:** Transportation Engineering	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	11^{th} level Physics				
Co-requisites					

Course Objectives

1. To help in acquiring knowledge about ancient roads and road development planning in India.
2. To make students apply basic science principles in highway alignment and prepare a detail drawing.
3. To give the students a detailed idea about the various geometric elements within a highway.
4. To deliver a detailed idea about various Bituminous Materials and different types of Pavement available in the present day scenario.
5. To demonstrate different methods of design for pavements.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	**Demonstrate** the nature of roads in the ancient days and development of the same through road development planning in India.	Remember (L1)
CO2	**Infer** basic science and principles behind finalizing a highway alignment.	Understand (L2)
CO3	**Explain** various geometric elements within a highway, both in horizontal and vertical plane.	Applying (L3)
CO4	**Illustrate** various pavement materials and **Outline** different associating factors in both Flexible and Rigid Pavements.	Analyzing (L4)
CO5	**Categorize** various available methods of design for both Flexible and Rigid Pavement.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Transportation engineering or transport engineering is the application of technology and scientific principles to the planning, functional design, operation and management of facilities for any mode of transportation in order to provide for the safe, efficient, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods transport.
Due to economic growth and automobile infrastructure it is becoming a challenge for a pavement engineer to design a pavement durable and long lasting. Before any planning occurs an engineer must take what is known as an inventory of the area or, if it is appropriate, the previous system in place. This inventory or database must include information of different kinds of pavement structures, land use, economic activity, materials used, community values and expectations. These inventories help the engineer create business models to complete accurate forecasts of the future conditions of the system.
Classroom activities will be planned to encourage students to play an active role building of their knowledge from the beginning of road development planning and various strategies during field work.

Course Content

Unit 1: **8 Lecture Hours**

Highway planning: Classification of roads, brief history of road development in India, present status of roads in India, Recommendations by Jayakar Committee, road patterns, saturation systems.
Highway alignment:
Basic requirements of Highway alignment, factors governing alignment. Alignment in hilly areas, Highway location surveys and studies. Drawings and reports.

Unit2: **12 Lecture Hours**

Module 2:
Geometric Design of Highways: Elements of geometric design, Design controls and criteria, Terrain classification and Design speed, vehicular characteristics, highway cross-section elements. Introduction to sight distance and reaction time, analysis of safe sight distance, analysis of overtaking sight distance, intersection sight distance.
Design of horizontal alignment: horizontal curves, design of super elevation and its provision, radius at horizontal curves, widening of pavements at horizontal curves, analysis of transition curves.
Design of vertical alignment: Different types of gradients, grade compensation on curves, analysis of vertical curves, summit curves, valley curves.

Unit3: **8 Lecture Hours**

Introduction to Pavements Materials & Pavements: Different Types of Bituminous Materials and their applications, Types of pavements. Comparison of pavements, components and functions of flexible pavements, pavement design factors, design wheel load, equivalent single wheel load, repetition of loads, equivalent wheel load factors, climatic factors.

Unit4: **8 Lecture Hours**

Design of flexible highway pavement: Empirical methods, Semi-empirical methods, Mechanistic Empirical Methods. Calculation of Stresses in Flexible Pavement, IRC Design Parameters, Design of flexible highway pavement as per IRC approach.

Unit5: **9 Lecture Hours**

Design of Rigid Pavement: Stresses in Rigid highway pavements, Critical load positions, Critical combination of stresses, Types of Rigid Pavement, Joints in rigid pavements: transverse joints, longitudinal joints, fillers and sealers. Design of Rigid Pavement as per IRC Approach.

Text Books

1. Highway Engineering by S.K.Khanna, C.E.G.Justo, A. Veeraragavan, Publisher - Nem Chand & Bros., Revised 10^{th} Edition.
2. Principles, Practice and Design, QA of Highway Engineering by Dr.S.K.Sharma, Publisher - S. Chandand company Ltd., reprint, 2017
3. Traffic engineering and transport planning by L.R.Kadiyali, Khanna Publishers.

Reference Books

1. Highway Engineering by L.R. Kadiyali, Khanna Publishers.
2. Principles of Transportation Engineering by Partha Chakraborty, Animesh Das- PHI Learning Pvt. Ltd., 01-Jan-2003

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY

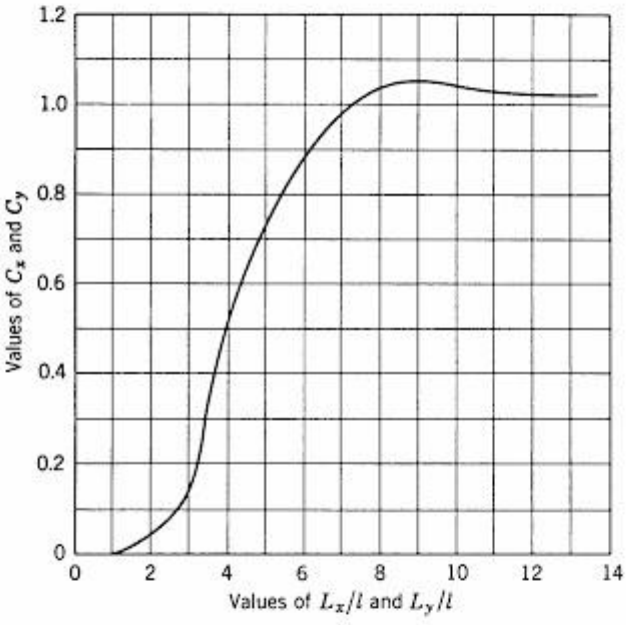
END SEMESTER EXAMINATION

(Academic Session: 2020 – 21)

Name of the Program:	B.Tech in CE	**Semester:**	IV
Paper Title:	Transportation Engineering	**Paper Code:**	CEE11015
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	What was the classification of road as per “Nagpur Road Plan”? (Just mention those types)	**U**	**CO1**
2	What is the function of ‘Base Course’ for Rigid Pavement?	**R**	**CO5**
3	Demonstrate the importance of Reconnaissance Survey during Highway Alignment.	**R**	**CO2**
4	What are the most important things to consider during the design of valley curve?	**R**	**CO3**
5	Why now a days Tar is not castoff by the Engineers in Road Construction Projects?	**U**	**CO4**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	What were the planning made during the “First 20 Year Road Development Planning in India”?	**R**	**CO1**
(OR)			
6 b)	With a rough sketch show Radial or star and grid pattern of road. State advantage of this road pattern. (1+1)	**U**	**CO1**
7 a)	What are the requirements of an ideal alignment?	**An**	**CO2**
(OR)			
7 b)	Illustrate the role of the factor ‘Monotony’ in finalizing an ideal alignment?	**U**	**CO2**
8 a)	Derive an expression of Stopping Site Distance for a vehicle, travelling along a downward gradient.	**An**	**CO3**
(OR)			
8 b)	Derive an equation for finding the super elevation required if the design coefficient of lateral friction is ‘f’. Mention other variables used in this expression.	**An**	**CO3**
9 a)	What is Bitumen Emulsion? What is the application of Bitumen Emulsion in Roads?	**R**	**CO4**
(OR)			
9 b)	Explain the ‘Pumping Action’ in Rigid Pavement.	**U**	**CO4**
10 a)	What are the functions of Joints in Rigid Pavement?	**R**	**CO5**
(OR)			
10 b)	Distinguish between ‘Warping Stress’ and ‘Frictional Stress’ in Rigid Pavement.	**U**	**CO5**
Group C			

<table>
<tr><th colspan="4">Answer All the Questions (7 x 5 = 35)</th></tr>
<tr><td>11 a)</td><td>Explain the Engineering survey procedures before finalizing a new alignment of Road.</td><td>U</td><td>CO2</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>11 b)</td><td>How Obligatory Points are responsible for finalizing an ideal alignment of a Road?</td><td>R</td><td>CO2</td></tr>
<tr><td>12 a)</td><td>What were the recommendations by Jayakar Committee in regards of Highway Development in India? Mention the name of official bodies and their year of establishments after Jayakar Committee. (3+2)</td><td>R</td><td>CO1</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>12 b)</td><td>What is Saturation System? Mention the steps involved for finding an ideal Plan Proposal in a Road Project as per this System. (1+4)</td><td>R & U</td><td>CO1</td></tr>
<tr><td>13 a)</td><td>The speed of overtaking and overtaken vehicles is 80 kmph and 60 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/s2, then calculate safe overtaking sight distance and minimum length of overtaking zone. Take other data values as per IRC.</td><td>App & An</td><td>CO3</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>13 b)</td><td>A valley curve is formed by a descending gradient of 1 in 25 meeting an ascending gradient of 1 in 40. Design the length of valley curve to fulfil both comfort condition and head light sight distance requirements for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration is equal to 0.63 m per sec^3.</td><td>App & An</td><td>CO3</td></tr>
<tr><td>14 a)</td><td>Find ESWL at depths of 5 cm, 20 cm and 40 cm for a dual wheel carrying 2044 kg each. The centre to centre tyre spacing is 20 cm and distance between the walls of the two tyres is 10 cm.</td><td>An</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>14 b)</td><td>The following data is obtained from the axle load survey conducted for 4 days. Determine the equivalent number of standard axle loads of 80 kN repetitions per year.
<table>
<tr><td>Axle Load in kN</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td><td>70-80</td><td>80-90</td></tr>
<tr><td>No. of Axles</td><td>45</td><td>62</td><td>67</td><td>78</td><td>115</td><td>106</td></tr>
<tr><td>Axle Load in kN</td><td>90-100</td><td>100-110</td><td>110-120</td><td>120-130</td><td>130-140</td><td>140-150</td></tr>
<tr><td>No. of Axles</td><td>110</td><td>99</td><td>75</td><td>89</td><td>62</td><td>79</td></tr>
</table></td><td>An</td><td>CO4</td></tr>
<tr><td>15 a)</td><td>Describe the different types of Cutback Bitumen with examples. Differentiate ‘Flexible Pavement’ and ‘Rigid Pavement’. (3+2)</td><td>U</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>15 b)</td><td>Explain the phenomena ‘Frost Heave’ and mention the suggestions for overcome of this phenomena? (2.5+2.5)</td><td>Ev</td><td>CO4</td></tr>
<tr><td>16 a)</td><td>The width of expansion joint gap is 2.2 cm in a cement concrete pavement. If the laying temperature of slabs is 18°C and the maximum temperature in summer is 44°C, then design the spacing of expansion and contraction joint. Assume, plain cement concrete construction with thermal co-efficient be 10×10^{-6} per °C, unit weight of concrete is equal to 2400 kg/m^3, allowable stress in tension during initial curing period = 0.8 kg/cm^2 and co-efficient of friction at the interface = 1.4</td><td>An</td><td>CO5</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>16 b)</td><td>Design the size and spacing of Dowel Bars at the expansion joints of a cement concrete pavement of thickness 240 mm with radius of relative stiffness being 820 mm and design wheel load of 5 tonnes. Assume load capacity of the dowel system as 40% of the design wheel load. Expansion joint gap is 22 mm, permissible shear and flexural stresses in dowel bars are 1000 kg/cm^2 and 1400 kg/cm^2 respectively and permissible bearing stress in cement concrete is 110 kg/cm^2.</td><td>An</td><td>CO5</td></tr>
</table>

17 a)	Determine the value of Cumulative number of standard axles for a two lane carriage way with Initial traffic in the year of completion of construction = 400 CVPD (sum of both directions), traffic growth rate is 7% per annum, design life of the pavement = 14 years and vehicle damage factor is equal to 2.4. Also determine the overall pavement thickness if CBR of subgrade soil would be 6%. (4+1)	**App & An**	**CO5**
(OR)			
17 b)	A concrete slab 7.62 m long, 3.66 m wide and 203 mm thick, is subjected to a temperature differential of 11.1 °C. Assuming that k= 54.2 MN/m^3 and α_t= 9×10^{-6} per °C. Determine the maximum curling stress in the interior, edge and corner of the slab. Take the radius of contact as a= 152 mm. Assume the other data. 	**App & An**	**CO5**

PSG11021	Human Values and Professional Ethics	L	T	P	C
Version1.0		2	0	0	2
Pre-requisites/Exposure	--				
Co-requisites	--				

Course Objectives

1. To inculcate human values and professional ethics in students.
2. To enhance the understanding of students towards personal, professional &societal relationships and achieve harmony in life.
3. To develop moral responsibilities and ethical vision.

Course Outcomes

At the completion of the course, the student should be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Realize the importance of values, ethics, harmony and lifelong learning in personal and professional life	Remember (L1)
CO2	Understand the professional ethics in the socity	Understand (L2)
CO3	Apply the knowledge to perform self-exploration and transformation augmentingharmony, peace and positivity in the surroundings.	Applying (L3)
CO4	Infer core values that shape the ethical behavior of a professional.	Analyzing (L4)
CO5	Evaluate the professional responsibilities	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course aims to develop an understanding for a movement from rule based society to a relationship based society. Apart from teaching values, this course encourages students to discover what values are for them and for society. Self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs. It is designed in a way where students get familiar with the Ethical Code of Conduct, Ethical Dilemma, Conflict of Interest and all this will help them eventually in their professional life.

Course Content

Unit I: Introduction to Human Values: Character, Integrity, Credibility, Mutual Respect, Dedication, Perseverance, Humility and Perception. Self-assessment & analysis, Setting Life Goals, Consciousness and Self-Transformation. Team Work, Conflict Resolution, Influencing and Winning People, Anger Management, Forgiveness and Peace, Morality, Conscience. Yoga and Spirituality

Unit II: Harmony and Life Long Learning: Harmony in human being, Nature and Existence. Harmony in family and society–Responsibilities towards society, Respecting teachers. Transition from School to College-Freedom & Responsibilities, Respecting Cultural Diversity, Learningbeyond the Classrooms, Independent study and research.

Unit III: Introduction to Professional Ethics: Work Ethics, Engineering Ethics, MoralDilemma, Moral Development Theories, Ethical Theories- Kantinism, Utilitarianism, etc , Case Studies for Choice of the theory, Code of Ethics

Unit IV: Individual to Global Issues: Industrial Standards, A Balanced Outlook on Law, Safety, Responsibility, Rights, Confidentiality, Conflict of Interest, Occupational Crime, Whistle Blowing, Environmental Ethics, Business Conduct in MNC, E-Professionalism (IPR, Internet Ethics & Privacy issues)

Text Books

1. Shetty, Foundation Course in Human Values and Professional Ethics [R.R. Gaur, R.Sangal, G.P. Bagaria]

Modes of Evaluation: Quiz/Assignment/ Seminar/Written Examination Scheme:

Components	MTE	Presentation/Assignment/ etc	ETE
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE12065	Structural Mechanics Lab	L	T	P	C
Version 1.0		0	0	3	2
Pre-requisites/Exposure	Structural Mechanics-I				
Co-requisites	----------------------------------				

Course Objectives

1. To introduce basic principles of Solid Mechanics, need of analysis of Solid structures, different techniques of analysis.
2. To practice principles of basic and engineering sciences in analysis and operation of civil engineering systems.
3. To expose students to the challenges involved in analysis of Solid structures through various practical experiments.
4. To enrich the knowledge and skills of engineers to proactively anticipate problems faced in structural engineering and resolve them effectively with best-practices.
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the list of civil engineering materials	Remember (L1)
CO2	Understand the behaviour of different civil engineering materials	Understand (L2)
CO3	Determine the Tensile strength, Compressive strength, Bending strength, Torsional strength and Impact strength of Structural Materials.	Applying (L3)
CO4	Calculate the stiffness of closely coiled & open coiled helical spring.	Analyzing (L4)
CO5	Compute the Hardness of Ferrous and Non-Ferrous Metals.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Solid Mechanics deals with the behavior of Solid objects subject to stresses and strains. This course includes specific activities like computing a structure's Deformations, Stiffness, Hardness, Tensile strength, Compressive strength, Bending strength, Torsional strength and Impact strength of Structural Materials. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

EXP. NO. 01
Determination of Tensile strength of Structural Materials (e.g Mild Steel and Tor steel, HYSD bars).
EXP. NO. 02
Determination of Compressive strength of Structural Materials (e.g Timber, bricks and concrete cubes.
EXP. NO. 03
Determination of Bending strength of Mild Steel.
EXP. NO. 04
Determination of Torsional strength of Mild Steel Circular Bar.
EXP. NO. 05
Determination of Hardness of Ferrous and Non-Ferrous Metals (Brinnel and Rockwell Tests).
EXP. NO. 06
Determination of stiffness of closely coiled helical spring.
EXP. NO. 07
Determination of Impact strength of mild steel by Izod method.
EXP. NO. 08
Determination of Impact strength of mild steel by Charpy method.

Reference Books

1. S. P. Timoshenko & D. H. Young, Elements of Strength of Material, EWP Pvt. Ltd.
2. E. P. Popov, Engineering Mechanics of Solids, Pearson Education.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-

CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name: **Enrolment No:**	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: – Structural Mechanics Lab

Program: B.Tech. (CE)
Semester: IV
Time: 03 Hrs.
Max. Marks: 50

Attempt any two questions from **Section A** (each carrying 50 marks).

Section A (attempt any two)

1.	**Draw** the stress-strain graph of steel for tensile test by Universal Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, and conclusion.	**Analyzing**	**CO1**
2.	**Determine** the compressive strength of given concrete cube using Compressive Strength Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, calculations and conclusion.	**Analyzing**	**CO1**
3.	**Evaluate** bending strength of mild steel by Universal Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, and conclusion.	**Analyzing**	**CO1**
4.	**Determine** the Angle of twist using Torsion Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, calculations and conclusion.	**Analyzing**	**CO1**
5.	**Evaluate** the hardness number using Rockwell and Brinell Hardness Testing Machine. The write up should contain the	**Analyzing**	**CO3**

	objective/aim of the test, basic theory, observation & results, calculations and conclusion.		
6.	**Draw** the load-deflection graph for tension using Spring Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, and conclusion.	**Analyzing**	**CO2**
7.	**Determine** the Impact energy using Izod Impact Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, calculations and conclusion.	**Analyzing**	**CO1**
8.	**Calculate** the Impact energy using Charpy Impact Testing Machine. The write up should contain the objective/aim of the test, basic theory, observation & results, calculations and conclusion.	**Analyzing**	**CO1**

CEE12087	Prof. Core Lab – V Soil Mechanics Lab	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure					
Co-requisites					

Course Objectives:

1. To introduce different properties of fine and coarse grained soils, such as water content, specific gravity to the students.
2. To make students knowledgeable about the process of obtaining in-situ density and unit weight of the soil at site.
3. To provide the students a detailed idea about different types of Indian Standard (IS) Sieves available to determine gradation of cohessionless soil and to draw particle size distribution curves for granular soils by sieving; and to make them understand about sedimentation analysis for fine grained soils which is helpful to classify the soil.
4. To demonstrate consistency parameters of soil based on the Atterberg's limits, this will be necessary for settlement analysis.
5. To demonstrate compaction procedure for soil; this will help the students in site works, like - in roadway construction sites.
6. To provide understanding about the permeability property of soil; this is required in seepage analysis in case of hydraulic structures.

Course Outcomes:

On completion of this course, the students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Introduce the different properties of soil	Remember (L1)
CO2	Understand the process of obtaining in-situ density and unit weight of the soil at site.	Understand (L2)
CO3	Demonstrate the compaction characteristics of soil and permeability of soil.	Applying (L3)
CO4	Evaluate shear strength parameters of soil in various drainage conditions using different tests.	Analyzing (L4)
CO5	Estimate the consolidation and compressibility properties of soil.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Description:

Soil Mechanics Lab is a very important practice to make students capable to identify different properties of soil and to classify the soil. The basic properties of soil are related with both physical and engineering aspects; and both of these are important to analyze the foundation soil. For designing foundations, required to support superstructure, analysis of soil parameters is very crucial and based on the measured parameters of soil the bearing capacity can be assessed and further foundation design can be done. The water content, specific gravity, in-situ density etc. basically indicate the physical properties; whereas the grade and consistency of soil, its compaction and seepage properties are related to engineering.

From this course students will be able to estimate the shear strength of soil based on the shear strength parameters (c and φ) of soil beneath the foundation. The different methodologies for the tests will be explained and based upon that the tests will be demonstrated to students with different applied conditions. This course also includes Odometer test through which the compressibility and consolidation properties of soil can be analyzed along span of time, which will be helpful for estimating the settlement of the foundation for long time.

Laboratory activities will be planned to encourage students to play an active role in building their strategies during field work, prepare bore-log, soil report, foundation design etc. Participation in these sessions is an elemental aspect of this course to build up knowledge during practical work. This course will also contribute in relating theoretical knowledge with practical aspects for the students.

Course Content:

List of experiments

Sl. No.	Name of the experiment
1	Determination of natural moisture content of soil by oven drying method and calcium carbide method. Determination of specific gravity of soil using pyncnometer and specific gravity bottles.
2	Determination of in-situ density of soil by core cutter method and sand replacement method.
3	Determination of particle size distribution for cohesion less soil by sieve analysis and for fine grained soil by hydrometer analysis.
4	Determination of the Atterberg's limits (liquid limit, plastic limit and shrinkage limit) of soil sample.
5	Evaluation of compaction characteristics of soil using standard proctor test. Determination of the coefficient of permeability by constant head permeability test (for coarse grained soil) and by falling head permeability test (for fine grained soil).

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		

CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Averag e	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

Name:

Enrolment No:

Course: Geotechnical Engineering Lab (CEE12020)

Program: B.Tech. (CE) — **Time: 03 Hrs.**

Semester: V — **Max. Marks: 50**

Follow the instruction given by Lab Instructor during the exam

1	Determine the natural water content of the given soil sample by oven drying method and calcium carbide method. Also find the Specific gravity of the given sand by using the Pycnometer.	**Remember & Analysis**
2	Find the in-situ density and dry density of the soil in University campus by core cutter method and sand replacement method.	**Remember**
3	Show the Particle size distribution curve of a coarse grained soil by conducting Sieve analysis and explain the process.	**Remember & Analysis**
4	Determine the Liquid limit of given sample and show the flow curve. Also calculate the Flow Index of the sample.	**Remember & Analysis**
5	Show the compaction curve of given soil using Standard proctor test and determine its OMC and MDD. Also define Zero Air void line.	**Remember & Analysis**

Year - III

SEMESTER –V

CEE11014	**Foundation Engineering**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/ Exposure	Soil Mechanics				
Co-requisites	Geotechnical Engineering Lab				

Course Objectives

1. To understand stability of slopes in soil and stability analysis methods.
2. To prepare the Bore-log data sheets; get knowledge about different soil exploration methods, borings, sampling process of any soil investigation project, including Geo-physical exploration methods.
3. To get brief knowledge about shallow foundations, its types, various design aspects according to the different bearing capacity theories and factors.
4. To understand Settlement and Bearing Capacity analysis for raft foundation.
5. To get a brief idea about deep foundations, like – pile foundations along with their design considerations and to gather understanding about drilled shafts, drilled piers, well foundation, caissons.
6. To understand the design and construction of different earth retaining structures as per the earth pressure theories.
7. To impart knowledge about different types of Machine foundations according to the feature of the machine and nature of the foundation soil.
8. To solve the settlement problems of foundations, constructed over expansive soil.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Compute the stability of slopes in soil and evaluate the subsoil condition at site adopting suitable soil exploration methods.	Remember (L1)
CO2	Estimate the bearing capacity of foundation soil satisfying the Shear failure as well as Settlement criteria.	Understand (L2)
CO3	Illustrate the design and installation procedures of deep foundations, mainly the piles, piers and caissons.	Applying (L3)
CO4	Find the earth pressures for various backfill conditions and design the earth retaining structures.	Analyzing (L4)
CO5	Design the machine foundation enhancing controls over various modes of vibration generated from machine; solve the problem regarding Expansive soils.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Foundation engineering is the course from which one can get a brief idea about the sub-soil condition using the soil exploration techniques. It also includes stability of slopes in case of earthen embankments. It gives knowledge different types of foundations, their functions with their limitations. In the case for shallow foundations (isolated, combined, raft etc.), one get knowledge of bearing capacity of soil, type loading, stress distributions, the existence of the water table etc. are too important. And under deep foundations (pile, well etc.), except bearing capacity, the knowledge of skin friction, group functions, earth pressure, water pressure, various components of caisson, its sinking and their designs as per IS codes are very crucial for the future engineers. Besides of these, the design of retaining structures (retaining walls, sheet piles etc.) accordingly the position of failure plane and different earth pressure theories. The design aspects of machine foundations and foundations on expansive soils also studied. Classes will be conducted by lecture, brief calculations according to relevant IS codes. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator.

Course Content

Unit I: 10 Lecture Hours

Stability of Slopes: Introduction, different factors of safety, types of slope failures, stability analysis of finite and infinite slopes, swedish slip circle method, friction circle method, stability numbers and charts, Bishop's method.

Soil Exploration and Site Investigation: Introduction, planning of soil exploration program, description of samplers with area ratios, field testing, drilling bore holes, preparation of bore-log and soil investigation report; Geo-physical exploration - seismic refraction survey, electrical resistively method, problems.

Unit II: 10 Lecture Hours

Shallow Foundations: Definitions of ultimate bearing capacity, gross, net and safe pressures, allowable bearing pressure, types of shallow foundations, modes of bearing capacity failures, Rankine's approach, Bearing Capacity using Prandtl, Terzaghi and Meyerhof's method of analysis and from SPT and SCPT and Plate load Test data, Effects of Size, Shape and Water Table. Combined footings, Modulus of sub-grade reaction and effecting parameters.

Raft Foundation: Settlement and Bearing Capacity analysis, Design of Raft including floating raft, Analysis of flexible and rigid raft as per IS2950.

Unit III: 11 Lecture Hours

Deep Foundations - Pile: Types of pile foundations, Tension piles, Laterally loaded piles: Elastic continuum approach, Under-reamed piles, Ultimate load Analysis, mechanics of load transfer in piles, load carrying capacity, dynamic and static formulae, Deflection and maximum moment as per IS 2911, Pile load test, design of pile groups including settlement calculations, pile group efficiency, negative skin friction.

Drilled Shaft: Construction procedures, Design Considerations, Load Carrying Capacity and settlement analysis, Caissons - Types, Sinking and control.

Unit IV: 10 Lecture Hours

Earth pressure: Active earth pressure, passive earth pressure, earth pressure at rest, coefficients of earth pressure, Earth pressure theories – Rankine's and Coulomb's theory.

Retaining walls: Earth pressure computations on retaining walls and Design: Gravity, cantilever and counter fort retaining walls: Stability checks and design

Sheet Pile Structures: Cantilever sheet piling, Anchored sheet piling: Free and fixed earth support methods of Analysis, Braced Excavation.

Unit V: 4 Lecture Hours

Design of foundation for vibration control: Elements of vibration theory, Soil-springs and damping constants, dynamic soil parameters, Types of Machine foundations, General consideration in designing dynamic bases.

Foundations on expansive soils: Problems and Remedies.

Reference Books

1. Dr. Punmia. B. C., Jain. A. K., Jain. A. K., Soil Mechanics and Foundation Engineering, 16th Edition, Laxmi Publications Pvt. Ltd.
2. B. M. Das, Principles of Geotechnical Engineering, Thomson.
3. VNS Moorthy, Principles of soil Mechanics & Foundation Engineering, UBS Publication.
4. J. E. Bowels, Foundation Analysis & Design, McGraw Hill.
5. Gopal Ranjan & A.S.R. Rao, Basic & Applied Soil Mechanics, Wiley Eastern Ltd.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Attendance	End Term
Weightage (%)	**20**	**10**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V
Paper Title:	Foundation Engineering	**Paper Code:**	CEE11014
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	List out the types of slope failures.	**Remember**	**CO1**
2	What is Raft foundation?	**Remember**	**CO2**
3	Define End bearing pile.	**Remember**	**CO3**
4	Classify Retaining wall.	**Analyze & Understand**	**CO4**
5	Explain Soil dynamics.	**Understand**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Compare non-representative soil sample with undisturbed soil sample.	**Analyze**	**CO1**
(OR)			

6 b)	Identify the stages to be planned for the purpose of completing a Soil exploration programme at site.	**Apply**	**CO1**
7 a)	Illustrate about Modulus of sub-grade reaction for soil.	**Understand**	**CO2**
(OR)			
7 b)	After conducting plate load test you got a data set for a selected site condition. Analyze how bearing capacity of the soil can be determined from the available plate load test data.	**Analyze**	**CO2**
8 a)	Illustrate about Negative skin friction for pile foundations.	**Understand**	**CO3**
(OR)			
8 b)	Define Drilled Shaft and List out the methods to construct Drilled Shafts.	**Remember**	**CO3**
9 a)	Explain Active earth pressure and Passive earth pressure with suitable diagram.	**Understand**	**CO4**
(OR)			
9 b)	What is Braced Excavation?	**Remember**	**CO4**
10 a)	Identify the elements of vibration theory.	**Apply**	**CO5**
(OR)			
10 b)	Explain about damping constants.	**Understand**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Solve the following problem related to a shallow foundation: A square footing of 2.5 m × 2.5 m size is built in a homogeneous bed of sand having unit weight as 20 kN/m^3 and angle of internal friction as 40°. The depth of the base of the footing is 1.5 m below the ground level. Determine the safe load that can be carried by the footing condisering the factor of safety against shear failure as 3. Use Terzaghi's bearing capacity analysis for General shear failure condition. [The bearing capacity factors are: N_c = 95.7, N_q = 81.3 and N_γ = 100.4]	**Apply**	**CO2**
(OR)			

11 b)	Solve the following problem related to a shallow foundation: A strip footing, having 1 m width at its base, is located at a depth of 0.8 m below the Ground level. The unit weight of soil is 18 kN/m^3, cohesion value is 30 kN/m^2 and angle of internal friction is 20°. Determine the safe bearing capacity of the soil using Terzaghi's bearing capacity analysis, considering the Factor of safety as 3. Assume the soil fails by local shear. [The bearing capacity factors are: $N'_c = 11.8$, $N'_q = 3.9$ and $N'_\gamma = 1.7$]	**Apply**	**CO2**
12 a)	During a site investigation you have to obtain rock cores or rock samples. Identify the method of boring you can use to complete the work very fast and Illustrate about that method of boring.	**Apply & Understand**	**CO1**
	(OR)		
12 b)	Briefly explain the important methods adopted for stability analysis of finite and infinite slopes.	**Understand**	**CO1**
13 a)	Solve the following problem related to a pile foundation: In a 16 pile group, the pile diameter is 45 cm and spacing (c/c) of the square group is 1.5 m. Determine the ultimate load carrying capacity of the pile group, when (i) the piles are acting individually and (ii) the piles are acting as a group. Consider cohesion value as 50 kN/m^2 and neglect bearing at the tip of the pile. All the piles are 10 m long and consider m = 0.7 for shear mobilization around each pile.	**Apply**	**CO3**
	(OR)		
13 b)	Briefly describe about the Sinking operation and its control for Caissons.	**Understand**	**CO3**
14 a)	Compare Cantilever sheet piling and Anchored sheet piling with suitable diagrams.	**Analyze**	**CO4**
	(OR)		
14 b)	Identify different stability checks considered for retaining walls after a site visit and explain the checks with suitable equations.	**Apply & Understand**	**CO4**
15 a)	Solve the following problem related to a Retaining wall: A counterfort retaining wall of 10 m height retains non-cohesive backfill. The void ratio and angle of internal friction of the backfill respectively are 0.7 and 30° in loose state; and the values are 0.4 and 40° in dense state. Calculate the active and passive earth pressure in both loose and dense state. Compare the results.	**Apply & Analyze**	**CO4**
	(OR)		

15 b)	Solve the following problem related to a Retaining wall: Design a Gravity retaining wall, trapezoidal in side view, having 5 m height and 1 m width at top, with vertical back to retain a dry cohesionless backfill of unit weight 18kN/m3 and angle of shearing resistance 30°. Find the factor of safety against sliding assuming the angle of friction between the base of the wall and the foundation soil as 30°. The retaining wall is to be constructed of brick masonry having unit weight of 20kN/m3. Use Rankine's theory for calculating Earth pressure.	**Apply**	**CO4**
16 a)	**Classify the types of Machine foundations with suitable diagrams and Compare the types.**	**Understand & Analyze**	**CO5**
(OR)			
16 b)	Analyze the general consideration for designing dynamic bases in soil.	**Analyze**	**CO5**
17 a)	After visiting a site near Newtown at Kolkata, a group of geotechnical engineers found that the soil parameters are matched with the parameters of expansive soils. If any foundation is going to be constructed at the same site, evaluate and explain related future problems to be faced by the foundation and associated structures.	**Evaluate & Understand**	**CO5**
(OR)			
17 b)	In a field it has been examined that the soil parameters are matched with the parameters of expansive soils. Few isolated footings are constructed at the same site; the footings and associated structural members are facing various problems related to foundations on expansive soils. Evaluate and explain different possible remedies to solve such problems.	**Evaluate & Understand**	**CO5**

CEE11013	Design of RC Structures	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics-I, Structural Mechanics-II, Construction Engineering Materials				
Co-requisites	Civil Engineering Drawing Lab				

Course Objectives

1. To understand mechanical behaviour of concrete and reinforcement
2. To explore the concept of designing a flexural member
3. To evaluate shear strength of RC member
4. To interpret the torsional behaviour of RC member
5. To comprehend the design procedure of compression member

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Infer** the basics of fundamentals of RC design.	Remember (L1)
CO2	**Understand** the concept of designing RC members against Limit State of Collapse-Flexure.	Understand (L2)
CO3	**Analyse** and design of RC members against Limit State of Collapse-Shear.	Applying (L3)
CO4	**Illustrate** the procedure to design RC members against Limit State of Collapse-Torsion.	Analyzing (L4)
CO5	**Interpret** the design steps of RC members against Limit State of Collapse-Compression.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Design of RC structure is an introductory course of design in Civil Engineering. The course is structured to incorporate the concept of designing a structure safely and serviceably under the effectof bending, shear, torsion, axial forces and combination of them. Two types of design procedures are there in this course- Working stress method and Limit State method. Among these two, major focus isgiven on Limit State Method of design as per IS456:2000. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practicalproblem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: **4 Hours**

Reinforced Concrete Fundamentals: Concept of reinforced concrete, stress strain characteristics of concrete and steel reinforcement, elastic theory, Reinforced concrete (RC) structures, Loadings, analytical models for analysis and design of RC structures, Comparison of Design Methodologies-WSM, LSM, USDM.

Limit State Method: Review of partial safety factors, Limit state of collapse, Limit state of serviceability.

Unit II: 12 Hours

Limit State of Collapse- Flexure: Limit state of collapse for flexure as per IS 456:2000, Balanced Section, under reinforced section & over reinforced section, Moment of resistance, Singly and doubly reinforced sections, Design tables and charts, Critical sections for bending in important structural elements- slabs, beams,footings & staircase, Design of one-way slab, Design of two-way slab.

Unit III: 12 Hours

Limit State of Collapse-Shear: Nominal shear stress, Design shear strength of concrete, Design of shear reinforcement, Use of SP16 for shear design, Critical sections for bending inimportant structural elements- slabs, beams, footings & staircase, Shear reinforcement of flexure member. Design of staircase spanning longitudinally, Design of staircase spanning horizontally.

Unit IV: 9 Hours

Limit State of Collapse-Torsion: Critical section, Shear and torsion, Equivalent, Reinforcement for Torsion, Equivalent longitudinal moment, Design project for the design and detailing of a water tank with curved beam.

Limit State of Serviceability: Deflection, Short term deflection, Long term deflection, Cracking, Control of cracking, Estimation of width of crack.

Unit V: 8 Hours

Limit State of Collapse-Compression: Analysis and design of columns using IS: 456-rectangular, square and circular cross sections, axially loaded columns, Columns with uniaxial eccentricity using SP 16 design charts, Column with biaxial eccentricity using SP 16 design charts, Short and slender columns, Design of isolated square footings, Design of isolated rectangular footings, Pedestal.

Reference Books

1. S. Unnikrishna Pillai & Devdas Menon, Reinforced Concrete Design, Mc Graw Hill
2. Dr.B.C. Punmia, Er. Ashok Kumar Jain, Dr. Arun K. Jain, R.C.C Designs, Laxmi Publication
3. N. Subramanian, Design of Reinforced Concrete Structures, Oxford

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V

Paper Title:	Design of RC Structure	**Paper Code:**	CEE11013
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	What is the minimum grade of concrete to be used for structural beam exposed to moderate exposure?	**U**	**CO1**
2	Find out the development length of a 20mm diameter HYSD bar of Grade Fe415 subjected to bending tension.	**R**	**CO2**
3	What is the minimum number of bars to be used in circular column?	**R**	**CO3**
4	What is the minimum slenderness ratio of a long column?	**R**	**CO4**
5	What is the difference between two way and one way lab in carrying load?	**U**	**CO5**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	Write a short note on factor of safety.	**An**	**CO1**
	(OR)		
6 b)	Write short notes on Balanced section.	**U**	**CO1**
7 a)	Write down the design steps for one-way slab.	**An**	**CO2**
	(OR)		
7 b)	Write down the design steps for two-way slab.	**U**	**CO2**
8 a)	Write down different types of stairs.	**U**	**CO3**
	(OR)		
8 b)	Write a short note on riser and thread.	**R**	**CO3**

9 a)	If LL = 50 kN, DL = 25 kN and WL = 20 kN then what will be the design load of the structure?	**Ev**	**CO4**
(OR)			
9 b)	What is ring beam of water tank ?	**U**	**CO4**
10 a)	What is punching share in footing?	**R**	**CO5**
(OR)			
10 b)	What are deflection provision mentioned in IS 146:2000?	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Determine the compressive and tensile force of typical rectangular RC section.	**U**	**CO1**
(OR)			
11 b)	Derive the equation of neutral axis depth of a balanced section in L.S.M	**R**	**CO1**
12 a)	Analyse by L.S.M, of a singly reinforced beam of 300mmx450mm (effective depth), reinforced with 4-16mm tor bar of Grade Fe500. Assume grade of concrete as M25.	**An**	**CO2**
(OR)			
12 b)	Determine the dimension of waist slab by L.S.M for a dog-legged staircase (2.5m x 4.5m) of clear height 3m and also find out the spacing of reinforcement, required tocarry a live load of 2.5kN/m^2 along with all the dead loads. Use M20 grade concrete and Fe415 steel.	**An**	**CO2**
13 a)	Evaluate all design bending moments and find out the suitable reinforcement for a four-way continuous two-way slab of dimension 3m x 4m, subjected to a load of 3.5 kN/m^2 (including floor finish and excluding self-weight). Use M20 grade concrete and Fe415 steel. (Use Limit state method)	**Ev**	**CO2**
(OR)			
13 b)	What is shear reinforcement? Why it is required? Design the shear reinforcement for a beam of dimension 250mmx500mm (effectivedepth) subjected to a factored shear force of 50kN. Use M20 grade concrete and Fe550 steel. 1+1+5	**App & An**	**CO3**
14 a)	Design the shear reinforcement for a cantilever beam of width 250mm and with a varying depth of 300 mm at free end and 600 mm fixed end (subjected to a force of 50kN at free end. Use M20 grade concrete and Fe550 steel.	**An**	**CO3**
(OR)			

14 b)	Find out the dimension of an isolated foundation and also the reinforcement by L.S.Mrequired to carry 1200 kN service load from 400mm x 600mm column. Use M20 grade concrete and Fe415 steel.	**An**	**CO4**
15 a)	Write design procedure of isolated footing according to IS:456 2000.	**U**	**CO4**
(OR)			
15 b)	Find out the dimension of an isolated foundation and also the reinforcement by L.S.Mrequired to carry 700kN service load from 300mm x 500mm column. Use M20 grade concrete and Fe415 steel.	**Ev**	**CO4**
16 a)	An axial compression member of dimension 450mm x 450mm is subjected to 1000kN axial load and 50 kN-m moment about both the axes. Find out the reinforcementrequired to carry design load and moments by L.S.M, if the height of the column is 3m with both end fixed. Use M25 grade concrete and Fe500 steel.	**Ev**	**CO5**
(OR)			
16 b)	An axial compression member of dimension 550mm x 550mm is subjected to 1200 kN axial load. Find out the reinforcementrequired to carry design load and moments by L.S.M, if the height of the column is 3.5m with one end fixed and other end hinged. Use M25 grade concrete and Fe500 steel.	**Ev**	**CO5**
17 a)	Write short notes on design procedure Axial column, uniaxial column, and eccentric column.	**R**	**CO5**
(OR)			
17 b)	An eccentric compression member with eccentricity of 20 mm of dimension 500mm x 500mm is subjected to 1000kN axial load and 50 kN-m moment about both the axes. Find out the reinforcement required to carry design load and moments by L.S.M, if the height of the column is 3m with both end fixed. Use M25 grade concrete and Fe500 steel.	**An**	**CO5**

CEE11068	**Construction Techniques, Equipment & Practices**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Construction Engineering Materials				
Co-requisites	--				

Course Objectives

5. To know the importance and techniques related to construction sites.

6. To enhance the knowledge of the students on construction equipment.
7. To achieve an overall knowledge of suitable construction practices.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand basics knowledge of construction techniques.	Remember (L1)
CO2	Explain substructure construction techniques.	Understand (L2)
CO3	Demonstrate superstructure construction techniques.	Applying (L3)
CO4	Demonstrate different construction equipment.	Analyzing (L4)
CO5	Identify the proper and suitable construction practices.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Construction Techniques, Equipment & Practices deals a wide range of modern techniques and practices. This course includes specific activities like the latest developments in materials technology, facilities management, services and construction techniques, fundamental concept of sub-structure and super structure construction, study on different types of equipment related to construction sites. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing onpractical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Module I: 6 lecture hours

CONSTRUCTION TECHNIQUES: Structural systems, Load Bearing Structure, Framed Structure, Load transfer mechanism, floor system, Development of construction techniques, High rise Building Technology, Seismic effect, Environmental impact of materials, responsible sourcing, Eco Building (Green Building), Material used, Construction methods, Natural Buildings, Passive buildings, Intelligent(Smart) buildings, Meaning, Building automation, Energy efficient buildings for various zones, Case studies of residential, office buildings and other buildings in each zones.

Module II: 6 lecture hours

SUB STRUCTURE CONSTRUCTION: Techniques of Box jacking, Pipe Jacking, under water construction of diaphragm walls and basement, Tunneling techniques, Piling techniques, well and caisson, sinking cofferdam, cable anchoring and grouting, driving diaphragm walls, sheet piles, shoring for deep cutting, well points, Dewatering and stand by Plant equipment for underground open excavation.

Module III: 6 lecture hours

SUPER STRUCTURE CONSTRUCTION: Launching girders, bridge decks, off shore platforms, special forms for shells, techniques for heavy decks, in-situ pre-stressing in high rise structures, Material handling, erecting light weight components on tall structures, Support structure for heavy Equipment and conveyors, Erection of articulated structures, braced domes and space decks.

Module IV: 6 lecture hours

CONSTRUCTION EQUIPMENT: Selection of equipment for earth work, earth moving operations, types of earthwork equipment, tractors, motor graders, scrapers, front end waders, earth movers, Equipment for foundation and pile driving, Equipment for compaction, batching, mixing and concreting, Equipment for material handling and erection of structures, types of cranes, Equipment for dredging, trenching, tunneling

Module V: **6 lecture Hours**

CONSTRUCTION PRACTICES: Specifications, details and sequence of activities and construction co-ordination, Site Clearance, Marking, Earthwork, masonry, stone masonry, Bond in masonry, concrete hollow block masonry, flooring, damp proof courses, construction joints, movement and expansion joints, pre cast pavements, Building foundations, basements, temporary shed, centering and shuttering, slip forms, scaffoldings, de-shuttering forms, Fabrication and erection of steel trusses, frames, braced domes, laying brick, weather and water proof, roof finishes, acoustic and fire protection.

Text Books:

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., “Construction Planning, Equipment and Methods”, 5th Edition, McGraw Hill, Singapore, 1995.
2. Arora S.P. and Bindra S.P., “Building Construction, Planning Techniques and Method of Construction”, Dhanpat Rai and Sons, 1997.
3. Varghese, P.C. “Building construction”, Prentice Hall of India Pvt. Ltd, New Delhi, 2007.
4. Shetty, M.S, “Concrete Technology, Theory and Practice”, S. Chand and Company Ltd, New Delhi, 2008.

Reference Book:

1) Sharma S.C. “Construction Equipment and Management”, Khanna Publishers New Delhi, 2002.
2) Gambhir, M.L, “Concrete Technology”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2004

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1

Avera ge	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE11088	Concrete Technology	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	CEE11003- Building Planning & Materials				
Co-requisites	CEE11013- Design of RC Structure				

Course Objectives

1. To provide knowledge in the execution of new technology concepts which are applied in field of Concrete Technology.
2. To understand concepts related Concrete Technology which involves types and property of concrete and different adhesive materials and its vital use for safe, economic development for the structures.
3. To present the foundations of many basic Engineering tools and concepts related to Concrete Technology.
4. To give an experience in the implementation of Engineering concepts which are applied in field of Civil Engineering.
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the various requirements of cement, aggregates and admixtures for making concrete	Remember (L1)
CO2	Examine the properties of fresh concrete by various testing methods and assess the water quality for concrete making.	Understand (L2)
CO3	Estimate the strength and properties of harden concrete respectively by conducting several tests.	Applying (L3)
CO4	Explain and estimate the concept of concrete mix design as per IS guidelines.	Analyzing (L4)

CO5	Discuss about special type of concrete used in modern construction practice.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Concrete is a construction material composed of cement, fine aggregates and coarse aggregates mixed with water which hardens with time. This course includes specific concepts related Concrete Technology which involves types and property of concrete and different adhesive materials and its vital use for safe, economic development for the structures. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: 10 Lecture Hours

Different types of Cement-Detail description about PCC and PSC - Portland cement- chemical composition- Hydration of cement- Structure of hydrate cement- Test on physical properties- Different grades of cement.

Admixtures: Types of admixtures- mineral and chemical admixtures- properties- dosages- effects- usage.

Aggregates: Classification of aggregate- Particle shape & texture- Bond, Strength & other mechanical properties of aggregate- Specific gravity, Bulk density, Porosity, adsorption & moisture content of aggregate- Bulking of sand- Deleterious Substance of aggregate- Soundness of aggregate- Alkali Aggregate reaction- Thermal properties- Sieve analysis- Fineness modulus- Grading curves- Grading of fine & coarse Aggregates- Gap graded aggregate- Maximum aggregate size.

Unit II: 10 Lecture Hours

Fresh Concrete: Workability- Factors affecting workability- Measurement of workability of tests- Setting times of concrete- Effect of time and temperature on workability- Segregation & bleeding- Mixing and vibration of concrete- Steps in manufacture of concrete- Quality of mixing water.

Unit III: 10 Lecture Hours

Hardened Concrete: Water/ Cement ratio- Abram's Law- Gel space ratio- Nature of strength of concrete- Maturity concept- Strength in tension & compression- Factors affecting strength- Relation between compression & tensile strength- Curing.

Testing of Hardened Concrete: Compression tests- Tension tests- Factors affecting strength- Flexure tests- Splitting tests- Pull- out tests, Non- destructive testing methods- codal provisions for NDT.

Elasticity, creep & shrinkage: Modulus of elasticity- Dynamic modulus of elasticity- Poisson's ratio- Creep of concrete- Factors influencing creep- Relation between creep & time- Nature of creep- Effects of creep- Shrinkage - types of shrinkage.

Unit IV: 7 Lecture Hours

Mix Design: Factors in the choice of mix proportions- Durability of concrete- Quality Control of concrete- Statistical Quality control- Acceptance criteria- Proportioning of concrete mix by normal pump able concretes by- BIS method of mix design.

Unit V: 8 Lecture Hours

Various Cementitious Materials - Special Concretes: Light weight concrete- Lightweight aggregate concrete- Cellular concrete- No-fines concrete- Fibre reinforced concrete- Polymer concrete- Types of Polymer concrete- Self compacting concrete.

Reference Books

1. A .M. Naville, Properties of Concrete, Low priced Edition.
2. M. S. Shetty, Concrete Technology, S. Chand & Co.
3. Job Thomas, Concrete Technology, Cengage Learning.
4. M.L. Gambir, Concrete Technology, Tata Mc.Graw Hill Publishers.
5. A.R. Santha Kumar, Concrete Technology, Oxford university Press.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-

CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name:

Enrolment No:

Course: CEE11088 – Concrete Technology

Program: B.Tech (CE) **Semester: V**

Time: 03 Hrs. **Max. Marks: 50**

Instructions:

Attempt All Questions from **Section A** (Each Carrying 1Marks); any **Three Questions** from **Section B** (Each Carrying 5Marks). Any **Two Questions from Section C** (Each Carrying 10 Marks).

SECTION A (Answer All Questions)			
1.a	**Describe** the characteristics of Bougue's compound.	**U**	**CO1**
b	**What** is Workability of concrete?	**R**	**CO2**
c	**Enumerate** Characteristic strength of concrete.	**U**	**CO3**
d	**Enumerate** Mean target strength.	**U**	**CO4**
e	**Define** Special concrete.	**R**	**CO5**

SECTION B (Attempt any Three Questions)			
2.	What do you mean by alkali aggregate reaction? What are the factors promoting alkali aggregate reaction? **Explain** briefly.	**Evaluate**	**CO1**
3.	**Distinguish** between Bleeding & Segregation.	**An**	**CO2**
4.	**Elucidate** the factors influencing Flexural strength of concrete.	**U**	**CO3**
5.	**Explain** Geo-polymer concrete.	**U**	**CO5**
SECTION C (Attempt any Two Questions)			
6.	**What** is the cause of rapid gain in strength of rapid hardening cement? **Write down** its uses.	**R**	**CO1**
7	**Carry out** a design mix for the following conditions according to IS: 10262-2009. **Stipulation for proportioning** a. Grade required : M35 for RCC. b. Type of cement : OPC 43 grade conforming to IS-8112. c. Maximum nominal size of aggregate: 20 mm (crushed angular aggregate) d. Workability required: 100 mm slump e. Method of placing concrete: Stationary pump f. Chemical admixture used: Super plasticizer (1.5 %) g. Degree of supervision: good h. Exposure condition: Moderate **Test data for material** a. Specific gravity of cement: 3.15 b. Specific gravity of super plasticizer: 1.145 c. Specific gravity of coarse aggregate: 2.80 d. Specific gravity of fine aggregate: 2.62 e. Water absorption for coarse aggregate: 0.5% f. Water absorption for fine aggregate: 1.0%	**Analyzing**	**CO4**

	g. Free moisture for coarse aggregate: Nil h. Free moisture for fine aggregate: Nil i. Grading zone of fine aggregate: Zone-II (IS-383)		
8.	**How** flexural strength & toughness improves for FRC? **Describe** also type of fibers used in FRC.	**R**	**CO5**

CEE11026	**Remote Sensing & GIS**	**L**	**T**	**P**	**C**
Version 1.0		**3**	**0**	**0**	**3**
Pre-requisites/Exposure	Remote Sensing & GIS Lab				
Co-requisites					

Course Objectives:

1. To provide an opportunity for individuals to learn Remote Sensing and Geoinformation Science for the benefit of their professional career. This basic course in Remote Sensing and Geoinformation Science will allow graduates to build their knowledge and practical expertise in RS and GIS technologies with independent studyand project experience at their graduate level.
2. To provide considerable flexibility allowing students to quickly gain the RS and GIS knowledge and qualification they need today, and to add to their credentials. Students develop a capacity for independent research, problem analysis and solution.
3. To empower students undertake this course to develop their knowledge and understanding through formal coursework and a program of independent reading. It has a practical component and a project associated with it to develop learners' research, analytical and problem-solving skills.
4. To undergo Laboratory Practical and Experiments in Cloud Computing Environment.

Course Outcomes:

At the end of the course, the student will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Infer the basics concept of remote sensing related to electromagnetic spectrum.	Remember (L1)
CO2	Outline the types of radiation principles based on the different laws.	Understand (L2)
CO3	Explain the importance of sensors and their application of remote sensing in their opticaldomain and different types of instrument with the specific characterization.	Applying (L3)
CO4	Interpret the basics concept of GIS with their basic components. **System** application areas ofGIS map projections, different types of data and their entry.	Analyzing (L4)

CO5	Apply GIS to hydrology and water resources.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The course aims to provide an introduction to the theory and practice of remote sensing. The aim is to equip students with the wide range of background knowledge and practical skills necessary to use remotely sensed observations with understanding. There are many applications of remote sensing in the domains of environmental science, policy and treaty verification, military applications, meteorology, oceanography, agriculture and ecology. In this course, an overview of applications and techniques is provided.

Course Content:

Module 1: 10 Lecture Hours

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, Radiation Characteristics, Spectral Information, Spatial Information, Classification of RS.

Module 2: 8 Lecture Hours

Types and Radiation principles: Types of RS, Imaging System, Solar Irradiation, Spectral Reflectance Signature, Images & their classification, Radiation Principles – Planck's Law, Stephens Boltzmann Law, Kirchhoff's Law.

Module 3: 10 Lecture Hours

Sensors and Applications: Sensors, SPOT HRV and HRVIR Instrument Characteristics, Remote sensing in the optical domain and their Application, Electromagnetic Spectrum

Module 4: 8 Lecture Hours

Geographic Information System: Introduction, key components, **System** application areas of GIS map projections, Data entry and preparation: spatial data input, raster data models, vector datamodels.

Module 5: 9 Lecture Hours

Application to Hydrology and Water Resources: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

Text Books:

1. Campbell, J.B.Introduction to Remote Sensing (2nd Ed),Taylor and Francis, London, 1996.A text book of Geology by Mukherjee P.K. Eleventh revised edition. The World Press Private Limited, Calcutta – 1990.
2. Harris R., "Satellite Remote Sensing: An Introduction", Routledge & Kegan Paul, 1987.Tyrell : Principles of petrology, 1972, Asia, Bombay.
3. Jensen, J. R., *Remote Sensing of the Environment: An Earth Resource Perspective*, Prentice Hall, New Jersey, 2000. (Excellent on RS but no image processing).Remote Sensing Principles and Interpretation – Floyd F.Sabins, H.Freeman and Co.
4. Kumar S, 'Basics of Remote sensing & GIS' by Laxmi Publications, New Delhi, 2005.
5. Burrough P. A. and McDonnell R. A., 'Principals of Geographical Information Systems', Oxford University Press, 1998.
6. KandTsung Chang, 'Introduction to Geographic Information Systems', McGraw Hill, Higher Education, 2009.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

CEE11028	Advanced Structural Analysis	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics II				
Co-requisites	------------------------------				

Course Objectives

1. To administer business and management skills in various positions within the construction industry.
2. To practice informed decision-making in personal and professional endeavours.
3. To apply scientific planning methods to optimize time and cost in construction relatedproblems.
4. To plan resource requirements including men, machine and materials based on resources allocation and budget and budgetary control methods.
5. To understand the labour laws and regulations, safety requirements and its financial aspects in construction industry.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Determine the boundary value problems.	Remember (L1)
CO2	Understand the complexity of higher order problems	Understand (L2)
CO3	Solve the structural analysis problem in vibrational methods.	Applying (L3)
CO4	Analyze the Finite element of one dimensional problems.	Analyzing (L4)
CO5	Analyze the Finite element of two dimensional problems.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Theory of the engineering structures is a fundamental science. Statements and methods of this science are widely used in different fields of engineering. Among them are the civil engineering, ship- building, aircraft, robotics, space structures, as well as numerous structures of special types and purposes – bridges, towers, etc. In recent years, even micromechanical devices become objects of structural analysis.

All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Module 1: **12 Lecture Hours**

Boundary value problems and Weighted residual methods: Introduction, weighted residual forms, weak formulation, Galerkin method, examples of one, two, and three-dimensional problems, examples of continuum problems.

Module II: **9 Lecture Hours**

Variational methods: Establishment of natural variational principles, approximate solution of differential equations by Rayleigh-Ritz method, the use of Lagrange multipliers, general variational principles, least-square method.

Module III: **12 Lecture Hours**

Finite Element analysis of one dimensional problems: One dimensional second order equations, discretization of domain into elements, generalized coordinates approach, derivation of elements equations, assembly of elements equations, imposition of boundary conditions, solution of equations, Cholesky method, extension of the method to fourth order equations and their solutions, time dependent problems and their solutions.

Module IV: **12 Lecture Hours**

Finite Element analysis of two dimensional problems: Second order equation involving a scalar-valued function, Variational formulation, Finite element formulation through generalized coordinates approach, Triangular elements and quadrilateral, Elements matrices and vectors, Assembly of element matrices, boundary conditions, solution techniques.

Reference Books

1. Zienkiewicz, O.C., and Morgan, K., Finite Element Approximation, John Wiley & Sons, 1983. Reddy, J.N., The Finite Element Method for Engineers, John Wiley & Sons, 1995.
2. An Introduction to the Finite Element Method, McGraw Hill, 2006. Huebner, K.H.,Thornton, E.A., and Byrom, T.G.
3. The Finite Element Method for Engineers, John Wiley & Sons, 1995.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

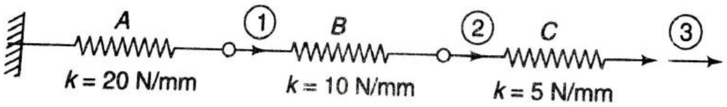
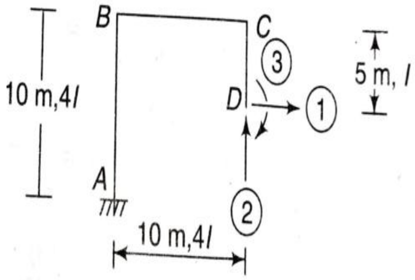
Model Question Paper

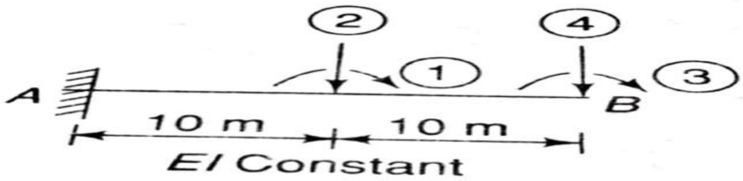
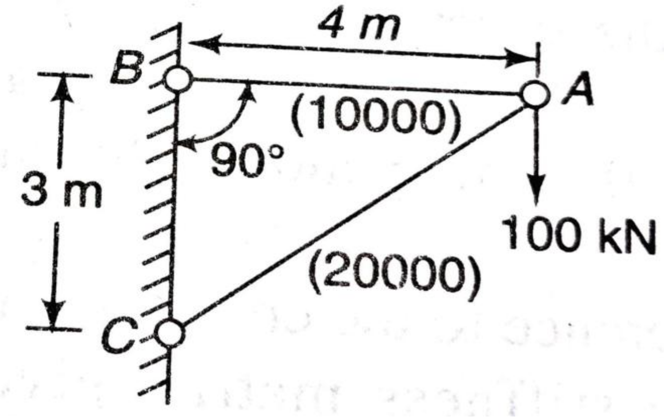
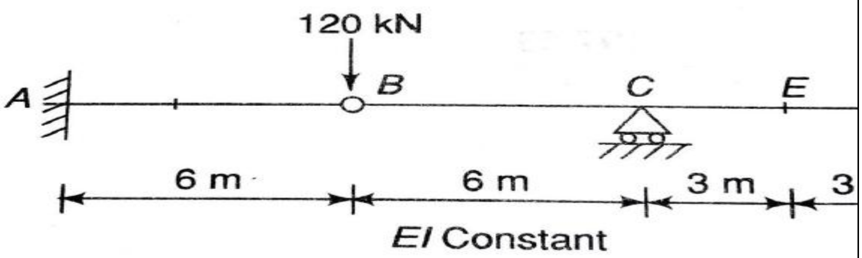
	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session:)		
Name of the Program:	B. Tech	**Semester:**	VI
Paper Title:	Advanced Structural Analysis	**Paper Code:**	CEE11028
Maximum Marks:	50	**Time Duration:**	3 Hrs

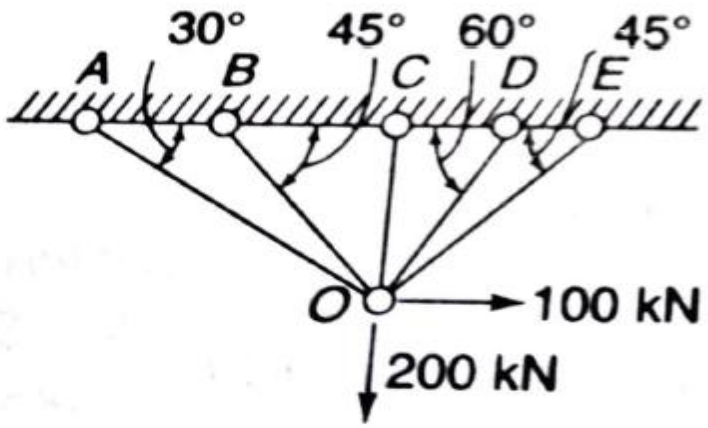
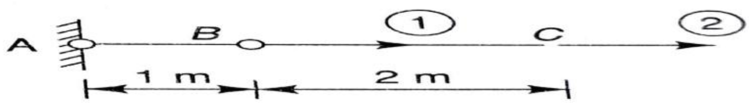
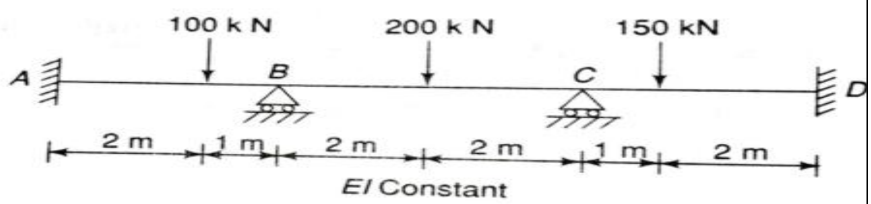
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

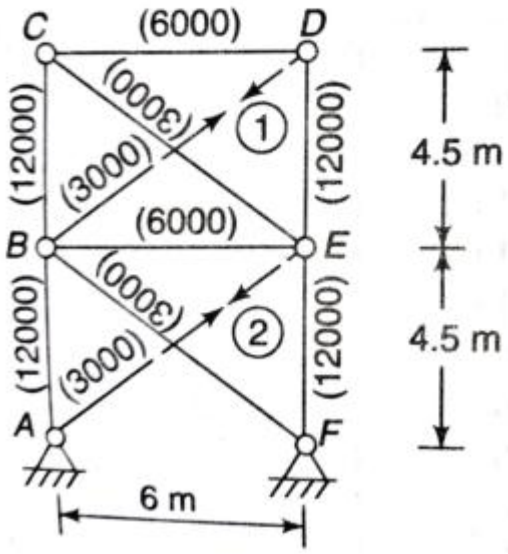
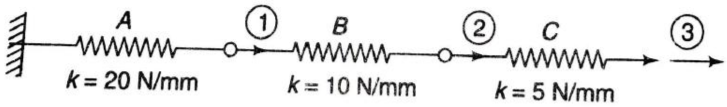
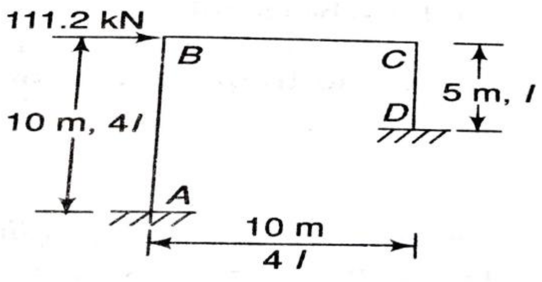
	Group A **Answer All the Questions (5 x 1 = 5)**		
1	The element stiffness matrix for a beam element with only rotational degree of freedom is given as c) $\frac{2EI}{L}\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ d) $\frac{2EI}{L}\begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ e) $\frac{2EI}{L}\begin{bmatrix} -2 & 1 \\ 1 & -2 \end{bmatrix}$ f) $\frac{2EI}{L}\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$	**U**	**CO 1**
2	Flexibility coefficients..................depend upon loading of primary structure. d) always c) never e) sometimes d) rarely	**R**	**CO 2**
3	The deformation of a spring produced by unit load is called c) Influence coefficient c) stiffness d) flexibility d) unit strain	**R**	**CO 3**
4	To generate the j-th column of a Flexibility matrix a) A unit force is applied at j-th coordinate and the forces are calculated in all coordinates b) A unit displacement is applied at j-th coordinate and the forces are calculated in all coordinates	**R**	**CO 4**

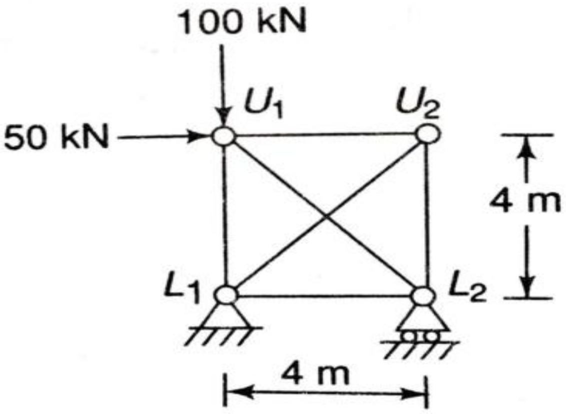
	c) A unit force is applied at j-th coordinate and the displacements are calculated in all coordinates d) A unit displacement is applied at j-th coordinate and the displacements are calculated in all coordinates		
5	For stable structures one of the important properties of flexibility and stiffness matrices is that the elements of main diagonal a) Must be unity b) Must be whole number c) Must be positive d) Must be identical	**U**	**CO 5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	What are the basic unknowns in Flexibility matrix method?	**An**	**CO 1**
(OR)			
6 b)	Define Stiffness coefficient.	**U**	**CO 1**
7 a)	What is the basic aim of the stiffness method?	**An**	**CO 2**
(OR)			
7 b)	What is the equilibrium condition used in the Stiffness matrix method?	**U**	**CO 2**
8 a)	Write a short note on Global stiffness matrix.	**U**	**CO 3**
(OR)			
8 b)	What are the basic unknowns in Stiffness matrix method?	**R**	**CO 3**

9 a)	Define Flexibility coefficient.	**Ev**	**CO 4**
	(OR)		
9 b)	Write the element stiffness matrix for a truss element.	**U**	**CO 4**
10 a)	What is the equilibrium condition used in the Flexibility matrix method?	**R**	**CO 5**
	(OR)		
10 b)	Compare Flexibility method and Stiffness method.	**U**	**CO 5**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	Three springs A, B, and C are connected in series as shown in figure below. Develop the flexibility matrix for the whole structure.  	**U**	**CO 1**
	(OR)		
11 b)	Develop the flexibility matrix with reference to coordinates 1, 2 and 3 of a rigid-jointed plane frame as shown in Figure below.  	**R**	**CO 1**

12 a)	Develop the stiffness matrix for beam AB with reference to coordinates as shown in figure below. 	**R**	**CO 2**
(OR)			
12 b)	Determine the displacement at joint A of the truss shown in Figure below by stiffness matrix method. The numbers in parentheses are the cross-sectional area of the members in mm^2. Take 'E'=200 GPa. 	**An**	**CO 2**
13 a)	Analyse of the continuous beam ABCD as shown in figure below by Flexibility Method. 	**App & An**	**CO 3**
(OR)			

1 3 b)	Analyse the pin-jointed plane frame as shown in figure below by Stiffness Method. The cross-sectional area of the each member is 2000 mm^2. Take, E=200 kN/ mm^2. 	**Ap** **p** **&** **An**	**CO** **3**
1 4 a)	Two steel bars AB & BC, each having a cross-sectional area of 20 mm^2, are connected in series as shown in figure below. Develop the flexibility matrix for the whole structure with reference to coordinates 1 & 2. Take, E=200 kN/ mm^2. 	**An**	**CO** **4**
(OR)			
1 4 b)	Develop the stiffness matrix of the beam shown in Figure below. 	**An**	**CO** **4**
1 5 a)	**1.** Develop the flexibility matrix with reference to coordinates 1 and 2 of a pin-jointed plane frame as shown in Figure below. The numbers in parentheses are the cross-sectional area of the members in mm^2.	**U**	**CO** **4**

			
(OR)			
15 b)	Three springs A, B, and C are connected are connected in series as shown in figure below. Develop the stiffness matrix for the whole structure. 	**Ev**	**CO 4**
16 a)	Analyse the portal frame as shown in figure below by Flexibility Method if the settlements of support D to the right and downwards in kN-m units are 200/EI & 500/EI respectively. 	**U**	**CO 5**
(OR)			

16 b)	Analyse the pin-jointed plane frame as shown in figure below by Stiffness Method. The axial stiffness for each member is 40 kN/ mm.  	**U**	**CO 5**
17 a)	List out the advantages and disadvantages of FEM. What are the factors governing the selection of finite elements?	**R**	**CO 5**
	(OR)		
17 b)	What are the basic steps in FEM? Explain also all the steps in details.	**U**	**CO 5**

CEE11069	**Waterproofing Protection of Concrete Structures**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics I, Structural Mechanics II, Construction Engineering Material,				
Co-requisites	Construction Techniques, Equipment & Practices,				

Course Objective:

1. To understand the importance of maintenance and assessment method of distressed structures.
2. To identify the causes of building failure under different factors and get idea about various materials with their composition and properties used for repair and rehabilitation of structures.
3. To acquire knowledge about testing methods available for investigation of structures andrepair techniques.

4. To build concepts of repair, rehabilitation and retrofitting of structures and demolition methods.

Course Outcome:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Define** maintenance and assessment for distressed structures.	Remember (L1)
CO2	**Identify** different causes of building failure.	Understand (L2)
CO3	**Execute** the techniques for repair rand protection methods.	Applying (L3)
CO4	**List** all advanced materials for repair and rehabilitation of structure.	Analyzing (L4)
CO5	**Build** concepts for repairing, rehabilitation and retrofitting of structures and demolition methods.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This is a course covers the idea of various waterproofing protection and deterioration process of structures, several non-destructive tests which includes rebound hammer test, ultrasonic pulse velocity test, pull out test, rebar location test etc., various causes responsible for failure of building. This course also provide idea of different materials that can be used for repair and rehabilitation, repair techniques, different testing methods for investigation of structures. Finally some case studies related to rehabilitation of special structures like bridge piers, canals, dams, heritage structures etc will be done and few pictorial representation will be provided to the students for complete understanding about this subject. Classes will be conducted by lectures as well as power point presentation as per the requirements. Discussions related to development of various practical approaches of repair techniques in modern construction advancement on existing structures will be done as well. Students will be subjected to class tests, assignments and field visit for a short period to obtain on site application of different tools/equipments/devices on existing structures for the assessment of current condition of structural bodies by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Unit I : Fundamentals of Waterproofing Protection 5 Hours

Factors behind water ingress through concrete structures; Understanding moisture movements through building elements causing leakage, seepage, and dampness; Factors to be considered for protection of concrete structures under building envelope concept.

Unit II : Distress Analysis in Concrete Structures 10 Hours

Manifestation of deterioration of concrete buildings due to temperature, humidity, moisture and associated impurities like gases, chemicals, acids and alkalis; Causes of failures due to lack in right construction practices at the formative stage of concrete; Damages due to wear, erosion and over loading, fire during service stage of concrete; Formation of Cracks due to design and construction errors including those due to corrosion and effects on serviceability and durability.

Unit III : Waterproofing Protection and Materials for Concrete Building Surfaces 15 Hours

Foundation and plinth waterproofing with damp proof course; Basement waterproofing with integral, barrier protection and tanking methods; Protection of roofs, terraces and podiums as per service usage; Waterproofing of wet areas – bathroom, kitchen and wash areas; Watertightness for retaining structures and water bodies; Treatment to joints based on types - expansion, construction, control, lap and butt joints, frame joints etc.; Selection of right systems and materials – permeability reducing admixtures, crystalline compounds, liquid and preformed barrier membranes, joints sealants and tapes with design, specifications, execution including methodologies with quality assurance.

Unit IV: Condition Survey and Evaluation of Distress 5 Hours

Process strategies for condition survey in existing structures; Diagnostic methods and analysis; Destructive, semi destructive and Non-Destructive methods including rebound hammer, ultrasonic pulse velocity, thermal imaging, core cutting, carbonation test, chloride test, cover meter, crack measurement techniques, pull-off test and pull-out test; Corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data and damage analysis.

Unit IV: Remedial Waterproofing and Repair of Concrete Buildings 10 Hours

Remedial treatment to existing building dampness, seepage and leakages using right systems and materials; Solar reflective coatings for heat protection; Methods for crack repairs in masonry and concrete elements using crack fillers, sealants etc.; Patch repairs using polymer modified mortar, polymer modified concrete, polymer concrete; Filling of cracks with injection grouting methods; Materials for repair of rebar corrosion crack and resultant spalling of concrete; Repair to damaged structural elements with jacketing method using micro concrete.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-

CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V
Paper Title:	Maintenance and Rehabilitation of Structure	**Paper Code:**	**CEE11069**
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A

Answer All the Questions (5 x 1 = 5)			
1	Define assessment of a structure?	**U**	**CO1**
2	Give outline of different building failure.	**R**	**CO2**
3	What is function of rebar locator?	**R**	**CO3**
4	Define carbonation depth.	**R**	**CO4**
5	What is the utilization of nailing?	**U**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Write a short note on importance of maintenance.	**U**	**CO1**
(OR)			
6 b)	Briefly explain the various aspects of building inspection.	**U**	**CO1**
7 a)	Discuss the physical process of freezing and thawing that develops deterioration of structures.	**An**	**CO2**
(OR)			
7 b)	Explain about structural damages developed due to fire.	**U**	**CO2**
8 a)	List all the non-destructive testing method for a structure.	**R**	**CO3**
(OR)			
8 b)	How Pull out test is applied for diagnose of structure?	**R**	**CO3**
9 a)	How Corrosion activity measurement can be done in a structure?	**App**	**CO4**
(OR)			
9 b)	List out all the type of admixtures available.	**U**	**CO4**
10 a)	Write a short note on Guniting.	**R**	**CO5**
(OR)			
10 b)	What is Column jacking? Explain	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Elaborate the assessment procedure for evaluating damaged building.	**U**	**CO1**

(OR)			
11 b)	Discuss about the mechanism developed for Alkali aggregate reaction and quantification and measurement of cracks in concrete structures.	**R**	**CO1**
12 a)	Briefly explain the type of building failure and their causes.	**R**	**CO2**
(OR)			
12 b)	Explain all the investigation techniques in case of building failure.	**An**	**CO2**
13 a)	Explain about how concrete behave under corrosion attack.	**An**	**CO3**
(OR)			
13 b)	Illustrate about various type of diagnostic testing methods and equipment used for maintenance of structures.	**U**	**CO3**
14 a)	Explain about application of Half- cell potential test for the diagnose of concrete structures.	**An**	**CO3**
(OR)			
14 b)	Write a short note on factors influencing electrical resistivity measurements	**R**	**CO4**
15 a)	What are advantages and disadvantages of using admixtures for retrofitting?	**R**	**CO4**
(OR)			
15 b)	Write a short note on resin based products.	**R**	**CO4**
16 a)	Write a brief over view on different retrofitting technique for corrosion, fire, Leakage, earthquake.	**U**	**CO5**
(OR)			
16 b)	Write a short note on concrete stitching and resin injection.	**U**	**CO5**
17 a)	Explain and demonstrate about Underpinning with neat sketches.	**U**	**CO5**
(OR)			
17 b)	Elaborate and compare Grouting, Jacketing and shotcreting.	**R**	**CO5**

		L	T	P	C
CEE11070	Prof. Elective II: Traffic Engineering	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Prof. Core VIII: Transportation Engineering				
Co-requisites	Prof. Core Lab – VI: Transportation Engineering Lab				

Course Objectives

1. To have an overall awareness of the traffic components and assess the traffic characteristics and related problems.
2. To develop a strong knowledge base of traffic planning and its management in any transportation area.
3. To provide acquaintance of traffic control devices and its techniques in transportation interaction.
4. To deliver an idea to estimate Highway Capacity under Uninterrupted Flow Situation.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Outline** all the traffic stream parameters like Speed, Flow, and Density and **Find** relationship between them.	Remember (L1)
CO2	**Analyze** traffic in both Conventional way and Statistical way.	Understand (L2)
CO3	**Identify** traffic flow pattern in At-Grade and Grade Separated Intersections and **Minimize** number of Conflicts between them.	Applying (L3)
CO4	**Illustrate** various traffic regulations and control devices.	Analyzing (L4)
CO5	**Determine** Highway Capacity for Uninterrupted Flow Situation and **Rephrase** the characteristics of Street Lighting.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Traffic Engineering is an important aspect of all modes of transportation. Due to the abundant growth in population and infrastructure development, there is urgent need to pay the immediate attention to the certain issues like designing traffic control device installations and modifications, including traffic signals, signs and pavement markings. Also it is important for safety of vehicle users as well as pedestrians. This course is expected to develop knowledge of performing various traffic surveys, analyze and interpret the data and provide the solutions in the form of traffic control devices. Classroom activities have designed to keep in mind that students will learn about all the parameters and maintenance activities related to traffic control strategies.

Course Content

Module 1 **Lecture Hr. 9**

Traffic stream characteristics: Introduction to traffic engineering: Road user characteristics, human and vehicle characteristics;

Fundamental parameters and relations of Traffic: flow: speed, density, volume, travel time, headway, spacing, time-space diagram, time mean speed, space mean speed and their relation. Relation between speeds, flow, density, fundamental diagrams; Traffic stream models: Greenshield's model and its Calibration; Moving observer method: Concepts and derivation, illustration.

Module 2 **Lecture Hr. 9**

Traffic measurement procedures: Measurement at a point: Traffic volume measurement, equipment for flow measurements, data analysis, concepts of ADT, AADT; Parking Studies.

Measurement over a short section: Speed measurements, 15th and 85th percentile speeds, design speed, speed distributions.

Statistical Analysis of Traffic Engineering: Concept of Probability and its application, Regression Analysis in Traffic Engineering, Normal Distribution Technique of Traffic, Binomial Distribution.

Module 3 **Lecture Hr. 9**

Traffic Conflicts: Types, Advantage of One Way Streets in minimizing Congestion. Traffic Islands.

Traffic geometrics: Basic geometric elements, Cross Roads, At-Grade Intersections and Grade Separated Intersection, Types of both kinds of Intersections and Traffic Flow Pattern in each category. Elements of Rotary Intersection, Advantage and Disadvantage of Rotary, Design of Rotary Intersection.

Module 4 **Lecture Hr. 9**

Traffic regulation: Traffic signs types of traffic signs, regulatory, mandatory, warning signs route marker, lane marking, lane width standards as IRC. Necessity of traffic signals criteria for providing traffic signals types of traffic signals. Webstar's method of designing traffic signals.

Module 5 **Lecture Hr. 9**

Capacity and Level of Service (LOS) for Uninterrupted Flow Condition: Definitions, highway capacity, LOS in the Highway Capacity Manual, factors affecting LOS.

Street Lighting: Needs, definitions, laws of Illumination. Definitions- Luminaire, foot candle, Lumen, utilization and maintenance factors. Different types of light sources used for street lighting.

Text Books

1. Traffic Engineering and Transport Planning by L.R. Kadiyali, Khanna Publishers, Delhi
2. Jotin Khisty, S.C. and Kent Lall, B., Transportation Engineering – An Introduction, Prentice-Hall, NJ
3. Traffic planning and design Saxsena, S C DhanpatRai& Sons Delhi, 2016.

Reference Books

1. Transportation Engineering Arora, N. L. Khanna Publishers, Delhi, 1996.
2. Transportation Engineering Vol. I & II Vazirani, V N Chaondola, S P Khanna Publishers. Delhi, 2016

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

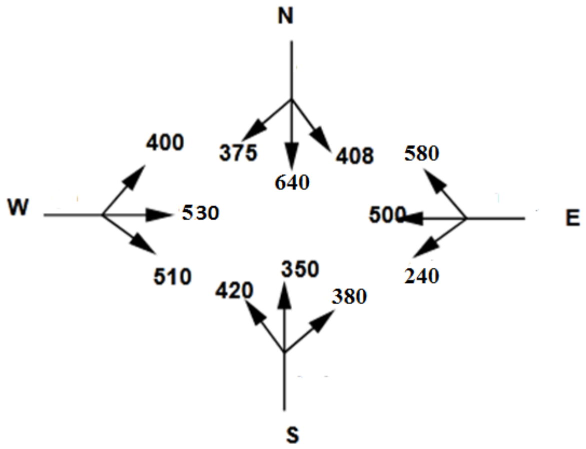
Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V
Paper Title:	Traffic Engineering	**Paper Code:**	CEE11070
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	3
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	How the terms ‘spacing’ and ‘gap’ are different in the context of Traffic Engineering?	**U**	**CO1**
2	Define the term “Lumen” and “Illumination”.	**R**	**CO5**
3	How AADT is determined in the Traffic Surveying Process?	**R**	**CO2**
4	What is the basic difference between ‘At Grade Intersection’ and ‘Grade Separated Intersection’?	**R**	**CO3**
5	As per IRC, what is the dimension of a Traffic Sign Plate that indicating ‘Warning Sign’?	**U**	**CO4**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	The free mean speed on a roadway is found to be 80 kmph. If under stopped condition the average spacing between vehicles is 7.1 m, determine the capacity flow.	**An**	**CO1**
	(OR)		
6 b)	Explain different Human Factors that govern Road User Behavior.	**U**	**CO1**
7 a)	Write down the steps that involve in finding ‘Design Speed’ of a Traffic Stream.	**R**	**CO2**

<table>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>7 b)</td><td>In which condition Regression Analysis is suitable? Explain.</td><td>U</td><td>CO2</td></tr>
<tr><td>8 a)</td><td>What are the disadvantages of Rotary Intersection?</td><td>U</td><td>CO3</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>8 b)</td><td>Determine the number of Major Conflicts in a 2 way 2 lane right angled Intersection.</td><td>R</td><td>CO3</td></tr>
<tr><td>9 a)</td><td>Illustrate the advantages of Traffic Signal?</td><td>U</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>9 b)</td><td>Explain the need and scope for traffic regulations.</td><td>U</td><td>CO4</td></tr>
<tr><td>10 a)</td><td>Write down the operating characteristics of LOS D for freeways.</td><td>R</td><td>CO5</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>10 b)</td><td>Explain the need of Passenger Car Unit in the context of Traffic Engineering.</td><td>U</td><td>CO5</td></tr>
<tr><td colspan="4">Group C
Answer All the Questions (7 x 5 = 35)</td></tr>
<tr><td>11 a)</td><td>Speed-Density equation on an urban road is given by $\mathbf{u = u_f (1- k^2/k_j^2 + k/k_j)}$ where u_f is free flow speed, k is density and k_j is jam density. For what value of density the maximum flow occurs? What is the maximum capacity attained for this problem? (3+2)</td><td>App & An</td><td>CO1</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>11 b)</td><td>For the data given below compute the Time Mean Speed and Space Mean Speed. Finally determine the concentration of the traffic stream.
<table>
<tr><td>Speed Range (kmph)</td><td>0-10</td><td>10-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td></tr>
<tr><td>Frequency</td><td>8</td><td>12</td><td>32</td><td>45</td><td>25</td><td>6</td></tr>
</table></td><td>App & An</td><td>CO1</td></tr>
<tr><td>12 a)</td><td>At an uncontrolled T Junction, past experience indicates that the probability of a vehicle arriving on the side road during a 15 sec interval and turning right into the main road is 1/5. Find the probability that in a period of 1 minute, there will be 0, 1, 2, 3 or 4 vehicles arriving and turning right.</td><td>App & An</td><td>CO2</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>12 b)</td><td>The spot speeds at a particular location are normally distributed with a mean of 52 kmph and a standard deviation of 8.7 kmph. What is the probability that (i) the speed exceeds 70 kmph? (ii) What is the 85^{th} percentile speed? Use “Normal Distribution Function Table” for solving this problem.</td><td>App & An</td><td>CO2</td></tr>
<tr><td>13 a)</td><td>Draw traffic flow diagrams with (i) Diamond Interchange, (ii) Trumpet Interchange.</td><td>U</td><td>CO3</td></tr>
</table>

<table>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>13 b)</td><td>The width of a carriage way approaching an intersection is given as 15 m. The entry and exit width at the rotary is 10 m. The traffic approaching the intersection from the four sides is shown in the figure below. Find the capacity of the rotary using the given data.

</td><td>App &An</td><td>CO3</td></tr>
<tr><td>14 a)</td><td>A fixed time signal is to be provided at an intersection having N-S and E-W flows. The design hour flows and the saturation flow from the various arms are given in the table. Determine the number of phases and calculate the optimum cycle length based on Webster’s equation and find the corresponding green times. Total loss per phase is 5 sec. and yellow interval is 2 sec. Sketch the timing diagrams for each phase.
<table>
<tr><td></td><td>N Bound</td><td>S Bound</td><td>E Bound</td><td>W Bound</td></tr>
<tr><td>Volume (PCU/hr)</td><td>1300</td><td>900</td><td>1000</td><td>600</td></tr>
<tr><td>Saturation Flow (PCU/hr)</td><td>3500</td><td>3000</td><td>2500</td><td>2300</td></tr>
</table></td><td>App & An</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>14 b)</td><td>List any 5 ‘Regulatory Sign’ with their sketches. Show dimensions as well.</td><td>An</td><td>CO4</td></tr>
<tr><td>15 a)</td><td>Explain the concept of Passenger Car Unit. List the PCU values of some vehicle types used in India. Explain the factors influencing the PCU value of vehicles. (3+2)</td><td>U</td><td>CO4</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>15 b)</td><td>List the types of Co-ordinated signal system.</td><td>R</td><td>CO4</td></tr>
<tr><td>16 a)</td><td>Demonstrate the law of Illumination.</td><td>U</td><td>CO5</td></tr>
<tr><td colspan="4">(OR)</td></tr>
<tr><td>16 b)</td><td>List all the factors affecting highway capacity and level of service.</td><td>U</td><td>CO5</td></tr>
</table>

17 a)	Explain the various types of light sources used for street lighting.	**R**	**CO5**
(OR)			
17 b)	Explain with sketch about the Illumination strategies within Traffic Rotaries.	**U & App**	**CO5**

CEE11071	**Prof. Elective – II: Hydraulics Structure**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Prof. Core – VII: Water Resources Engineering				
Co-requisites	Prof. Core – IX: Foundation Engineering				

Course Objectives

1. To obtain idea about the layout of diversion head work and design of weir on permeable foundation.
2. To study the canal regulation works and various type of dams and spillways.
3. To understand the design and computation of earthen dam and gravity dam.
4. To gather information about the reservoir management and understand the concept of various theories for designing the irrigation channels.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Explain the network of diversion headwork and calculate the pressure at key points of sheet piles and floor thickness for a weir/ Barrage.	Remember (L1)
CO2	Explain various canal regulation work and also the basics of dams and spillways.	Understand (L2)
CO3	Plot the seepage line of earthen dam with corrections at entry and exit and also calculate the various forces acting on gravity dam.	Applying (L3)
CO4	Estimate the Difference between Kennedy and Lacey's design procedure.	Analyzing (L4)
CO5	Design the stable irrigation channels and also compute the reservoir capacity.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This is a course which covers basic concepts of irrigation engineering related to the description of diversion headwork, weir or barrage design on impermeable foundation, various canal regulation work, design of various hydraulic structures such as dam, irrigation channels etc.. This course also covers the study of reservoir planning and management. Demonstration of various irrigation systems and other elements will be provided by pictorial representations as per requirements. Numerical problems will be solved in connection with the several aspects of hydraulics structure. Classes will be conducted by lectures as well as power point presentation asper the requirements. Discussions related to development of various empirical equations regarding water resources engineering will be done as well. Students will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Unit I: **12 Lecture Hours**

Diversion Head works: Necessity, Difference between weir and Barrage, Type of Weirs, Selection of site, layout and description of each part, causes of failure of weirs on permeable foundation and their remedies.

Theories of seepage and Design of weirs and Barrages: Failure of Hydraulic Structures on pervious foundation, Bligh's creep theory, Khosla's theory & concept of flow-nets, Khosla's method of independent variable for determination of pressures and exit gradient necessary corrections, examples.

Unit II: **10 Lecture Hours**

Irrigation canals: Alignment of canal, canal distribution system, Design capacity of an irrigation canal, canal loss, canal regulation.

Canal regulation and transmission structures: Canal regulator, Canal falls - necessity, locations, types, Canal escapes, Cross drainage works - necessity, types, selection of a suitable type.

Dams and Spillways (Introduction): Definition, classification of Dams, factors governing selection of type of dam, selection of suitable site for a dam, classification and location of spillways.

Unit III: **12 Lecture Hours**

Earthen Dams: Introduction, Types of earthen dam, Methods of construction, Causes of failure, Design criteria, Determination of line of phreatic line in earthen dam, Seepage control in earthen dam, Examples.

Gravity Dam: Typical cross- section, Forces acting on Gravity Dam, Mode of failure and criteria for structural stability of Gravity Dams, Principal and shear stresses. Elementary profile of a Gravity Dam, Concept of High and low Gravity Dam, Examples.

Unit IV: **11 Lecture Hours**

Reservoir Planning and Management: Purpose of reservoir, Classification, Yield and capacity of reservoir, Mass curveand demand curve, Zones of storage reservoir, Useful life of reservoir - Trap efficiency, Reservoir losses, Reservoir sedimentation - Causes, Control, Computations of sediment load.

Sediment transport and Design of Irrigation channels: Importance, Sediment load, Design of stable channels, Regime channels, Kennedy's theory, Lacy's theory, Initial and final regime, Design procedure for Lacy's theorem, Lining of Irrigation canals—Objective and types, Difference between Kennedy and Lacey's theorem.

Reference Books

1. G L Asawa, Irrigation Engineering, Wiley Eastern
2. S K Garg, Irrigation Engineering & Hydraulic Structures, Khanna Publishers.
3. P N Modi, Irrigation Engineering, Water Resources and Water Power Engineering, Standard Book House, New Delhi
4. Varshney, Gupta & Gupta, Theory and Design of Irrigation Structures, Nem Chand & Bros.
5. Punmia B C & Pande B B Lal, Irrigation Engineering and Water Power Engineering, Laxmi Publications.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written ExaminationScheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

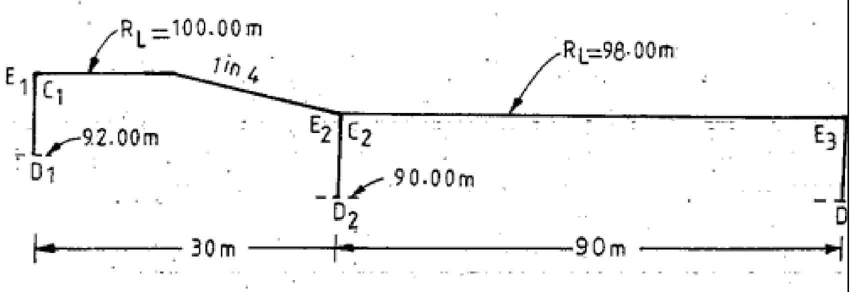
Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

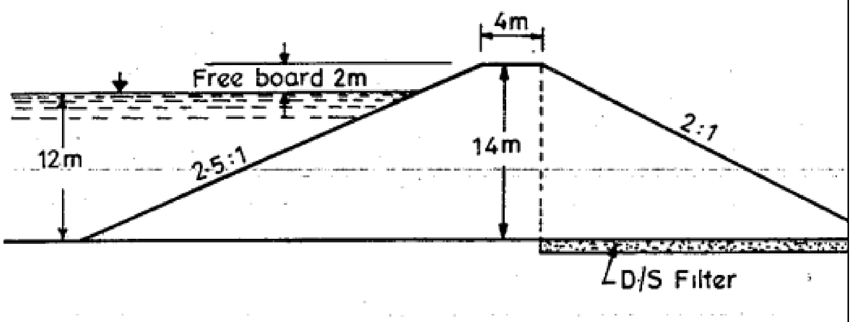
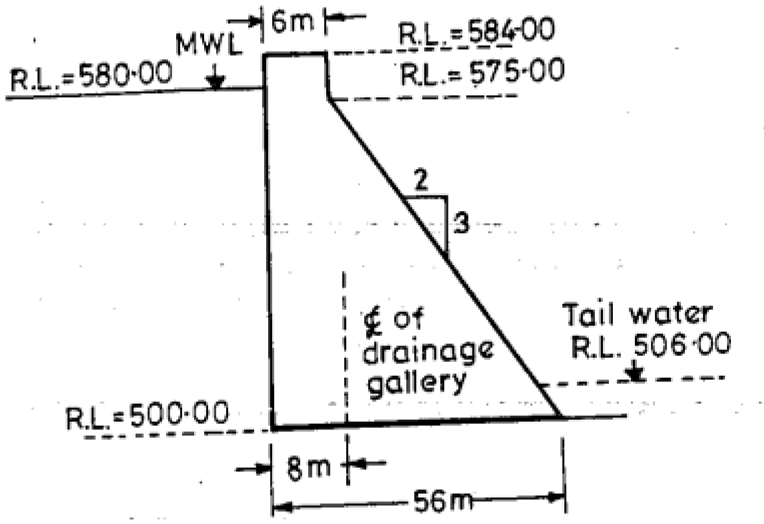
Model Question Paper

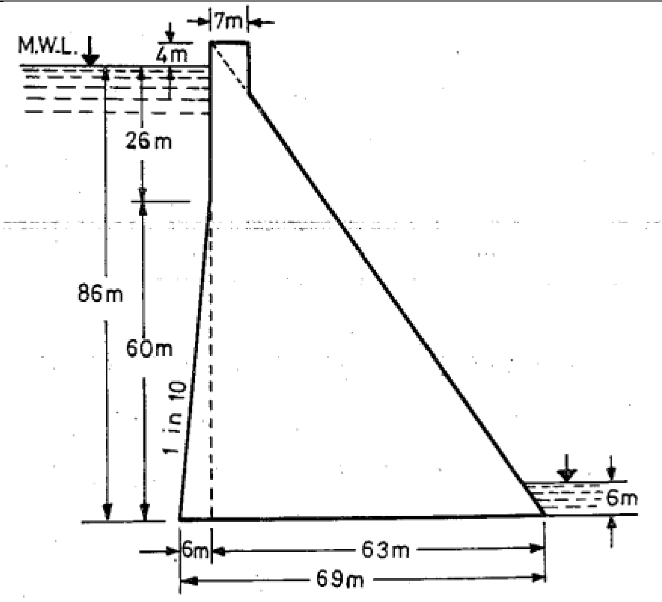
ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V

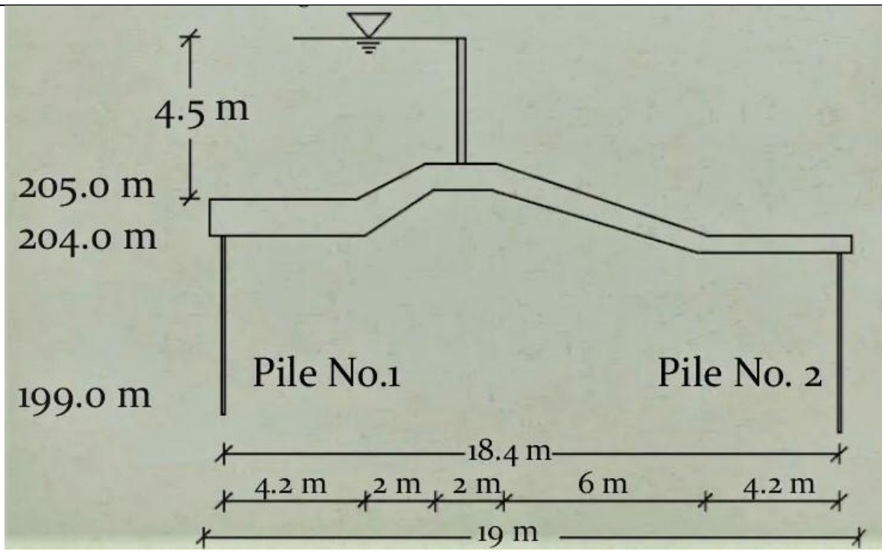
Paper Title:	Hydraulic Structures	**Paper Code:**	CEE11071
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	**What** is the function of a diversion headwork?	**Remembe r**	**CO 1**
2	In an arch dam, **what** is the reason behind its shape?	**Understa nd**	**CO 2**
3	**What** is the significance of phreatic line?	**Remembe r**	**CO 3**
4	**What** causes the uplift pressure in a dam?	**Understa nd**	**CO 2**
5	**Why** gravity dam requires a sound foundation?	**Understa nd**	**CO 4**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	**Explain** the Khosla's findings which he conducts on the weirs that were designed according to Bligh's theory but failed.	**An**	**CO 1**
	(OR)		
6 b)	**What** are the various reasons for weir failure on permeable foundation?	**Understa nd**	**CO 1**
7 a)	**Briefly discuss** a system of regulation that is practised to minimize the sediment load entering a canal.	**Understa nd**	**CO 2**
	(OR)		
7 b)	Under **which circumstances** various cross drainage works are provided?	**Understa nd**	**CO 2**
8 a)	Briefly **explain** the different hydraulic failures occurring in an earthen dam.	**Understa nd**	**CO 3**

	(OR)		
8 b)	**Mention** the various forces acting on a gravity dam. Briefly explain any two of them.	**Remember**	**CO 3**
9 a)	**Explain** the various zones of a reservoir with the help of a diagram.	**Understand**	**CO 4**
	(OR)		
9 b)	**Explain** Lacey's regime theory. What do you understand by intial and final regime?	**U**	**CO 4**
10 a)	**Compare** a weir and a barrage with the help of a diagram.	**R**	**CO 1**
	(OR)		
10 b)	**Identify** the cause of failure of hydraulic structures on permeable foundation.	**Analyse**	**CO 1**
	Group C **Answer All the Questions (7 x 5 = 35)**		
11 a)	**Explain** the various factors governing the selection of a type of dam.	**U**	**CO 2**
	(OR)		
11 b)	**What** will happen if the designed bed slope of the canal is greater the ground slope? **Explain** briefly and also **identify** the solution for that.	**Understand, Analyse**	**CO 2**
12 a)	**Draw** a neat sectional view of a weir with four shutters showing the various parts. **What** is exit gradient? **How** does it effect the design of weir?	**U, App**	**CO 1**
	(OR)		
12 b)	Use Khosla's curves to calculate the percentage uplift pressure at the three cut-offs for a barrage foundation profile as shown in Fig. applying corrections as applicable. The slope correction for 1 in 4 slope is 3.3%.  	**Apply**	**CO 1**
13 a)	A section of a homogeneous earth dam is shown in the Fig. **Calculate** the seepage discharge per metre length, through the body of the dam. The coefficient of permeability of the dam material may be taken as 8.5 x 10^{-5} m/s.	**Apply**	**CO 3**

	 		
(OR)			
13 b)	Fig. shows the section of a gravity dam built of concrete. **Calculate**: vi. The vertical stresses at the heel and toe of the dam. vii. The major principle stress. viii. The intensity of shear stress on a horizontal plane near the toe. Assume weight of concrete = 24 kN/m^3  **Fig**	**Apply**	**CO 3**
14 a)	Design a regime channel for a discharge of 45 cumecs and silt factor 1.1 using Lacey's theory.	**App**	**CO 4**
(OR)			
14 b)	Explain the various causes and the control measures of reservoir sedimentation.	**Understand**	**CO 4**
15 a)	Fig. shows the section of a gravity dam built of concrete. Examine the stability of the section at the base. The uplift may be taken as equal to hydrostatic pressure at the either ends and is considered to act over 60% of the area of the section. Also indicate the values of various kinds of stresses that are developed at the heel and toe. Assume weight of concrete as 24 kN/m^3 and weight of water as 10 KN/m^3.	**Analyse**	**CO 3**

	 **Fig**		
(OR)			
1 5 b)	Briefly explain the various causes of failure of an earthen dam with the help of diagram.	**Ev**	**CO 3**
1 6 a)	Compare Kennedy's theorem with Lacey's theorem.	**U**	**CO 4**
(OR)			
1 6 b)	Design an irrigation channel to carry 50 cumecs of discharge. The channel is to be laid at a slope of 1 in 4000. The critical velocity ratio for the slope is 1.1. Use Kutter's rugosity coefficient (n) as 0.023.	**App**	**CO 4**
1 7 a)	How does silt excluder differ from silt ejector?	**An**	**CO 1**
(OR)			
1 7 b)	Determine the percentage pressure at the key points and the exit gradient. Check if the structure is safe against piping or not. The permissible exit gradient is 1/6.	**U**	**CO 5**

	4.5 m 205.0 m 204.0 m 199.0 m Pile No.1 Pile No. 2 18.4 m 4.2 m 2 m 2 m 6 m 4.2 m 19 m		

CEE11072	Building Services	L	T	P	C
Version1.0		3	0	0	3
Pre-requisites/Exposure	12th level Science knowledge				
Co-requisites					

Course Objectives

1. To understand the essential services required in buildings for providing improving functions and facilities in efficient manner in the building.
2. To provide knowledge about the electrical services, mechanical services and plumbing requirements in different kinds of buildings.
3. To make the students well-informed for understanding drawings/ plans for various types of services in the buildings.
4. To impart knowledge on the preparation and presentation of civil engineering drawings with relevant conventional signs related to building services.
5. To provide idea about Fire protection and other miscellaneous requirements in buildings.
6. To give understanding about scope and provisions for building components and services, integrating concepts of green buildings

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Illustrate basic requirements of essential building services and manage illumination & ventilation requirements in buildings.	Remember (L1)
CO2	Evaluate the installation and function of Electrical Services in buildings including Earthing and Lightning Protection requirements.	Understand (L2)
CO3	Plan the installation of Lift, Elevators, Escalators, Air conditioning system and sound insulations in buildings as per requirement.	Applying (L3)
CO4	Estimate and synchronize the provisions and requirements for adopting fire protection in buildings.	Analyzing (L4)
CO5	Understand and ensure Green building applications with other miscellaneous services for new building constructions.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Building services are the essential services provided in the buildings for improving functioning of the buildings in efficient manner for the desired use of the building. In other words, Building Services are the electrical, plumbing, and mechanical systems required in a building. For this reason they are also known as MEP services (for mechanical, electrical, and plumbing). The electrical services, mechanical services such as air conditioning, lighting/ illumination, elevators, escalators, ventilation, fire protection, acoustics and sound insulations, and other important civil engineering or infrastructural services in a building, such as water supply, sanitary services, etc. have become most necessary services for residential, industrial, high-rise, hotels, motels, monumental buildings. No building can be operated, utilized and maintained effectively without adopting suitable building services. This course will provide knowledge about essential building services, like - Electrical

Services, Fire protection, Elevators, air conditioning etc. This course also includes basic provisions required for Green buildings.

Course Content

Unit I: **8 Lecture Hours**

Introduction: Definitions, Objective and uses of building services, Applications of services for different types of building, Classification of building services, Selection of building services.

Illumination & Ventilation: Natural and artificial lighting- principles and factors, Laws of illumination, illumination from point, line and surface sources, interior and exterior lighting; Necessity of Ventilation, Types of ventilation – Natural and Mechanical, Factors considered in design of Ventilation.

Unit II: **8 Lecture Hours**

Electrical Services and Layout in Building: Technical terms and symbols for electrical installations and accessories of wiring, Types of insulation, electrical layout for residential buildings, small workshops, show rooms, school buildings etc., Earthing and Lightning Protection.

Unit III: **15 Lecture Hours**

Lift, Elevators & Escalators: Definition of lift, Types of Lifts, Design Considerations, Location, Sizes, Component parts; Different types of elevators and Escalators, Freight elevators, Passenger elevators, Hospital elevators, Uses of different types of elevators Escalators.

Air Conditioning: Definition, Purpose, Principles, Temperature Control, Air Velocity Control, Humidity Control, Air Distribution system, Cleaners, Filters, Spray washers, Types of Air Conditioners - Central type, Window Type, Split Unit.

Acoustics and sound insulations: Necessity of sound insulation in building, Methods adopted for sound insulation.

Unit IV: **9 Lecture Hours**

Fire Protection: Classes of fire and causes, development of fire, effects of fire, Characteristics of fire resisting materials, means of escape, Standing Fire Advisory Council norms, General Requirements of Fire Resisting Building as per IS: 1642:1989 and NBC 2005, Maximum Travel Distance, Fire Fighting Installations for Horizontal Exit, Roof Exit/ Fire Lifts, External Stairs.

Unit V: **5 Lecture Hours**

Miscellaneous Services and Green Buildings Provisions: Water supply - Water distribution and plumbing fixtures; Basic sanitary services in buildings; Plan for Rain Water Harvesting in new buildings; Concept of Green Buildings, Components of Green Building, Eco-friendly materials, Components of Grey Water System, Management of Grey Water System and Distribution Pattern, Solar Power System; Certification systems – Green Rating for Integrated Habitat Assessment (GRIHA) and Leadership in Energy and Environmental Design (LEED).

Reference Books

5. R. Udaykumar ; A text book on Building Services;Eswar Press, Chennai
6. S. M. Patil ; Building Services ; Seema Publication, Mumbai Revised edition
7. Dr. B. C. Punmia ; Building Construction ; Laxmi Publications (P) Ltd., New Delhi
8. P. C. Varghese ; Building Construction ; PHI Learning (P) Ltd., New Delhi
9. David V. Chadderton, Building Services Engineering, 2013.
10. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison, Green Building, Handbook, Volume I, Spon Press, 2003.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V
Paper Title:	Building Services	**Paper Code:**	CEE11072

Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Classify building services.	**Analyze & Understand**	**CO1**
2	List the accessories required for electrical wiring of a building.	**Remember**	**CO2**
3	What do you mean by Elevator in a building?	**Remember**	**CO3**
4	Analyze the causes of fire in a building.	**Analyze**	**CO4**
5	List out the Water distribution and plumbing fixtures required in a building.	**Remember**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Explain objectives of important building services.	**Understand**	**CO1**
(OR)			
6 b)	Why ventilation is necessary in a building?	**Remember**	**CO1**
7 a)	What do you mean by Earthing for a building?	**Remember**	**CO2**
(OR)			
7 b)	Suppose you need to plan for electrical services of a residential building before construction. Analyze the requirements for electrical layout of the same.	**Analyze**	**CO2**
8 a)	Explain the necessity of sound insulation in a building.	**Understand**	**CO3**
(OR)			
8 b)	List different types of elevators.	**Remember**	**CO3**
9 a)	Explain briefly about Classes of fire.	**Understand**	**CO4**
(OR)			
9 b)	Analyze the factors which can contribute in development of fire in a building.	**Analyze**	**CO4**
10 a)	List out the basic sanitary services in buildings.	**Remember**	**CO5**
(OR)			
10 b)	Explain about the necessary components of a Green building.	**Understand**	**CO5**
Group C			

Answer All the Questions (7 x 5 = 35)			
11 a)	Explain Lightning protection required for any building.	**Understand**	**CO2**
(OR)			
11 b)	Identify important properties of Insulating materials used for electrical services in building.	**Apply**	**CO2**
12 a)	How can you select required services in a building? Analyze the selection criteria.	**Remember & Analyze**	**CO1**
(OR)			
12 b)	Illustrate about the principles and factors affecting natural lighting and artificial lighting.	**Understand**	**CO1**
13 a)	Identify different types of Air Conditioners in buildings and explain briefly about all the types.	**Apply & Understand**	**CO3**
(OR)			
13 b)	Identify different methods adopted for sound insulation in buildings and explain briefly.	**Apply & Understand**	**CO3**
14 a)	Illustrate about the characteristics of fire resisting materials.	**Understand**	**CO4**
(OR)			
14 b)	Illustrate about the functions of Fire Lifts and External Stairs in a building.	**Understand**	**CO4**
15 a)	Explain about the effects of fire on a building.	**Understand**	**CO4**
(OR)			
15 b)	Identify the general requirements of a Fire Resisting Building.	**Apply**	**CO4**
16 a)	Discuss the objectives of Rain Water Harvesting in new buildings and analyze the steps for its construction.	**Understand & Analyze**	**CO5**
(OR)			
16 b)	Identify the use eco-friendly materials for building construction and services.	**Apply**	**CO5**
17 a)	Discuss briefly about the Solar Power System for a building with its components and applications.	**Understand**	**CO5**
(OR)			
17 b)	Explain about Certification systems for Green buildings.	**Understand**	**CO5**

CEE12020	**Geotechnical Engineering Lab**	**L**	**T**	**P**	**C**
Version 1.0		0	0	2	1
Pre-requisites/ Exposure	Soil Mechanics				
Co-requisites	Foundation Engineering				

Course Objectives:

1) To introduce different properties of fine and coarse grained soils, such as water content, specific gravity to the students.
2) To make students knowledgeable about the process of obtaining in-situ density and unit weight of the soil at site.
3) To provide the students a detailed idea about different types of Indian Standard (IS) Sieves available to determine gradation of cohessionless soil and to draw particle size distribution

curves for granular soils by sieving; and to make them understand about sedimentation analysis for fine grained soils which is helpful to classify the soil.

4) To demonstrate consistency parameters of soil based on the Atterberg’s limits, this will be necessary for settlement analysis.
5) To demonstrate compaction procedure for soil; this will help the students in site works, like - in roadway construction sites.
6) To provide understanding about the permeability property of soil; this is required in seepage analysis in case of hydraulic structures.
7) To introduce shear strength of soil to the students and to demonstrate different laboratory tests required to obtain the shear strength parameters i.e. cohesion (c) and angle of internal friction (φ), according to different conditions for various soils. It will be essential for estimate the bearing capacity of soil for foundation design.
8) To demonstrate consolidation properties of soil below foundations through laboratory consolidation test; this laboratory test will help students to calculate various coefficients, indexes related to consolidation of soil at site and to draw the settlement curve.

Course Outcomes:

On completion of this course, the students will be able to:

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	**Identify** the physical properties of soil i.e., moisture content, specific gravity, insitu density, unit weight of soil.	Remember (L1)
CO2	**Determine** the particle size distribution of soil and consistency of soil based on Atterberg's limits.	Understand (L2)
CO3	**Demonstrate** the compaction characteristics of soil and permeability of soil.	Applying (L3)
CO4	**Evaluate** shear strength parameters of soil in various drainage conditions using different tests.	Analyzing (L4)
CO5	**Estimate** the consolidation and compressibility properties of soil.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Description:

Geotechnical Engineering Lab is a very important practice to make students capable to identify different properties of soil and to classify the soil. The basic properties of soil are related with both physical and engineering aspects; and both of these are important to analyze the foundation soil. For designing foundations, required to support superstructure, analysis of soil parameters is very crucial and based on the measured parameters of soil the bearing capacity can be assessed and further foundation design can be done. The water content, specific gravity, in-situ density etc. basically indicate the physical properties; whereas the grade and consistency of soil, its compaction and seepage properties are related to engineering.

From this course students will be able to estimate the shear strength of soil based on the shear strength parameters (c and φ) of soil beneath the foundation. The different methodologies for the tests will be explained and based upon that the tests will be demonstrated to students with different applied conditions. This course also includes Odometer test through which the compressibility and consolidation properties of soil can be analyzed along span of time, which will be helpful for estimating the settlement of the foundation for long time.

Laboratory activities will be planned to encourage students to play an active role in building their strategies during field work, prepare bore-log, soil report, foundation design etc. Participation in these sessions is an elemental aspect of this course to build up knowledge during practical work. This course will also contribute in relating theoretical knowledge with practical aspects for the students.

Course Content:

List of experiments

Sl. No.	Name of the experiment
1	Determination of natural moisture content of soil by oven drying method and calcium carbide method. Determination of specific gravityof soil using pyncnometer and specific gravity bottles.
2	Determination of in-situ density of soil by core cutter method and sand replacement method.
3	Determination of particle size distribution for cohesion less soil by sieve analysis and for fine grained soil by hydrometer analysis.
4	Determination of the Atterberg's limits (liquid limit, plastic limit and shrinkage limit) of soil sample.
5	Evaluation of compaction characteristics of soil using standard proctor test. Determination of the coefficient of permeability by constant head permeability test (for coarse grained soil) and by falling head permeability test (for fine grained soil).
6	Determination of the shear strength parameters of soil by Direct shear test.
7	Determination of the shear strength parameters of soil by Tri-axial test (UU condition).
8	Determination of the unconfined compressive strength of soil by Unconfined compression test.
9	Determination of undrained shear strength of soil by Vane shear test.
10	Estimation of the compressibility characteristics of soil by Oedometer test (determination of coefficient of consolidation and compression Index).

Modes of Examination: Assignment/ Quiz/ Project/ Presentation/ Written Examination

Scheme:

Components	Mid term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		

CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

Name: **Enrolment No:**		
Course: Geotechnical Engineering Lab (CEE12020) **Program: B.Tech. (CE)** **Time: 03 Hrs.** **Semester: V** **Max. Marks: 50**		
Follow the instruction given by Lab Instructor during the exam		
1	Determine the natural water content of the given soil sample by oven drying method and calcium carbide method. Also find the Specific gravity of the given sand by using the Pycnometer. (20 +20)	**Remember & Evaluate**
2	Find the in-situ density and dry density of the soil in University campus by core cutter method and sand replacement method.	**Remember**
3	Show the Particle size distribution curve of a coarse grained soil by conducting Sieve analysis and explain the process.	**Remember & Understand**
4	Determine the Liquid limit of given sample and show the flow curve. Also calculate the Flow Index of the sample.	**Remember & Evaluate**
5	Show the compaction curve of given soil using Standard proctor test and determine its OMC and MDD. Also define Zero Air void line.	**Remember & Evaluate**
6	Determine the Shear strength parameters of a soil sample by Direct shear test.	**Evaluate**
7	Determine the Shear strength of a soil sample using Tri-axial test in UU condition.	**Evaluate**

8	Estimate the unconfined compressive strength of a soil sample by Unconfined compression test.	**Evaluate**
9	Determine the undrained shear strength of soil by Vane shear test.	**Evaluate**
10	Develop the Virgin compression curve of the given soil by Oedometer method.	**Apply**

CEE12021	Prof. Core Lab VI- Transportation Engineering Lab	L	T	P	C
Version1.0		0	0	2	1
Pre-requisites/Exposure	Prof. Core – VIII- Transportation Engineering				
Co-requisites	--				

Course Objectives

1. To craft students knowledgeable about different properties of coarse aggregates.
2. To train students in handling different equipment that will help them in construction sites.
3. To craft students knowledgeable about different kinds of bituminous materials.
4. To give the students a detailed idea about consistency and different grades of Bitumen.
5. To make student expert in finding various properties of bitumen through lab experiments.
6. To make students proficient regarding finding Optimum Binder Content of Heterogeneous Mix of Coarse Aggregate and Bitumen

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	**Examine** various strength properties like Toughness, Hardness, Specific Gravity and Water Absorption of Coarse aggregates.	Remember (L1)
CO2	**Identify** the percentage of undesirable Flaky and material in a given sample of Coarse Aggregate.	Understand (L2)
CO3	**Demonstrate** various Consistency and Resistance Tests of Bitumen prior to its application.	Applying (L3)
CO4	**Evaluate** strength of Subgrade material by California Bearing Ratio Test.	Analyzing (L4)
CO5	**Determine** the optimum binder content for a heterogeneous mix of aggregate and bitumen.	Evaluating (L5)

CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The Transportation Engineering lab has equipment required to conduct all standardized tests to assess quality of highway materials, pavement evaluation and traffic engineering studies. Experiments are conducted in pre-, during- and post-construction phases of highways. The Transportation Engineering lab does quality assurance and quality control tests for the Roads, Traffic engineering surveys are also conducted in the lab and students learn to conduct spot speed studies, volume counts, and conflict studies for preparing road improvement plans to enhance road safety.

Laboratory activities will be planned to encourage students to play an active role building of their strategies during field work. Participation in these sessions is an elemental aspect of this course to build up knowledge during practical work.

Course Content

Transportation Engineering Lab	**CEE1202 1**
Experimentno.1	Determination of specific gravity and water absorption of Coarse aggregate
Experimentno.2	Determination of Impact value and Los-Angeles Abrasion value of coarse aggregate
Experimentno.3	Determination of Flakiness and Elongation Index of coarse aggregate
Experiment no. 4	Determination of penetration value, specific gravity and softening point of Bitumen.
Experiment no. 5	Determination of Flash & Fire point, loss on heating of Bitumen & bituminous Materials and Stripping value of materials
Experiment no. 6	Identification of Optimum Moisture Content and Maximum Dry Density of Subgrade Material.
Experiment no. 7	Determination of California Bearing ratio (CBR) of Subgrade Material
Experiment no. 8	Marshal Stability test of Bitumen and Aggregate Mix

Text Books:
2. Highway material testing (Laboratory Manual) by S.K. Khanna and CE. G. Justo
3. Relevant IS and IRC Codes
Reference Books:
3. BIS codes on Aggregates & Bituminous materials

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	V
Paper Title:	Transportation Engineering Lab	**Paper Code:**	CEE12021
Maximum Marks:	50	**Time Duration:**	3Hrs

Total No. of Questions:	10	**Total No of Pages:**	1
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Follow the instruction given by Lab Instructor during the exam			
1	**Find** the specific gravity and water absorption test of 1 kg Coarse Aggregate sample passing from10 mm IS Sieve.	**CO1**	**R & An**
2	**Establish** a graphical relationship between Load Vs Penetration for a Subgrade soil sample and determine the design CBR value.	**CO4**	**R, U & An**
3	**Analyze** toughness and hardness of a given Coarse Aggregate sample.	**CO1**	**An**
4	**Determine** the presence of Flaky and elongated material present in a stock of Coarse Aggregate sample.	**CO2**	**An**
5	**Find** the flash and fire point of a given grade of bitumen.	**CO3**	**An**
6	**Determine** grade of bitumen from a Standard Penetrometer.	**CO3**	**An**
7	**Determine** the softening point of a given grade of bitumen.	**CO3**	**An**
8	**Find** the optimum bitumen content from Marshall Mix Design of Bituminous Mix Concrete.	**CO5**	**An**

CEE12090	**Skill Enhancement Course - 1** Computer Aided Drawing	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Basic Civil Engineering Drawing				
Co-requisites					

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software

Course Outcome:

After completing this course student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the various computer aided Drawing tools.	Remember (L1)
CO2	Interpret the functions of building components and draw them free hand.	Understand (L2)
CO3	Develop Single Line building drawing as per functional requirements.	Applying (L3)
CO4	Evaluate the planning & drawing with appropriate scales using AutoCAD Software.	Analyzing (L4)
CO5	Develop the Provisional drawing of a building as per bye-laws.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Contents:

Unit	Contents	Hours
1	**Introduction of Drawing tools** – Introduction to various methods of Drawing, Its's significance, various drawing tools & software's. Introduction to 2D & 3D Drawings, Various software commands & their applications.	**5**
II	Design single line plan on Graph paper (line plans) based on various requirements for residential, public, education and industrial buildings.	**8**
III	**Auto CAD (Computer Aided Drafting)** a) Specifying Distance and coordinates. Polar coordinates, relative Cartesian coordinates. Interpreting curser modes and understanding prompt, choosing commands options, selecting objects, editing and grips. Setting up work area, measurement systems, scales factor mode as drafting tools. Symbols, blocks layers. Templates copying object, editing lines, changing length of object. Geometric construction of line and point parallel line, perpendicular lines, breaking lines, dividing lines, fillets, chambers, circles, tangent, arcs, curves through points, breaking polygons, solid shape ellipse.	**8**

IV	**Signs & Symbol :-** Hatch patterns boundary, adding text, Text formatting styles, size of text and scale of drawing, dimensions style, unit heights, locations, arrow style	**5**
V	**Method of Drawing:** Importance of Building drawing as Engineers language in construction & costing, Selection of scales for various drawings. Thickness of line Dimensioning, first angle and third angle method of projection, Abbreviations and conventional representations as per NBC, Free hand dimensioned sketches, stones of various building elements.	**6**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann
Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line TL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	One compulsory field visit and exercise given by teacher, free hand sketching of components and building plans and report submission.
2	Minimum 15 free hand self-explanatory dimensioned sketches of various building elements in sketchbook
3	Minimum 15 self-explanatory dimensioned sketches of various building elements on Auto-CAD
4	Drawing of single line plan of residential single storied building in sketchbook & on Auto-CAD
5	Drawing of single line plan of various types of Public building single storied building in sketchbook & on Auto-CAD
6	Single Line plans of multi-storied (2-storied) residential buildings in sketchbook
7	Single Line plans of multi-storied (2-storied) various types of buildings e.g. public / educational / industrial / hospital / community on graph papers (Four assignments) in sketchbook.
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

		L	T	P	C
CEE12091	**Skill Enhancement Course - 1** Designing of Structure using Sketch Up				
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Basic Civil Engineering Drawing				
Co-requisites					

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software

Course Outcome:

After completing this course student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the various computer aided Drawing tools.	Remember (L1)
CO2	Interpret the functions of building components and draw them free hand.	Understand (L2)
CO3	Develop Single Line building drawing as per functional requirements.	Applying (L3)
CO4	Evaluate the planning & drawing with appropriate scales using AutoCAD Software.	Analyzing (L4)
CO5	Develop the Provisional drawing of a building as per bye-laws.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	**INTRODUCTION-** Introduction of GOOGLE SKETCHUP ,Unit setup, Shortcut key, Default tray , Mouse Control
2	**TOOLS-BARS-**Camera Tool ,Construction Tool, Edit ,Getting Started ,Large Tool Set ,Layers ,Standard , Principal
3	**DRAWING TOOLS –** Shadows, Styles, Views, Sandbox
4	**3D PLAN DRAW-** Level setting and editing of door, window, and wall
5	**INTERIAL DRAWING -**Kitchen Draw ,Room designing
6	**FURNITURES -** Bed , Table , Chair
7	**3D WAREHOUSE-**Download Components – Importing, editing, placing.
8	**RENDERING -**Apply material, Rendering setup
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO2	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO3	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO4	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO5	3	-	3	-	3	-	-	3	-	-	-	3	2	3
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE12066	Construction Engineering Materials Lab	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Basic Civil & Mechanical Engineering, Structural Mechanics I				
Co-requisites	Construction Engineering Materials Lab				

Course Objective:

1. To facilitate the understanding of the behavior of construction materials.
2. To understand the behaviour of aggregates and bricks.
3. To calculate the different phenomenon of concrete.
4. Understand the procedure of mix design.

Course Outcome:

After completing this course student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Determine** the required physical properties of construction aggregates.	Remember (L1)
CO2	**Categorize** bricks based on their physical properties.	Understand (L2)
CO3	**Identify** physical properties of cement.	Applying (L3)
CO4	**Examine** the physical properties of fresh concrete.	Analyzing (L4)
CO5	**Estimate** the requirement for mix design of concrete.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Catalogue

This course addresses all the properties of aggregates, bricks, cement and concrete needed in construction applications, including strength and durability. It also provides guidance on all aspects of concrete from its preparation to curing and then testing. Students will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Test on Aggregates	
EXP. NO.01	Sieve analysis of fine and coarse aggregates
EXP. NO.02	Specific gravity Test of Fine and Coarse Aggregates
EXP. NO. 03	Bulking Test of Fine Aggregates
EXP. NO.04	Determination of elongation index and fineness index of coarse aggregates
Test on Bricks	
EXP. NO.05	Determination of water absorption and Efflorescence of bricks
EXP. NO.06	Compressive strength test of bricks
Test on Cement	
EXP. NO.07	Fineness test of cement
EXP. NO.08	Specific gravity test on cement
EXP. NO.09	Hardness test of cement
EXP. NO.10	Compressive strength test of cement mortar
Test on Concrete	
EXP. NO.11	Slump test of concrete
EXP. NO.12	Compaction factor test of concrete
EXP. NO.13	Compressive strength test of concrete – Cube and Cylinder
EXP. NO.14	Flexural strength test of concrete – Beam
EXP. NO.15	Mix Design of Concrete

References:

1. Construction Materials Laboratory Manual, Adamas University, Kolkata- 700126
2. IS 4031 (Part 1) – 1996 – Indian Standard Method for determination of fineness by dry sieving.
3. IS 2386 (Part 1 to Part 6) – 1963 – Indian Standard methods for test for aggregate for concrete

4. IS 383 – 1970 Indian Standard specification for coarse and fine aggregates from natural sources for concrete.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Continuous Class Assessment	End Term
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE15089	Technical Seminar	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	All the previous Professional courses				
Co-requisites	All the current Professional Courses				

Course Objective:

1. To Identify and compare technical and practical issues related to the area of course specialization
2. To demonstrate the ability to describe, interpret and analyze technical issues and develop competence in presenting.
3. To analyze the methodology of emerging technology to address the innovation in the selected topic.
4. To develop a new idea to add improvement in the selected topics and convey the same before the assessor.

Course Outcome:

After completing this course student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Establish** a sound technical knowledge of their selected seminar topic.	Remember (L1)
CO2	**Infer** problem identification, formulation and solution.	Understand (L2)
CO3	**Demonstrate** the knowledge, skills and attitudes of a professional engineer.	Applying (L3)
CO4	**Communicate** with engineers and the community at large.	Analyzing (L4)
CO5	Narrate the technical issues with good communication and presentation	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Catalogue

This course aims to explore the communication, presentation, enthusiastic learning towards emerging technologies in the field of civil engineering, preparation to face the audience during the seminar presentation, selection of topics and soft skills.

Skills:

• Identification of emerging area in the relevant field

• Motivation towards lifelong learning

• Narration of technical issues with good communication and presentation

Activities:

• Preparing the presentation using power point

• Writing the report on selected topics by including all the sections

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Examination Scheme:

Components	Continuous Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

SEMESTER –VI

CEE11024	Design of Steel Structure	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics-I, Structural Mechanics-II, Design of RC Structure				
Co-requisites	Advanced Construction Materials & Techniques				

Course Objectives

1. To understand the design considerations as well as design philosophies related to steel structure
2. To design suitable bolted and welded simple and eccentric connection under different type ofloading condition
3. To design tension and compression steel members
4. To understand the design procedure of beam column base plate
5. To design suitable steel beams (laterally supported and unsupported) and calculate differentdesign values of steel plate girders and gantry girders

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Rephrase** the background, concept of design considerations and philosophies.	Remember (L1)
CO2	**Design** common bolted and welded connections for steel structures.	Understand (L2)
CO3	**Develop** the design of tension and compression members.	Applying (L3)
CO4	**Infer** specific problems related to design of beam-column base plate as well as laterallyrestrained and unrestrained steel beams.	Analyzing (L4)
CO5	**Design** various design values of steel gantry girder and plate girders.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Design of steel structure i.e. steel design is a course that covers fundamental aspects, analysis as wellas design of several steel elements, structures and different connection along with satisfactory requirements like safety, serviceability, feasibility and economy. This course includes design philosophies, background of design and discussion related to latest Indian code IS 800: 2007.All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: 4 Hours

Introduction: Historical development, Structural steel properties, Classification of structural steel, Metallurgy of steel, Corrosion and fire on steel.

The Basis of structural Design: Design considerations, Codes and specification, Design philosophies, Failure criteria for steel.

Unit II: 10 Hours

Bolted Connections: Rivets and riveted connection, Behavior of bolted connection, Design strength of ordinary black bolts, Eccentric connection, Truss connections.

Welded Connection: Welding process, Symbols, Classification, Welding process, Types of joints, Design strength of weld, Design of welded bracket connection.

Unit III: 12 Hours

Design of Tension Member: Types of tension members, Slenderness ratio, Behaviour of tension member, Modes of failure, Design of tension member, Design of Gusset Plate.

Design of Compression Member: Classification of cross section, buckling of slender compression member, Design of compression member using rolled section, Design of Built-Up Compression Member using Batten, Laced compression member, Design of Column Base.

Unit IV: 9 Hours

Design of Beams: Beam types, Section Classification, Shear strength of Steel Beams, Web buckling, Web crippling, Deflection of beam, Concept of shear buckling, Design of laterally supported beam, Design of laterally unsupported beam, Failure modes of beam.

Design of Beam-Columns: Design of Beam-Columns subjected to Tension and Bending, Design of Eccentrically Loaded Base Plates.

Plastic Analysis of Beam: Concept of Plastic hinge, Collapse loads of determinate and indeterminate structures such as beams and rectangular portal frames, mechanisms. Bending moment diagram at collapse**.**

Unit V: 10 Hours

Design of Plate Girders: Introduction of Plate Girders, Web panel subjected to Shear, Web panel subjected to combined bending and shear, Concept of tension field method, Simple post critical method, Design of Plate Girders using IS-800 provisions without stiffener, Design of stiffened plate girder, Splices and curtailment.

Design of Gantry Girder: Introduction of Gantry Girder, Loading Considerations, Maximum Load effects, Design of Gantry Girders.

Reference Books

1. V.L. Shah & Veena Gore, Limit State Design of Steel Structures, Structures Publication
2. S.K. Duggal, Limit State Design of Steel Structures, Mc Graw Hill Publication
3. N. Subramanian, Design of Steel Structures, Oxford University Press

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

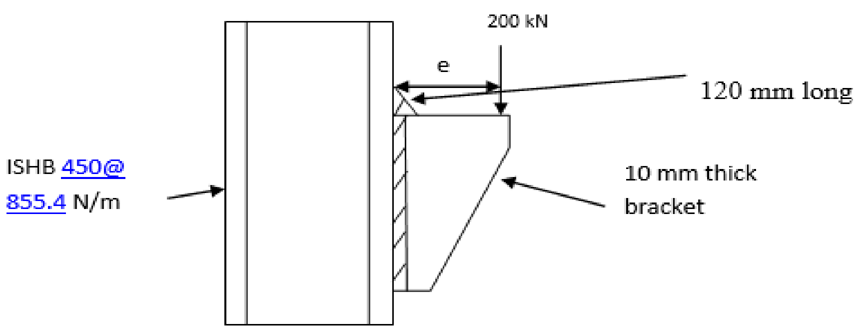
Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

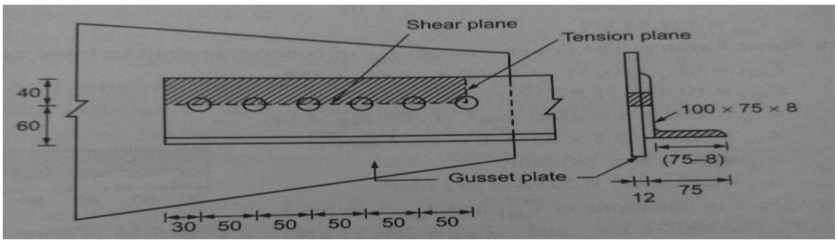
Model Question Paper

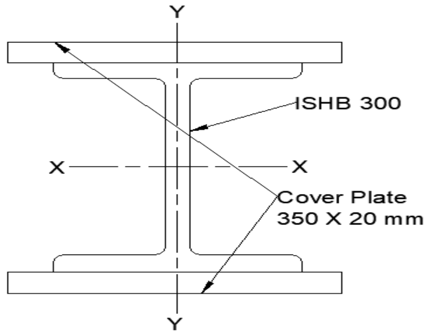
ADAMAS UNIVERSITY PURSUE EXCELLENCE	ADAMAS UNIVERSITY END SEMESTER EXAMINATION (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	VI
Paper Title:	Design of Steel Structure	**Paper Code:**	CEE11024
Maximum Marks:	50	**Time Duration:**	3 Hrs

Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	What is shape factor.	**U**	**CO1**
2	Determine threaded area of a 16 mm diameter bolt.	**R**	**CO2**
3	What is the maximum effective throat thickness of weld having size of weld is S.	**R**	**CO3**
4	Predict the effective length of a circular electric pole of length L and constant diameters erected on ground.	**R**	**CO4**
5	Show the general maximum span / deflection ratio of a steel beam.	**U**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Describe the type of failures in bolt connections with diagram.	**An**	**CO1**
(OR)			
6 b)	State the types of bolt connection.	**U**	**CO1**
7 a)	Draw a longitudinal section of an ordinary bolt showing all the components of it.	**R**	**CO2**
(OR)			
7 b)	Write a short note on different type of joints.	**U**	**CO2**
8 a)	Why Built-up sectioned are used?	**U**	**CO3**
(OR)			
8 b)	What is rolled section?	**R**	**CO3**
9 a)	What are the different type of section ?	**U**	**CO4**
(OR)			
9 b)	Write a short note on lug angle?	**U**	**CO4**

10 a)	What are different force in gantry girder?	**R**	**CO5**
10 b)	What is prying force ?	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Two plates of thickness 18 mm and 10 mm joined by a double cover butt joint. If it subjected to force of 150 KN. Find the no. of bolt required for the connection and also the show the complete diagram.	**Ev**	**CO2**
(OR)			
11 b)	A joist cutting is used as bracket to support a factored load of 200 kN. It is welded to the column as shown in figure. Determine the size of the fillet weld. At top and bottom of bracket 120 mm long welding is done (shown only the top part, but it is also present at the bottom).  	**Ev**	**CO2**
12 a)	A circular plate 150 mm in diameter is welded to another plate by means of 6 mm size weld. Estimate the ultimate twisting moment that can be resisted by the weld. UseFe410 grade of steel and shop welding.	**Ev**	**CO1**
(OR)			
12 b)	Estimate the strength of a 20 mm diameter bolt of grade 4.6 for double cover butt joint:each of the cover plate being 8 mm thick. The main plates to be jointed are 12 mm thick.	**Ev**	**CO1**
13 a)	Estimate the design compressive load for a stanchion 350@710.2 N/m,3.5 m high. The column is restrained in the direction and position at both the ends. It is to be as an uncased column in a single-storey building. Use steel of grade Fe 410.	**App & An**	**CO3**
(OR)			

<table>
<tr>
<td>13 b)</td>
<td>A single unequal angle 100 x 75 x 8 mm is connected to a 12 mm thick gusset plate at the ends with 6 number of 20 mm diameter bolts to transfer tension as shown in figure. Determine the design tensile strength of the angle if the gusset is connected to the 100 mm leg. Assume steel grade of Fe410.


</td>
<td>App & An</td>
<td>CO3</td>
</tr>
<tr>
<td>14 a)</td>
<td>Design a laterally unsupported beam for the following data:
Effective span is 4m, maximum bending moment is 550 kNm, Maximum shear forceis200 kN. Use steel of grade Fe410.</td>
<td>An</td>
<td>CO4</td>
</tr>
<tr>
<td colspan="4">(OR)</td>
</tr>
<tr>
<td>14 b)</td>
<td>Calculate the compressive resistance of a compound column consisting of ISHB 300 with cover plate of 350 X 20 mm on each side of the flange as shown in Figure 2. Length of the column is 5 m. Assume that the bottom face of the column is fixed and top face is rotationally fixed transition free. Take f_y = 250 MPa.


</td>
<td>Ev</td>
<td>CO4</td>
</tr>
<tr>
<td>15 a)</td>
<td>Calculate the compressive resistance of a compound column consisting of ISHB 300 with cover plate of 300 X 30 mm on each side of the flange as shown in Figure 2. Length of the column is 6.5 m. Assume that the bottom face of the column is fixed and top face is rotationally fixed transition free. Take f_y = 250 MPa.</td>
<td>Ev</td>
<td>CO4</td>
</tr>
<tr>
<td colspan="4">(OR)</td>
</tr>
<tr>
<td>15 b)</td>
<td>Design a 3.5 m long single angle section as a tension member to support a DL of 150 KN and LL of 200 KN. The member is to be connected to a gusset plate by 20 mm diameter bolt. The slenderness ratio should not exceed 300 mm. The structural steel is of the grade Fe410.</td>
<td>Ev</td>
<td>CO4</td>
</tr>
<tr>
<td>16 a)</td>
<td>Design a 4 m long single angle section as a tension member to support a DL of 200 KN and LL of 250 KN. The member is to be connected to a gusset plate by 16 mm diameter bolt. The slenderness ratio should not exceed 300 mm. The structural steel is of the grade Fe410.</td>
<td>Ev</td>
<td>CO5</td>
</tr>
</table>

(OR)			
16 b)	An ISMC 300 @35.8 kg/m is used to transmit a factored load of 700 KN. The channel section connected to 10 mm gusset plate. Design the fillet weld if the overlap is limited to 250 mm. Use slot weld if required, assume site welding.	**Ev**	**CO4**
17 a)	Design a welded plate girder 24 m in span and laterally restrained throughout. It has to support a uniform load of 100 kN/m through ut the span exclusive of self-weight. Use intermediate transverse stiffeners. The steel for the flange and web plates is a grade of Fe 410. Design the cross section. Use post-critical method for design.	**App & An**	**CO5**
(OR)			
17 b)	Design a slab base for a column ISHB 350 @710.2 N/m subjected to a factored axial compressive load of 1500 kN for the following conditions: Load is transferred to the base plate by direct bearing of column flanges. 200	**App & An**	**CO5**

CEE11025	**Environmental Engineering**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

1. To ensure that societal development and the use of water, land and air resources are sustainable.
2. To manage these resources so that environmental pollution and degradation is minimized.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Infer Water and wastewater quality and treatment methods for large and small communities.	Remember (L1)
CO2	Illustrate Air quality, emissions and pollution control (sampling, modelling and the design of devices to remove particulate and gaseous pollutants)	Understand (L2)
CO3	Demonstrate Hazardous and solid waste engineering and identify the communication effectively with a range of peoples.	Applying (L3)

CO4	Describe Environmental health (toxicology, industrial hygiene, ecological impacts) and with a solid foundation in design, project management and preparation for professional licensure.	Analyzing (L4)
CO5	Evaluate pollutant dispersion in the air	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

With the rapid degradation of the environment all around the world due to various factors like air and water pollution, deforestation, rampant encroachments, waste disposal, etc, the need for this subject is on a rise. The prospective students can learn about various scientific and engineering principles to find probable solutions to the existing crisis so that the people have access to healthy and safe land, water and air. This subject will provide an insight into the key details that need to know about Environmental Engineering.

Course Content:

Module 1: 6 Lecture Hours

Water demands; Per capita demand; Variations in demand, Factors affecting demand; Design period; Population, forecasting.

Module 2: 20 Lecture Hours

Water: Impurities in water; Water quality parameters; Standards for potable water,
Surface Water: sources of water pollution and their impact on aqueous environment and public health, water quality and supply, wastewater treatment,
Water Supply systems, Need for planned water supply schemes, Sources of Water, Water demand and Potable, industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.

Module 3: 9 Lecture Hours

Solid Waste: sources of solid waste, characterization and treatment of solid waste, solid waste management

Module 4: 10 Lecture Hours

Air Pollution and Control: air pollutants and sources, air pollution meteorology, pollutant dispersion in the air, air pollution control.
Noise- Basic concept, measurement and various control methods.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Course: CEE11025 – Environmental Engineering

Program: B. Tech. (CE) **Semester: Even (VI) 2022-23**
Time: 03 Hrs. **Max. Marks: 50**

Instructions:
Attempt All Questions from **Group A** (Each Carrying 1 Marks); all Questions from **Group B** (EachCarrying 2 Marks). all Questions from **Group C** (Each Carrying 7 Marks).

Group A

Answer All the Questions (5 x 1 = 5)

1.a	Name the chemical most commonly used to increase speed of sedimentation of sewage.	**R**	**CO1**
b	Which system will be appropriate for layout of distribution system in which water flows towards the outer periphery?	**R**	**CO2**
c	Name the type of valve which allows water to flow in one direction but prevents its flow in the reverse direction.	**U**	**CO3**
d	What is the main disadvantage of cement concrete sewers.	**U**	**CO4**
e	Write the working conditions in imhoff tanks.	**U**	**CO5**

Group B

Answer All the Questions (5 x 2 = 10)

2 a.	What is ozone layer depletion?	**R**	**CO3**
	OR		
2 b.	What is acid rain?	**R**	**CO3**
3 a.	Differentiate between pre, post and super chlorination	**U, Ap**	**CO2**
	OR		
3 b.	With a neat sketch show the different layers of atmosphere.		
4 a.	Explain the theory of filtration in water treatment plant?	**U**	**CO3**
	OR		
4 b.	List the various elements of atmosphere.	**U**	**CO2**
5 a.	Explain the working principle of sedimentation in water treatment plant?	**U, Ap**	**CO4/ CO5**
	OR		
5 b.	How is ozone hole formed?	**R**	**CO4**
6 a.	What is the difference between adsorption and absorption?	**R**	**CO5**

OR			
6 b.	Name some of the special noise environment.	**R**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
7 a.	Draw a neat sketch of rapid gravity filter and describes how it works.	**U, Ap**	**CO1/ CO2**
OR			
7 b.	Find the diameter of the particles with specific gravity 1.2 removed in a tank having a surface area of 250 m^2, treating 10 MLd of water at 21^0C.	**Ap, U**	**CO2, CO3**
8a.	Discuss briefly the various methods which adopted collectively for treating public water supplies drawn from a river? Show a layout of treatment units.	**R, U**	**CO3/ CO4**
OR			
8 b.	Calculate the population of the year 2000 and 2005 for a city whose population in the year 1930 was 24,000 and in the year 1970 was 46,000. Make the use of geometric increase method.		
9 a.	(a) Compare rapid sand filters and slow sand filters? (b) The population figures of a town during the last four consecutive decades (from 1980 to 2010) are-**20,000; 24500; 29500, 32,200** respectively. Predict the population in the next decade using incremental increase method. Calculate the total water requirement of a town in 2020, if population meets its water demand at the rate of 200 lpcd.	**U, Ap**	**CO3**
OR			
9 b.	Name any four commonly used coagulant in water treatment. What are the factors which affect coagulant dosage.	**U, Ap**	**CO3**
10 a.	Explain the concept of equivalent continuous energy level (Leq).	**U, Ap**	**CO5**
OR			
10 b.	Discuss the purpose and methods of aeration in water treatment.	**U, Ap**	**CO3**
11 a.	Design a slow sand filter from following data. Population to be served = 50,000 persons Per capita demand = 150 Lpcd Rate of filtration = 180 L/hr./sq.m Length of each bed = Twice the breadth Assume maximum demand as 1.8 times the average daily demand. Also assume that one out of six will be kept as standby.	**U, Ap**	**CO2, CO3**
OR			
11 b.	Name the various types of water distribution systems.	**R**	**CO2**
12 a.	Write a note on greenhouse gases? Explain their benefits and ill effects on global environment.	**U**	**CO4**
OR			
12 b.	What are the various factors affecting “per capita demand”?	**R**	**CO2**
13 a.	Explain Logistic curve method of population forecasting.	**R**	**CO1, CO2**
OR			

13 b.	Illustrate with a sketch, the different functional zones of a rectangular sedimentation tank.	**U**	**CO2, CO3**

CEE11042	**Prestressed Concrete Structures**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Structural Mechanics-I, Design of RC Structures,				
Co-requisites	--				

Course Objectives:

1. To know the fundamental concept of prestressed concrete structures.
2. To apply scientific planning methods to optimize time and cost in construction related problems.
3. To enhance the knowledge of design procedure of prestressed concrete member.
4. To compare the suitable construction techniques in order to achieve efficient and effective service.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Understand the concept of prestressing and the behaviour of pre-stressed concrete structures.	Remember (L1)
CO2	Determine losses and deflection of prestress in prestressed concrete structures.	Understand (L2)
CO3	Explain the Limit State Design criteria and checking of serviceability according to IS:1343.	Applying (L3)
CO4	Find the flexural, torsional and shear strength of prestressed concrete members.	Analyzing (L4)
CO5	Design of prestressed concrete members.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Pre-stressed concrete is a form of concrete where initial compression is given in the concrete before applying the external load so that stress from external loads are counteracted in the desired way during the service period. This initial compression is introduced by high strength steel wire or alloys (called ‘tendon’) located in the concrete section.

It is now commonly used for floor beams, piles and railways sleepers, as well as structures such as bridges, water tanks, roofs and runways. Generally, prestressed concrete is not necessary for columns and walls, however, it can be used economically for tall columns and high retaining walls with high bending stresses.

All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the co-ordinat

Course Content:

Module 1: **11 Lecture Hours**

Introduction: Basic concepts, High strength concrete, high tensile steel, terminology, system of pre-stressing, pre-tensioning, post-tensioning, principle of pre-stressing, types of pre-stressing.

Analysis for Stresses: Assumptions, analysis of pre-stress, concentric & eccentric tendon, resultant stresses, concepts of pre-stressing - stress concept, strength concept and load balancing concept, analysis of stresses of composite construction of pre-stressed and in-situ concrete.

Module II: **10 Lecture Hours**

Losses of Pre-stress: Losses of pre-stress, types, losses due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, friction, anchorage slip.

Deflection of Pre-Stressed Member: Effect on tendon profile on deflections, Factors influencing deflections, Calculation of deflections – Short term deflection, long term deflections, permissible limits of deflection. Check of deflection according to IS:1343 code recommendations.

Module III: **8 Lecture Hours**

Limit State Design Criteria: Inadequacy of Ultimate load method, criteria for limit states, strength and serviceability, design of flexural members, check of serviceability according to IS:1343

Module IV: **8 Lecture Hours**

End Zone Stresses In Pre-Stressed Members: Pretension transfer bond, transmission length, end block of post-tensioned members.

Strength of Pre-Stressed Concrete: Types of flexural failure strain compatibility method, IS code procedure design for limit state of shear, torsion.

Module V: **8 Lecture Hours**

Design of Pre-Stressed Concrete Section: Types of Pre-stressed concrete slab, design of one-way slab,design of two-way slab. Design of electric poles, railway sleepers.

Reference Book:

1. “Pre-stressed Concrete”, N. Krishna Raju, Tata McGarw-Hill, 7th edition, 2015
2. “Reinforced Concrete Design”, Unnikrishna Pillai S and Deavadas Menon, Tata MacGraw Hill Publishing Company Limited, 2nd Edition, New Delhi,2003
3. Code of Practice for pre-stressed concrete structures, IS: 1343, BIS, 2009

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE11019	**Solid Waste Management**	**L**	**T**	**P**	**C**
Version 1.0		**3**	**0**	**0**	**3**
Pre-requisites/ Exposure					
Co-requisites	Environmental Engineering				

Course Objectives:

1) To be able to understand the types, generation, sources of different wastes and environmental impact of generated waste.
2) To know about several rules, regulations and guidelines available for managing, handling and disposal of the wastes.
3) To understand components of solid wastes and to learn about required infrastructure for managing solid wastes to minimize their harmful environmental impacts.
4) To be familiar with relationships between inappropriate waste management practices and impacts on water, soil and sediment quality.
5) To gather knowledge about managing hazardous wastes, biomedical wastes, e-wastes and other industrial wastes in an environment-friendly manner.
6) To be aware of the significance of recycling, reuse and reclamation of wastes with a objective of waste minimization.

Course Outcomes:

At the end of the course, the student will be able to:

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Understand the technical terms related to general waste classification, sources, and harmful environmental impacts from wastes and waste management.	Remember (L1)
CO2	Evaluate the application of standard rules, regulations, laws and guidelines available for managing, handling and disposal of the wastes.	Understand (L2)
CO3	Develop a municipal solid waste management system with proper collection, handling and disposal facilities.	Applying (L3)
CO4	Illustrate the necessary approaches for managing hazardous wastes, biomedical wastes, e-wastes and other industrial wastes in an environment-friendly manner.	Analyzing (L4)
CO5	Plan different waste minimization facilities, including recycling program and recovery of conversion products through waste management.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description:

Waste management is a burning topic in today's world, applicable for both municipal and industrial domain. This course includes detailed idea about types of wastes, their generation, need of managing wastes, their environmental and health impacts. Different rules, regulations, laws and guidelines are also available for managing, handling and disposal of the wastes as provided by standard regulatory bodies. In waste management, this course will help in learning management of solid wastes produced from municipal areas with their suitable disposal pathways. The students will also get to know about management methodologies adopted for hazardous wastes, biomedical wastes, e-wastes and other industrial wastes in an environment-friendly manner. Waste minimization and recovery of energy from wastes are also among the important aspects of this course.

Course Content:

Unit 1: **8 Lecture Hours**

I**ntroduction** – Classification of Waste (MSW, Industrial waste, Biomedical waste, e-waste), Characteristics of waste, Waste generation sources, Waste Management, Need of waste Management, issues faced in managing wastes, Impacts of waste on Environmental and human health, 5 R of Waste Management.

Unit 2: **8 Lecture Hours**

Rules and Guidelines for Waste management: Environmental rules and regulations for solid waste management, hazardous waste management, biomedical waste management, E-waste rules, Battery waste management rules; Legal aspects of industrial practices for managing waste.

Unit 3: **10 Lecture Hours**

Solid waste management: Introduction of solid waste management, Need of Integrated solid waste management, Solid Waste survey, Functional Elements of MSW, Quality and composition of solid waste, Characterization and waste generation, onsite waste storage, Collection of solid wastes, handling and processing, Separation and recycling of waste, Integrated solid waste management, Method of disposal, Sanitary landfill, Composting, Incineration, Pyrolysis, Energy recovery.

Unit 4: **12 Lecture Hours**

Hazardous waste management: Definition of Hazardous waste, Management and Disposal of Hazardous waste, storage, Manifest system, TREM card, Radioactive wastes and its disposal.

Biomedical wastes and e-wastes: Disposal methods of biomedical wastes, Disposal methods of e-wastes.

Industrial waste: Characteristics, effects of Industrial waste on water streams, Effluent standards, Treatment of industrial waste, Waste management for industries, Introduction to Zero discharge concept, Industrial ecology, Industrial symbiosis and industrial ecoparks.

Unit 5: **7 Lecture Hours**

Waste minimization: Objectives of waste minimization, Flow chart of waste minimization (hierarchy process in detail), Waste minimization methods - by source reduction, process modification, Waste minimization by reuse and recycle, Waste minimization by treatment and processing of waste, Recovery of thermal conversion products and Recovery of biological conversion products, Calculation of Amount of oxygen required.

Text Books:

1. Santosh Kumar Garg, Sewage Disposal and Air Pollution Engineering, Environmental Engineering (Vol.II), Khanna Publishers, 2013.
2. Iqbal H. Khan, Nawed Ahsan, Text Book of Solid Waste Management. CBS Publication.
3. S.C. Bhatia, Handbook of Industrial Pollution & Control, Vol – I, CBS Publication.
4. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan,Thompson/Brooks/Cole; Second Edition 2008.
5. Introduction to Environmental Engineering, Vesilind, PWS Publishing Company2000

Reference Books:

6. Integrated Solid Waste Management, Tchobanoglous, Theissen & Vigil. McGraw Hill Publication.
7. Environmental Engineering by H.S. Peavy, D.R. Rowe, G. Tchobanoglous; 2007, Tata-Mcgraw Hill.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1

Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	VI
Paper Title:	Solid Waste Management	**Paper Code:**	CEE11019
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Classify different types of Wastes.	**Analyze & Understand**	**CO1**
2	List out important rules for managing wastes.	**Remember**	**CO2**
3	What are the methods for disposal of solid wastes?	**Remember**	**CO3**
4	Define Hazardous waste.	**Remember**	**CO4**
5	What is source reduction in waste minimization?	**Remember**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Explain the term “5 R of Waste Management”.	**Understand**	**CO1**
(OR)			
6 b)	Why waste management is necessary?	**Remember**	**CO1**
7 a)	Why Biomedical waste management rule is important?	**Remember**	**CO2**
(OR)			
7 b)	Analyze the necessity of E-waste rules at present times.	**Analyze**	**CO2**

8 a)	Explain about the composition of solid wastes.	**Understand**	**CO3**
(OR)			
8 b)	What do you mean by Solid Waste survey?	**Remember**	**CO3**
9 a)	Explain briefly about TREM card.	**Understand**	**CO4**
(OR)			
9 b)	Analyze the process of storing biomedical wastes.	**Analyze**	**CO4**
10 a)	How recovery of thermal conversion products can be achieved in waste minimization techniques?	**Remember**	**CO5**
(OR)			
10 b)	Explain about the objectives of waste minimization.	**Understand**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Explain briefly about Battery waste management rules in India.	**Understand**	**CO2**
(OR)			
11 b)	Identify important legal aspects followed by industries for efficient waste management.	**Apply**	**CO2**
12 a)	What are the major sources of Waste generation in your community? Analyze briefly.	**Remember & Analyze**	**CO1**
(OR)			
12 b)	Illustrate about the impacts of wastes on human health.	**Understand**	**CO1**
13 a)	Identify the need of Integrated solid waste management system and explain briefly about its components.	**Apply & Understand**	**CO3**
(OR)			
13 b)	Explain composting methods used for solid waste management.	**Understand**	**CO3**
14 a)	Explain about the Manifest system.	**Understand**	**CO4**
(OR)			
14 b)	Illustrate about the Radioactive wastes and its disposal.	**Understand**	**CO4**
15 a)	Illustrate about the Zero discharge concept.	**Understand**	**CO4**
(OR)			
15 b)	Identify the disposal methods of Hazardous waste.	**Apply**	**CO4**
16 a)	Discuss how process modification can contribute to successful waste minimization and analyze some methods involved.	**Understand & Analyze**	**CO5**
(OR)			
16 b)	Identify the methods used for Waste minimization by reuse and recycle.	**Apply**	**CO5**
17 a)	Discuss briefly about the processes related to Waste minimization by treatment and processing of waste.	**Understand**	**CO5**
(OR)			
17 b)	Explain about hierarchy of waste minimization process in brief.	**Understand**	**CO5**

CEE11039	**Construction Planning & Management**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Construction Techniques, Equipment & Practices				
Co-requisites	--				

Course Objectives:

1. To administer business and management skills in various positions within the construction industry.
2. To practice informed decision-making in personal and professional endeavours.
3. To apply scientific planning methods to optimize time and cost in construction related problems.
4. To plan resource requirements including men, machine and materials based on resources allocation and budget and budgetary control methods.
5. To understand the labour laws and regulations, safety requirements and its financial aspects in construction industry.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Discuss the Elements, Tools & Methods of Construction Management.	Remember (L1)
CO2	Identify the Fundamentals of Network Analysis to Schedule a Project.	Understand (L2)
CO3	Develop the Schedule for Time and Cost of a Construction Project.	Applying (L3)
CO4	Relate application of information technology in construction industry.	Analyzing (L4)
CO5	Illustrate Organizational Structure and Safety Procedures to the Project Site.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Construction Management is the overall planning, coordination and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally and financially viable project. This course includes specific activities like defining the responsibilities and management structure of the project management team, planning methods and implementing it in project controls (time and cost), defining roles and responsibilities of personnel in the organization, equipment and safety measures in construction. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: 9 Lecture Hours

Project Management: Introduction, Construction stages, Elements of Construction Management, Tools of Constriction management, Planning, Scheduling and Controlling, Methods of construction Management, Steps in construction Planning, Work breakdown Structure, Coding.

Unit II: 9 Lecture Hours

Fundamentals of Network: Activity, Type of activities, Event, Type of events, Relationship between Activities - Activity on Arrow, Activity on node, Dummy activity - Planning of network construction, Precedence relationships.

Unit III: 9 Lecture Hours

PERT and CPM Analysis: Time estimation - Deterministic approach, Probabilistic approach, Frequency distribution Probability distribution.

PERT Calculations: Expected time Event time, Slack Critical path, Probability of completion of project.

CPM Analysis: Time estimate of an analysis, Floats, Critical path.

Project Cost Control – Crashing /time cost trade off.

Unit IV: 9 Lecture Hours

Contractual Relation and Contract Management – Introduction, Various parties involved, contracts, types of contracts, stages of contract, disputes and attributions.

Information Technology in Construction Industry – It in Construction, DBMS, Spatial Data Management, Communication and Computer Network

Unit V: 9 Lecture Hours

Construction Personal and Safety Management - Manpower planning, Organization charts, Staffing, Planning, Compensation- wages and salary, Employee benefit- safety and health, Safety ofaccidents, Prevention of accidents, Safety measures.

Reference Book:

1) M. S. Shetty, Concrete technology, S.Chand& Co.
2) S. P.Arora, Building construction, Dhanpat Rai & Sons, New Delhi.
3) Dr.Mahesh Varma, Construction Equipment and its Planning and Application, Metropolitan Book Company.
4) R.L.Peurifoy, W.B.Ledbetter, Construction Planning, Equipment, and methods, Tata McGraw Hill.
5) Chitkara, Construction Project Management Planning scheduling and control, McGrawHill
6) B.L.Gupta, Amit Gupta, Construction Management and Accounts, Standard publishers and Distributors.
7) James.D.Steevens, Techniques for Construction Network Scheduling, McGraw Hill

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE11074	Ground Improvement Techniques	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Foundation Engineering				
Co-requisites	--				

Course Objectives:

1. To understand about the necessity of ground improvement
2. To explain the various methods of ground improvement techniques.
3. To illustrate the Field compaction methods and its control.
4. To gather knowledge about various ground improvement methodologies for cohesive and cohesion less soil sites.
5. To know soil stabilization methods with the help of admixtures.
6. To clarify the use of geo-synthetics in construction work for ground improvement

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the objectives, necessity and scope of ground improvement techniques; and know in-situ densification by various compaction methods used in ground improvement.	Remember (L1)
CO2	Evaluate the function of Hydraulic modification of soil for ground improvement through various drainage and dewatering methods.	Understand (L2)
CO3	Plan and select the suitable methods of Grouting for improving soil properties as required.	Applying (L3)
CO4	Illustrate about soil reinforcements and applications of Geosynthetics in ground improvement.	Analyzing (L4)
CO5	Identify the process of soil stabilization by selecting suitable admixture or by finding alternative methods.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The soils at construction sites are not always completely suitable for supporting foundation and superstructures. There may not be sufficient bearing capacity available in soil at field which can carry loads from future civil engineering works, such as buildings, bridges, highways, tunnels and dams. Under such conditions, soil needs to be treated using ground improvement techniques. Similarly specific types of soil stabilization techniques are also required in the case of expansive soils, collapsible soil and in the case of earthquake prone areas. This course addresses various ground improvement techniques along with their scopes, principles, methods, design issues and construction procedures. This course on Ground Improvement Techniques includes compaction methods at site, drainage & dewatering techniques, soil reinforcement by providing soil nailing and anchors, grouting process, blasting, prefabricated drains, compaction piles, granular columns etc. Soil stabilization through using several admixtures can be possible, which is also emphasized in this course.

Course Content

Unit I: 12 Lecture Hours

Introduction: Need of Ground Improvement, Different types of problematic soils, Emerging trends in ground Improvement, Different methods of Ground improvement.

Mechanical stabilization of soil by Compaction: Mechanism of soil compaction, field procedure - Shallow and deep compaction requirements, methods of shallow compaction, Quality control of compacted soil in field, methods of deep compaction, deep dynamic compaction, vibro-compaction, compaction piles, blast densification.

Unit II: 12 Lecture Hours

Hydraulic modification of soil: Ground improvement by drainage, dewatering methods, design of dewatering systems, Preloading, Types of Drains, Vertical drains, Design and construction techniques of vertical drains, vacuum consolidation, granular columns - stone column, Function and design principles of stone columns, load carrying capacity and construction techniques of stone columns, settlement of stone column foundation, electro-kinetic dewatering and electro-osmosis.

Unit III: 7 Lecture Hours

Ground Improvement by Grouting: Grouting in soil, types of grout, desirable characteristics, grouting pressure, grouting methods - permeation grouting, compaction grouting, jet grouting, different varieties of grout materials, grouting under difficult conditions.

Unit IV: 7 Lecture Hours

Soil Reinforcement: Types of reinforcing elements, reinforcement-soil interaction, soil nailing, rock anchoring, micro-piles, mechanically stabilized earthwork, light weight fill; Geosynthetics - classification, functions and their application.

Unit V: 7 Lecture Hours

Soil Stabilization using admixtures: Lime stabilization - Base exchange mechanism, Pozzolanic reaction, lime-soil interaction, lime columns; Cement stabilization - Mechanism, amount, age and curing; Fly-ash-lime Stabilization; Stabilization using bitumen and emulsions; Stabilization using industrial wastes.

Reference Books

1. Ground improvement techniques by P. Purushottam Raj, Laxmi Publications, 1999.
2. Manfred R. Hausmann, Engineering Principles of Ground Modification, McGraw-Hill Pub, Co., 1990.
3. M C. R. Davies, F. Schlosser, Ground improvement geosystems.
4. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc. 1998.
5. Dr. B. C. Chattopadhyay and J. Maity, Ground Control and Improvement Techniques, PEEDOT, Howrah, 2011.
6. G. V. Rao and G. V. S. Rao, Text Book On Engineering with Geotextiles, Tata McGraw Hill.
   T. S. Ingold and K. S. Miller, Geotextile Hand Book, Thomas Telfrod, London.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	VI
Paper Title:	Ground Improvement Techniques	**Paper Code:**	CEE11074
Maximum Marks:	50	**Time Duration:**	3Hrs

Total No. of Questions:	17	Total No of Pages:	2
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

Group A **Answer All the Questions (5 x 1 = 5)**			
1	Classify different methods of Ground improvement.	**Analyze & Understand**	**CO1**
2	Define Preloading in Ground improvement.	**Remember**	**CO2**
3	Why grouting is needed as a method for ground improvement?	**Remember**	**CO3**
4	What do you mean by Geosynthetics?	**Remember**	**CO4**
5	List out the admixtures used for soil stabilization.	**Remember**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Analyze the requirement for mechanical stabilization of soil.	**Understand & Analyze**	**CO1**
(OR)			
6 b)	What is vibro-compaction for soil?	**Remember**	**CO1**
7 a)	What do you mean by electro-osmosis as a process of ground improvement?	**Remember**	**CO2**
(OR)			
7 b)	Identify different types of Drains to be constructed for ground improvement process.	**Apply**	**CO2**
8 a)	Explain desirable characteristics of grouting materials for soil.	**Understand**	**CO3**
(OR)			

8 b)	Illustrate about grouting pressure for ground improvement.	**Understand**	**CO3**
9 a)	List out various types of reinforcing elements used for soil reinforcement.	**Remember**	**CO4**
(OR)			
9 b)	Explain the functions of Geosynthetics.	**Understand**	**CO4**
10 a)	Illustrate about lime columns used in soil stabilization and ground improvement.	**Understand**	**CO5**
(OR)			
10 b)	Explain about the effects of curing on Cement stabilization process.	**Understand**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Explain load carrying capacity and construction techniques of stone columns.	**Understand**	**CO2**
(OR)			
11 b)	Identify different types and objectives of Hydraulic modification of soil.	**Apply**	**CO2**
12 a)	Briefly discuss about compaction piles.	**Understand**	**CO1**
(OR)			
12 b)	Illustrate about the objective and procedure of blast densification for ground improvement.	**Understand**	**CO1**
13 a)	Describe permeation grouting, compaction grouting and jet grouting in soil.	**Understand**	**CO3**
(OR)			
13 b)	Identify different varieties of grout materials used in ground improvement and explain their applications.	**Apply & Understand**	**CO3**
14 a)	Illustrate about soil nailing and its application.	**Understand**	**CO4**
(OR)			
14 b)	Describe rock anchoring.	**Understand**	**CO4**
15 a)	Explain about micro-piles and its application.	**Understand**	**CO4**
(OR)			

15 b)	Classify Geosynthetic materials used for ground improvement.	**Understand & Analyze**	**CO4**
16 a)	Discuss about Base exchange mechanism and Pozzolanic reaction in case of Lime stabilization for soil.	**Understand**	**CO5**
(OR)			
16 b)	Explain the mechanism of Cement stabilization for soil and analyze its effectiveness for a construction site work.	**Understand & Analyze**	**CO5**
17 a)	Discuss briefly about soil stabilization methods using bitumen and emulsions.	**Understand**	**CO5**
(OR)			
17 b)	Identify the industrial wastes which can be used in soil stabilization and explain the way forward for its successful utilization.	**Apply & Understand**	**CO5**

CEE11075	Prof. Elective IV: Railways, Airport, Docks & Harbour	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

1. To introduce the students about Railways planning, design, construction and maintenance.
2. To make students knowledgeable about basics of airports, docks and harbours.
3. To understand various airside structures including Terminal Building.
4. To learn various marine structures and navigation aids at port.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Outline** the methods of route alignment and design elements in Railway Planning and Constructions.	Remember (L1)
CO2	**Demonstrate** the Construction techniques and Maintenance of Track laying and Railway stations.	Understand (L2)
CO3	**Develop** an insight on the planning and site selection of Airport Planning and design.	Applying (L3)
CO4	**Analyze** and **design** the elements for orientation of runways and passenger facility systems.	Analyzing (L4)
CO5	**Identify** the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Railway, Airport and Harbours are the other modes of transportation for the users of Transportation. So far students have completed land transport systems by Highway and Traffic. This elective course has been designed only for those students those have a knack in the domain of Transportation Engineering. This course is giving knowledge of Railway planning, design, construction and maintenance. Students who successfully complete this course will be able to understand the methods of route alignment and design elements in Railway Planning and Constructions, understand the Construction techniques and Maintenance of Track laying and Railway stations, Gain an insight on the planning and site selection of Airport Planning and design, analyze and design the elements for orientation of runways and passenger facility systems, understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations.

Course Content

Module 1 **Lecture Hr. 10**

Railway Planning & Construction

Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, Selection of gauges-Track Stress, coning of wheels, creep in rails, defects in rails – Route alignment surveys, conventional and modern methods--Geometric design of railway, gradient, super elevation, widening of gauge on curves- Level Crossings. .

Module 2 **Lecture Hr. 9**

Railway Construction & Maintenance

Earthwork – Stabilization of track on poor soil - Track drainage – Calculation of Materials required for track laying - Construction and maintenance of tracks – Railway Station and yards and passenger amenities-Signalling

Module 3 **Lecture Hr. 8**

Airport Planning

Air transport characteristics - airport classification – ICAO - airport planning: Site selection typical Airport Layouts, Case Studies, parking and Circulation Area

Module 4 **Lecture Hr. 8**

Airport Design

Runway Design: Orientation, Wind Rose Diagram, Problems on basic and Actual Length, Geometric Design – Elements of Taxiway Design – Airport Zones – Passenger Facilities and Services – Runway and Taxiway Markings.

Module 5 **Lecture Hr. 10**

Dock & Harbour Engineering

Definition of Basic Terms: Harbour, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works – Coastal Regulation Zone, 2011.

Text Books

1. Subramanian K.P., Highways, Railways, Airport and Harbour Engineering, V Scitech Publications (India), Chennai, 2010

2. Saxena Subhash, C. and Satyapal Arora, A Course in Railway Engineering, Dhanapat Rai and Sons, Delhi, 1998

3. Khanna. S.K. Arora. M. G and Jain. S. S, Airport Planning and Design, Nemachand and Bros, Roorkee, 1994

Reference Books

1. Venkatramaiah. C., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels., Universities Press (India) Private Limited, Hyderabad, 2015.
2. Mundrey J S, Railway Track Engineering, McGraw Hill Education (India) Private Ltd, New Delhi, 2013

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	VI
Paper Title:	Railways, Airport, Docks & Harbour	**Paper Code:**	CEE11075
Maximum Marks:	50	**Time Duration:**	3Hrs
Total No. of Questions:	17	**Total No of Pages:**	3
(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.		

	Group A **Answer All the Questions (5 x 1 = 5)**		
1	Explain the function of ballast in railway track.	**U**	**CO1**
2	What is ‘Gravity Dry Dock’?	**R**	**CO5**
3	Classify the methods used for stabilization of tracks in poor soil.	**R**	**CO2**
4	Illustrate what is a hangar and mention its types.	**App**	**CO3**
5	List the elements to be considered in the Geometric design of runways.	**R**	**CO4**
	Group B **Answer All the Questions (5 x 2 = 10)**		
6 a)	List the functions of Sleepers.	**R**	**CO1**
	(OR)		

6 b)	Outline the allowable super elevation in Broad Gauge & Meter Gauge tracks.	**U**	**CO1**
7 a)	Explain the purpose of different types of yards.	**An**	**CO2**
(OR)			
7 b)	Explain the factors governing track alignment.	**App**	**CO2**
8 a)	What are the passenger facilities, required at an airport terminal?	**R**	**CO3**
(OR)			
8 b)	Describe briefly the salient features and functions of aprons in an airport.	**App**	**CO3**
9 a)	Describe about the geometric design standards of taxiway.	**U**	**CO4**
(OR)			
9 b)	List out the design consideration in taxiway lighting.	**U**	**CO4**
10 a)	Define ‘Fender’. What are the different types of ‘Fender’?	**R**	**CO5**
(OR)			
10 b)	Classify Harbour on the basis of Utility and briefly explain them.	**App**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	Outline about super elevation and derive its expression in railways.	**U**	**CO1**
(OR)			
11 b)	Compare the various types of switches in railway track.	**An**	**CO1**
12 a)	Describe in detail about plate laying techniques.	**R**	**CO2**
(OR)			
12 b)	Explain in detail about the passenger amenities to be provided in a railway station.	**App**	**CO2**
13 a)	List the factors to be considered for the selection of site for a commercial airport.	**R**	**CO3**
(OR)			
13 b)	Summarize briefly the various geometrics of the runway as recommended by the ICAO.	**U**	**CO3**
14 a)	The length of a runway at mean sea level, standard temperature and zero gradients is 1600 m. The site has an elevation of 320 m, with a reference temperature of 33.6ºC. The runway has to be constructed with an effective gradient of 0.25%. Calculate the actual length of the runway at site.	**App & An**	**CO4**

(OR)			
14 b)	The runway length required for landing at sea level in standard atmospheric condition is 3000 m. Runway length required for take- off at a level site at sea level in standard atmospheric condition is 2500 m. Aerodrome reference temperature is 25°C & that of standard atmosphere at aerodrome elevation of 150 m is 14.025°C. If the effective gradient is 0.5%, determine the runway length to be provided.	**App & An**	**CO4**
15 a)	Describe the importance of runway lighting. Explain about threshold lighting with neat sketch.	**R**	**CO4**
(OR)			
15 b)	Explain in brief about: (i) Approach Zone, (ii) Buffer Zone.	**R**	**CO4**
16 a)	Explain with sketch the features of a composite Breakwater.	**U**	**CO5**
(OR)			
16 b)	Discuss the tides and wave effects and its action on coastal structures.	**An**	**CO5**
17 a)	Define dredging? Explain the reasons for its adoptions. How dredged Materials are disposed off? (1+2+2)	**R**	**CO5**
(OR)			
17 b)	Bring out the differences between a port and a harbor. What are the requirements of good port? (3+2)	**U & R**	**CO5**

CEE11076	Project Safety & Management	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Construction Techniques, Equipment & Practices,				
Co-requisites	Construction Planning & Management				

Course Objectives:

1. To study different safety concepts and requirements applicable to construction work or projects.
2. To study various construction accidents, safety programmes, contractual obligations and design safety.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Explain** construction accidents and safety as well as legal implications.	Remember (L1)
CO2	**Assemble** and improve knowledge about various safety programs related to job site, contracts, records.	Understand (L2)
CO3	**Develop** concepts about safety design in various aspects as well as important management practices.	Applying (L3)
CO4	**Define** various important contractual obligation and safety personnel.	Analyzing (L4)
CO5	**Examine** different safety issues during construction and role of owners in safety, health, protective measures	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course deals with fundamental idea about safety managements related to construction accidents, causes, construction injury costs, assessment of occupational and safety hazards and legal implications. Various safety programs such as identification of problematic areas in construction, components of effective safety program, safety assessment, meetings, incentives, recordings, contract safety etc will be discussed in detail. Also different several safety designing like culture, worker's safety, management practices as well as company activities are included in this course. This course will cover contractual obligation safety personnel consists of sub contractual obligation, Project Coordination and Safety Procedures, Workers Compensation, Safety concerns in construction, organizing for safety. Along with these various safety measures for ongoing construction work will be studied in detail. This study covers various safety concern construction, role of owners in safety and health management, proactive POsition as an owner, allocation of responsibility for safety, fostering total safety culture, promote job site safety, additional concerns of owners. Through this course student will understand and apply the entire project based safety management knowledge that will be helpful during his/her working in any organization. Student will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Classes will be conducted through online as well as class room lectures by means

of board work and power point presentation. Through these teaching methods student will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in their professional life in future.
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Course Content

UNIT –I: 9 Lecture Hours

Construction Accidents: Introduction to Safety Management - Accidents and their Causes - Human Factors in Construction- Safety - Costs of Construction Injuries - Occupational and Safety Hazard Assessment - Legal Implications.

Unit II: 9 Lecture Hours

Safety Programs: Problem areas in Construction Safety - Elements of an Effective Safety Programme -Job-Site Safety Assessment - Safety Meetings - Safety Incentives - Safety in Construction Contracts - Substance Abuse - Safety Record Keeping.
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Unit III: 9 Lecture Hours

Designing for Safety: Safety Culture, Safe Workers, Safety and First Line Supervisors, Safety and Middle Managers - Top Management Practices, Company Activities and Safety.
.

Unit IV: 9 Lecture Hours

Contractual Obligation Safety Personnel - Sub Contractual Obligation, Project Coordination and Safety Procedures, Workers Compensation, Safety concerns in construction, organizing for safety.

Unit V: 9 Lecture Hours

Safety During Construction: Safety concern construction Role of owners in safety and health management - Proactive POsition as an owner -Allocation of responsibility for safety - Fostering total safety culture -Promote job site safety - Additional concerns of owners.

Reference Books

1. Hinze, Jimmy W. "Construction Safety", Prentice Hall Inc. New Jersey, 1997
2. Coble, Richard J. Hinze, Jimmie and Haupt, Theo C. "Construction Safety and Health Management", Prentice Hall Inc. New Jersey, 2001
3. Raymond E. Levitt, and Nancy Morse Samelson., "Construction Safety Management", Second Edition, 1993.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

SDS11511	**Probability & Statistics**	L	T	P	C
Version 1.0	**Contact hours-60**	3	1	0	4
Pre-requisites/Exposure	12th level Mathematics				
Co-requisites	--				

Course Content

Unit 1: **[15 L]**

Descriptive statistics:

Measures of central tendency - mean, median and mode, geometric and harmonic means and their limitations, Measure of variations - quantiles, percentiles, quartiles, variance and standard deviation, standard errors of estimates, inter-quartile range, skewness, moment.

Correlation and Regression: Introduction to correlation analysis, Karl Pearson correlation coefficient, Rank Correlation, Regression Analysis, fitting straight lines, method of least square, regression coefficients, properties of regression coefficients and applications.

Unit 2: **[15L]**

Introduction to probability: Events and their probabilities, Rules of probability, Combinatorics, Conditional probability and independence, Total probability, Bayes' rule and applications.

Probability Distributions: Random variables, Distribution of a random variable, expectation, variance and standard deviation of probability distribution, standard discrete distributions – Bernoulli, binomial, geometric, Poisson, Poisson approximation of binomial distribution. Probability density function, Cumulative distribution function, standard continuous distribution – uniform, exponential, normal distribution. Bivariate distribution.

Unit 3: **[15 L]**

Sampling : Population and Sample, Sampling with and without replacement, Random samples, Population parameters, Sample statistics, Sampling distribution of means, Sampling distribution of variances, Case where population variances is unknown.

Statistical inference: Point estimate and Interval Estimates, Unbiased estimates and efficient estimates, Confidence Interval estimates of population parameters, Maximum likelihood estimates.

Unit 4: **[15 L]**

Test of Hypothesis and Significance: Statistical hypothesis, Null and Alternative hypothesis, Type I and Type II errors, Level of Significance, One-Tailed and Two-Tailed tests, p value. Special tests of significance for large samples and small samples (F, chi- square, z, t- test).

Text Books:

1. Fundamentals of Statistics- vol. I, A. M. Gun, M. K. Gupta, B. Dasgupta, world Press.
2. Vijay K. Rohatgi, A.K. Md. Ehsanes Saleh, An Introduction to Probability and Statistics, Second edition, Wiley.
3. T N Srivastava and ShailagaRego, Statistics for Management, McGraw Hill Education.

Reference Books:

1. Statistical Methods (Volume I & II), N. G. Das, Mc GrawHill Education
2. Fundamentals of Mathematical Statistics, S.C. Gupta, V. K. Kapoor, Sultan Chand & Sons.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	**30**	**20**	**50**

ECE11050	**Sensors and Actuators**	L	T	P	C
Version 1.0	**Contact Hours – 45**	3	0	0	3
Pre-requisites/Exposure	Physics				
Co-requisites	Electronics Measurement, Basic Networking				

Course Objectives

1. To study basic concepts of various sensors and actuators.
2. To develop knowledge in selection of suitable sensor based on requirement and application.
3. To understand the operation of resistive, inductive, capacitive, magnetic, thermal, radiation and piezoelectric sensors for the identification of appropriate sensors.
4. To introduce the concept of M2M (machine to machine) with necessary protocols.
5. To introduce the Raspberry PI platform, that is widely used in IoT applications.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Identify** the appropriate sensor, including powering ofthe sensor and signal conditioning (electrical and Calculation conversions	Remember (L1)
CO2	**Learn** the operation of strain gauge and different types of sensors.	Understand (L2)
CO3	**Identify** different actuators to monitor and control the behaviour of a process or product.	Applying (L3)
CO4	**Explore and learn about** Internet of Things with the help of preparing projects designed for Raspberry Pi.	Analyzing (L4)

CO5	**Understand** IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The course is intended to give knowledge about modern electrical sensors for measuring non-electrical variables. The course is oriented towards physical phenomena used to sense such variables as: displacement, temperature, radiation, pressure, etc. In particular, issues related to modern micro-sensors made in silicon, fiber, and film technology are treated.

Course Content

Module 1: Introduction: 7 lecture hours

Definition, classification, static and dynamic parameters, Characterization – Electrical, mechanical, thermal, optical, biological and chemical, Classification of errors – Error analysis, Static and dynamic characteristics of transducers, Performance measures of sensors.

Module 2: Sensors: 12 lecture hours

Classification of sensors basic working principles, Displacement Sensor - Linear and rotary potentiometers, LVDT and RVDT, incremental and absolute encoders. Strain gauges. Force/Torque – Load cells. Temperature – Thermocouple, Bimetallic Strips, Thermistor, RTD. Accelerometers, Velocity sensors Tachometers, Proximity and Range sensors – Eddy current sensor, ultrasonic sensor, laser interferometer transducer, Hall Effect sensor, inductive proximity switch. Light sensors – Photodiodes, phototransistors, Flow sensors – Ultrasonic sensor, laser Doppler anemometer tactile sensors – PVDF tactile sensor, micro-switch and reed switch Piezoelectric sensors, vision sensor.

Module 3: Actuators: 10 lecture hours

Electrical Actuators: Solenoids, relays, diodes, thyristors, TRIACS, BJT, FET, DC motor, Servo motor, BLDC Motor, AC Motor, stepper motors. Hydraulic & Pneumatic devices – Power supplies, valves, cylinder sequencing. Design of Hydraulic & Pneumatic circuits. Piezoelectric actuators, Shape memory alloys.

Module 4: Physical Devices and Endpoints: 6 lecture hours

Introduction to Arduino and Raspberry Pi- Installation, Interfaces (serial, SPI, I2C), Programming – Python program with Raspberry PI with focus on interfacing external gadgets, controlling output, reading input from pins.

Module 5: Introduction to IoT and M2M: 10 lecture hours

Introduction to Internet of Things- Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Embedded Systems, IoT Levels and Templates.

Software defined networks, network function virtualization, difference between SDN and NFV for IoT, Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER.

Text Books

1. Ernest Doebelin and Dhanesh N. Manik, Doebelin's Measurement Systems, 6th Ed., McGraw Hill Education, 2017.
2. Ian Sinclair, Sensors and Transducers, Elsevier, 2011.
3. D. Patranabis, Sensors and Transducers, 2nd Ed., Prentice Hall of India Learning Pvt. Ltd., 2003.
4. Internet of Things - A Hands-on Approach, Ars deep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
5. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Reference Books

1. Sawhney.A.K, Puneeth sawhney, "A Course in Electrical and Electronic Measurements and Instrumentation", Dhanpat Rai Publications, 2012.
2. Ernest O. Doeblin, "Measurement System, Application and Design", Tata McGraw Hill Publishing Company Ltd., 5th Edition, 2008
3. Ronald K. Jurgen, Sensors and Transducers (Progress in Technology), 2nd Ed., SAE International, 2003.
4. S. M. Sze, Semiconductor Sensors, Willy –Interscience Publications.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1

CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

		L	T	P	C
ECO11505	**HSSM-IV (Economics for Engineers)**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

1. Help students in general to analyse, understand and explain the past, present economic conditions of the country.
2. To forecast the future course of changes and development through their knowledge of policies and programmes set by the governments and other development agencies.
3. Evaluate the economic theories, cost concepts and pricing policies.
4. Apply the concepts of financial management for project appraisal.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the basic economic concepts and make economic analyses in the decision making.	Remember (L1)
CO2	Apply principals of economics to analyze the behaviour of consumers and producers in awell-functioning economy and also in case of market failures.	Understand (L2)
CO3	Develop the ability to account for time value of money using factors and formulas, estimateannual and future worth comparisons for cash flows.	Applying (L3)
CO4	Understand how factor market works, identify the manpower and resources management,need of credit/finance for initiating and accelerating projects.	Analyzing (L4)
CO5	Analyze the individual behaviors and market structure	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This paper introduces students to the terminology and analytic principles used in microeconomics, which is broadly defined as the study of markets, and to the application of these conceptual tools to several policy issues. As the design and manufacturing process become more complex, an engineer is required to make decisions that involve money more than ever before. The competent and successful engineer at present must have an improved understanding of the principles of economics. This paper is concerned the analysis of individual behaviors and market structure, and systematic evaluation of the benefits and costs of projects.

Course Content

Module 1: Basic Concepts of Economics: [10 lecture hours]

Introduction to the Literature of Micro-economics centering on Decision Making at Individual Level. Some Fundamental Concepts: Maximization, Equilibrium and Efficiency.

Module 2: Theories of Economics: [12lecture hours]

The Theory of Consumer Choice and Demand, the Theory of Supply, market equilibrium, market structure, market failure and environmental issues, Game Theory, concept of yield and Theories of Term Structure, the Theory of Asset Pricing, decision-making under uncertainty: risk and insurance.

Module 3: Sustainability Study of a Project: [5 lecture hours]

Budget plan, estimation of the project cost, prices, fees and cost recovery, financing of recurrent costs, sustainability of the activities generated by the project.

Module 4: Economic Feasibility Study: [12 lecture hours]

Problem of pricing under oligopoly, problem of market stagnation, problem of volatility in open economy, problem of global meltdown, problem of financing a project.

Module 5: Project Report: [6 lecture hours]

Facets of project viability – commercial, technical, financial, outline of a model projectreport, a real life case study.

Text Books:

1. R. Panneersalvam, *Engineering Economics*, 2nd Ed., Prentice Hall of India, 2014.
2. James Riggs, *Engineering Economics*, 4th Ed., McGraw Hill Education, 2004.

Reference Books:

1. Donald G. Newnan, Ted G. Eschenbach and Jerome P. Lavelle, *Engineering Economic Analysis*, 13th Ed., Oxford University Press, 2017.
2. Chan S. Park, *Contemporary Engineering Economics*, 6th Ed., Pearson, 2015.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE12033	**Environmental Engineering Lab**	L	T	P	C
Version 1.0		0	0	3	2
Pre-requisites/Exposure	SCY41206/ Engineering Chemistry Lab				
Co-requisites	ECE 43107/ Environmental Engineering				

Course Objectives

1. To be able to analyze physical, chemical and biological water quality parameters in laboratory.
2. To learn to maintain safety standards in the laboratory.
3. To make water safe to drink, properly treat and dispose of wastes, improve air quality, promote recycling and solid waste management, and clean up contaminated air, land, and water.
4. To introduce students how the common environmental experiments relating to water and wastewater quality are performed.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems.	Remember (L1)
CO2	Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions.	Understand (L2)
CO3	Understand the impact of water and wastewater treatment on people and the environment.	Applying (L3)
CO4	Understand and apply ethical issues associated with decision making and professional conduct in the laboratorial and field environment.	Analyzing (L4)
CO5	Evaluate Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) for a given sample of waste water	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course covers various tests that are required to be done for the determination of quality of water sample. Various test methods will be performed as per standards and test results will be checked with permissible standard values according to which acceptance and rejection of sample can be done. Laboratory classes will be conducted by course coordinator and lab assistant in to the laboratory. For different type of tests relevant Indian standards will be followed which provides proper guidelines about sample collection, testing procedures, data recording, analysis of data, determination of parameter values and finally checking of resulting values with permissible standard values. Students will get individual/ group-wise opportunity to perform all the tests and for that continuous assistance will be provided by the concerned lab assistant. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content:

EXP. NO.01	Determination of turbidity for a given sample of water
EXP. NO.02	Determination of color for a given sample of water
EXP. NO. 03	Determination of solids in a given sample of water: Total Solids,
EXP. NO.04	Determination of Suspended Solids and Dissolved Solids
EXP. NO.05	Determination of pH for a given sample of water
EXP. NO.06	Determination of concentration of Chlorides in a given sample of water
EXP. NO.07	Determination of carbonate, bi carbonate and hydroxide alkalinity
EXP. NO.08	Determination of hardness for a given sample of water
EXP. NO.09	Determination of amount of Dissolved Oxygen (DO) in a given sample of water
EXP. NO.10	Determination of the Biochemical Oxygen Demand (BOD) for a given sample of waste water
EXP. NO. 11	Determination of bacteriological quality of water.

Text Books:	
1	Introduction to Environmental Engineering by P. AarneVesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition 2008.
2	Introduction to Environmental Engineering, Vesilind, PWS Publishing Company 2000
Reference Books:	
1	Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill Publication
2	Environmental Engineering by H.S.Peavy, D.R. Rowe, G.Tchobanoglous; 2007, Tata-McgrawHill.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	**Class Assessment**	**End Term**
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Paper

Name:

Enrolment No:

Course: CEE12033 – Environmental Engineering Lab

Program: B.Tech. (CE)
Time: 03 Hrs. **Max. Marks: 50**

Instructions:
Attempt **Two Questions** from **Section A** (Each Carrying 25 Marks).

Section A

S. No.	Laboratory Questions (Experiments Available as per Syllabus)	Knowledge Level
1.	Why turbidity unit is expressed in NTU. Draw in hand sketch the measurement principle of turbidity.	**U**
2.	What is the significance if the colour is present to some extent? Is there is any difference between colorimetry and spectrophotometry for measurement of colour of a given watersample? State in comparative study.	**U, R**
3.	Write the experimental procedure for determination of solids in a given sample.	**U, An, Ap**
4.	What is pH? Explain its principle.	**U, R**
5.	What does it indicate if the taste of potable water is little bit salty? Explain in details.	**U, R**
6.	What are the laboratories apparatus are used for determine chloride concentration.	**U**
7.	In which chemical analysis, titration may include. Write the titration procedure.	**U, R**
8.	What are the basic glasswares are required for doing titration process.	**U, Ap, R**
9.	Determine the dissolve oxygen (DO) of the given samples.	**U, Ap, U**

CEE12093	**Skill Enhancement Course – 2** Architectural Planning and Drawing	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

Course Objectives	To understand importance of Building drawing as an engineers language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software

Course Outcomes

After the completion of this course, students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the principle of planning and provisions in Bylaws	Remember (L1)
CO2	Interpret the functions of building components and draw them free hand	Understand (L2)
CO3	Relate building drawing as per functional requirements	Applying (L3)
CO4	Evaluate the planning & drawing with appropriate scales using AutoCAD software.	Analyzing (L4)
CO5	Develop the submission drawing of a building as per bye-laws	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Contents:

Unit	Contents	Hours
1	**Designing of Building-** Importance of drawing in Civil Engineering, Site requirements, zoning concept, Detailed Project Report and Building byelaws necessary documents. Climate and design consideration, orientation, recommendations of CBRI, General principles of planning with emphasis on functional planning. Graph paper design (line plans) based on various requirements for residential, public, education and industrial buildings.	**8**
II	**Auto CAD (Computer Aided Drafting)** a) Specifying Distance and coordinates. Polar coordinates, relative Cartesian coordinates. Interpreting curser modes and understanding prompt, choosing commands options, selecting objects, editing and grips. Setting up work area, measurement systems, scales factor mode as drafting tools. Symbols, blocks layers. Templates copying object, editing lines, changing length of object. Geometric construction of line and point parallel line, perpendicular lines, breaking lines, dividing lines, fillets, chambers, circles, tangent, arcs, curves through points, breaking polygons, solid shape ellipse.	**5**

III	Hatch patterns boundary, adding text, Text formatting styles, size of text and scale of drawing, dimensions style, unit heights, locations, arrow style Polyline, editing, creating splice curve, dividing in segments, filling in solid area, Printing and plotting drawing, output device paper size, orientation, control on scale and location.	**5**
IV	**Method of Drawing:** Importance of Building drawing as Engineers language in construction & costing, Selection of scales for various drawings. Thickness of line Dimensioning, first angle and third angle method of projection, Abbreviations and conventional representations as per NBC, Free hand dimensioned sketches, stones of various building elements. Developing working drawings to scale as per NBC from the givens sketch design and general specifications for terraced and pitched roofs in Auto-CAD, Developing submission drawings to scale with location site and block plan complete in Auto-CAD.	**8**
V	**Perspective Drawing:** Two point and Three Point perspective of Residential building including small elements of building such as plinth offset, chajjah projections etc.	**6**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann
Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line TL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

List of Experiments-

Sr. No.	Name of Experiments / Mini Projects/ Case Studies
1	Drawing of Double line plan of residential single storied building on Auto-CAD
2	Working drawing of residential single storied building of terrace and pitched roofs with foundation plan of load bearing structure. (Two assignment)
3	Submission drawing of single storied residential building (framed structure) with access to terrace including with foundation plan, all details and statements as per the local bye-laws. (One assignment) on Auto-CAD
4	Submission drawing of 02 (G+1) storied residential building framed structure including with foundation plan, all details and statements as per the local bye laws. (One assignment) on Auto-CAD
5	Double Line plans of various types of buildings e.g. public / educational / industrial / hospital / community on Auto-CAD (Two assignments).
6	Two point perspective of the single Residential building neglecting small building elements. (Two assignment – pitched & terraced roof)
7	Three Point perspectives of the single Residential building neglecting small building elements. (Two assignment – pitched & terraced roof)

8	Working drawing of multistoried Public / Educational / Health / Community / Industrial building including structural details and layout of services. (Two assignment) on Auto-CAD/ Sketch-up / 3-D Max / BIM
Details of on line Laboratory Resource Material Instruction / Operating Manuals	
1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar16
2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar14

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	**30**	**20**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

CEE12095	**Skill Enhancement Course – 2** Modelling & Animation Rendering using REVIT Architecture	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure					
Co-requisites					

Course Objectives

Course Objectives	To understand importance of Building drawing as an engineer's language
	To plan building as per owner's requirements and Building byelaws
	To develop drawings to scale with location site and block plan with AutoCAD software

Course Outcomes

After the completion of this course, students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the principle of planning and provisions in Bylaws	Remember (L1)
CO2	Interpret the functions of building components and draw them free hand	Understand (L2)
CO3	Relate building drawing as per functional requirements	Applying (L3)
CO4	Evaluate the planning & drawing with appropriate scales using AutoCAD software.	Analyzing (L4)
CO5	Develop the submission drawing of a building as per bye-laws	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Contents:

Unit	Contents	Hours
1	**Introduction**:- To Revit Architecture- Exploring Gui & Workspace, Display Control (Zoom, Pan, Views, Undo, Redo),File Management (New Open, Save, Save As)	**5**
II	**Units Setting-** Project Browser–Plan Views, Top Views, 3D View, Level Setting, Build Tools – Wall Architecture(Wa), Trim, Modify Tool Trim/ Extend To Corner, Extend Single Element, Trim / Extend Multiple Elements, Annotate Tool – Aligned Dimension, Build Tools – Door (Dr) & Windows (Wn) Load, Family, Door Editing, Window Editing, Build Tools – Floor Architecture & Editing, Roof By Footprint & Editing, Column Architecture & Editing, Build Tools–Ceiling & Editing	**5**
III	**Modify Tools: -** Move, Copy, Offset, Align, Mirror Pick Axis, Mirror Draw Axis, Rotate, Split Element, Split With Gap, Pin, Unpin, Delete, Wall Join.	**5**
IV	**Circulation Tools:-** Railing & Editing, Ramp & Editing, Stairs & Types & Editing, Stair By Sketch	**5**

V	**Opening Tools**:- Edit Profile (Wall), Wall Opening, Attach & Detach Wall. Opening By Face, Vertical, Opening, Shaft Opening, Dormer, Join / Unjoin Roof.	**5**
VI	**Model Site:-** Topo surface, Sub region, Split, Surface, Merge Surfaces, and Site Component.	**5**

Text Books	1.	Shah and Kale, Building Drawing and Design, 2nd Edition, Tata McGraw, 2002
EBooks	1.	Advances in Landscape Architecture, Murat Ozyavuz (ed.) - InTech , 2013
	2.	Green Architecture: Advanced Technologies and Materials, Osman Attmann
Reference Books	1.	V. B. Sikka, Civil Engineering Drawing, 3rd Edition, S. K. Kataria & sons, 2003
	2.	George Omura, Mastering Autocad 1, 1st Edition, BPB Publications, New Delhi, 2004
on line TL Material	1.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar08
	2.	https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ar09

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	**Class Assessment**	**Mid-Term**	**ETE**
Weightage (%)	**30**	**20**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**P**
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	

CEE12035	Remote Sensing & GIS Lab	L	T	P	C
Version 1.0		**0**	**0**	**3**	**2**
Pre-requisites/Exposure	ECE42106/ Surveying				
Co-requisites	----------------				

Course Objectives:

1. To understand the basic concepts of remote sensing.
2. To know the applications of Geographic information systems in Civil Engineering.
3. Identify the basic remote sensing concepts and its characteristics.
4. Implement the photogrammetry concepts and fundamentals of Air photo interpretation.
5. Use various analysis and interpretation of GIS results.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Demonstrate detailed, integrated knowledge of the application and history of remote sensing	Remember (L1)
CO2	Describe the process of data acquisition of satellite images and their characteristics	Understand (L2)
CO3	Analyze the principles and components of photogrammetry and remote sensing.	Applying (L3)
CO4	Explain the concepts and fundamentals of GIS.	Analyzing (L4)
CO5	Illustrate the remote sensing and GIS in different civil engineering applications.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description:

Remote sensing is the use of remote observations, often space-based observations, to make inferences about the state of Earth's varied environments. Space-based observations usually consist of measurements of electromagnetic (EM) radiation made by specialist sensors at times and locations constrained by the mechanics of satellite orbits. A wide variety of wavelengths of EM radiation are used, with different wavelengths imprinted with different information about Earth, and subject to different capabilities and limitations.

To extract insight from remotely sensed data involves the techniques of retrieval (also known as: inversion, estimation) and image processing. In this course, students have the opportunity to use software to undertake simple retrieval and image processing, such as change detection, classification and some examples of digital filtering.

In this course, an overview of applications and techniques is provided to the students.

Course Content

Exp. No.01	Advance DIP Fuzzy, ANN, Expert system, Image Segmentation etc.
Exp. No.02	SAR Interferometry and its applications
Exp. No. 03	Analysis of hyperspectral satellite data

Exp. No.04	GIS customization concepts Concept and approaches of Multi-criteria decision making
Exp. No.05	Geo-statistics
Exp. No.06	Demonstrations and assignments

Reference Books

1. Rao, U. R. Space Technology for Sustainable development. New Delhi, Tata McGraw-Hill, 1996.
2. Rao, Bernhardsen, “Geographic Information Systems, an Introduction”, 3 rd Edition, Published by John Wiley Sons, 2006.
3. Chein-I Chang, Hyperspectral Imaging: Techniques for Spectral Detection and Classification, Springer; 1 edition (July 31, 2003).
4. Andrew Skidmore, Environmental Modelling with GIS and Remote Sensing, Published 2002 CRC Press

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	**Class Assessment**	**Mid-Term**	**ETE**
Weightage (%)	**30**	**20**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**P**
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	

Name: **Enrolment** **No:**	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: CEE12035 – Remote Sensing & GIS Lab

Program: B.Tech. (CE)
Time: 03 Hrs Marks: 50
Instructions:
Attempt **Two Questions** from **Section A** (Each Carrying 25 Marks).

SECTION A (Attempt any **Two Questions)**

1.	**Explain** the term Advance DIP Fuzzy, ANN, Expert system and Image Segmentation.	**Analyzing**	**CO1**
2.	**Determine** the process of SAR Interferometry and its applications.	**Analyzing**	**CO2**
3.	**Analyse** the hyperspectral satellite data.	**Analyzing**	**CO3**
4.	**Write** a detailed **plan** on use of remote sensing and GIS in different civil engineering applications.	**Analyzing**	**CO4**
5.	**Explain** the concepts and fundamentals of Geo-Statics.	**Create**	**CO5**
6.	**Demonstrate** briefly fundamental concept of all the experiments.	**R**	**CO1**

CEE12078	**Advanced Structural Analysis Lab**	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Structural Mechanics I, Structural Mechanics II, Design of Steel Structure, Design of RC Structures Civil Engineering Drawing Lab				
Co-requisites					

Course Objectives

1. To introduce the students about the software tool/s useful for Civil Engineering.
2. To make students aware of software/s which can be implemented for solving Civil Engineering problems.
3. To expose students to structural analysis software packages for solving civil engineering problems and provide hands on experience on testing of structural systems to understand their behavior.

Course Outcomes

After the completion of this course, students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Identify** and formulate Civil Engineering problems using CAD tools necessary for engineering practice.	Remember (L1)
CO2	**Use** the latest analysis and design software to **Illustrate** Civil Engineering problems with technological aids.	Understand (L2)
CO3	**Create** Plan, Section, 3D views of building model.	Applying (L3)
CO4	**Calculate** reinforcing requirements of a building model.	Analyzing (L4)
CO5	Evaluate the moment of the support and span section	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Catalogue

Computer-aided design (CAD) is the use of computers (or workstations) to aid in the creation, modification, analysis, or optimization of a design. CAD output is often in the form of electronic files for print, machining, or other manufacturing operations. In this course building model will be prepared through CAD software and then they will be analyzed with design software. Design with respect to the analysis result will also be performed at end.

All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

1. Using CAD tools draw plans, section and prepare layout of multistory residential building

- Introduction to CAD software
- Setting up levels and grids
- Basic Drawing and Editing
- Working Beams, Columns, Roof, Floor etc.
- Create section, Floor-wise plan

2. Using STAAD.Pro to analyze and design the following structures, including the dynamic analysis

- Model prepared in CAD Software
- Plane steel frames

3. Placing reinforcement in beam, column, slab etc.

4. Prepare design sheets of Beams, slab, column and other building component.

TEXT BOOKS

1. David S. Cohn, "AtoCAD2000", Tata McGraw Hill, Publishing Company, New Delhi, 2000.
2. Yarwood, A., "An Introduction to AutoCAD, 2000", Pearson Education Limited, England 2000.

REFERENCES

1. "National Building Code, Bureau of Indian Standards", New Delhi, 2005.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	P
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	

CEE12079	Building Services Lab	L	T	P	C
Version 1.0		0	0	2	1
Requisites	Building Services				
Co-requisites	----------------------------				

Course Objectives

1. To provide a familiarity in the execution of new technology concepts which are applied in field of Building Technology.
2. To practice concepts related Building which involves types and property of ingredients of building.
3. To present the foundations of many basic Engineering tools and concepts related to Building Technology and resolve them effectively with hands on practice.
4. To enrich the knowledge and skills of engineers to proactively anticipate problems faced in Building Technology and resolve them effectively with best-practices.
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Planning of house wiring layout, electric lighting system, electric pipeline layout of slab, electric duct.	Remember (L1)
CO2	Planning of Sanitary one pipeline system, Sanitary two pipeline system, layout of Bathroom and W.C.	Understand (L2)
CO3	Preparation of plumbing system for a 1 BHK residential building.	Applying (L3)
CO4	Understanding the installation of AC, Greaser, and other electrical appliances.	Analyzing (L4)
CO5	Planning of Rainwater harvesting system in a building.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course includes specific concepts related Building Technology which involves planning of house wiring layout, electric lighting system, electric pipeline layout of slab, electric duct, sanitary one pipeline system, sanitary two pipeline system, layout of Bathroom and W.C, plumbing system for a 1 BHK residential building, rainwater harvesting system in a building, installation of AC, Greaser, and other electrical appliances. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Experiment 1: Preparation of House wiring layout.

Experiment 2: Preparation of plumbing system for a 1 bhk residential building.

Experiment 3: Preparation of Sanitary one pipeline system.

Experiment 4: Preparation of Sanitary two pipeline system.

Experiment 5: Planning of electric lighting system inside the building.

Experiment 6: Understanding the installation of AC, Greaser, and other electrical appliances.

Experiment 7: Planning of electric pipeline layout of slab.

Experiment 8: Planning of electrical duct.

Experiment 9: Planning of Rainwater harvesting system in a building.

Experiment 10: Planning of layout of Bathroom and W.C.

Reference Books

3. David V Chadderton, Building Services Engineering, Taylor & Francis publication.
4. M. N. Gangrade, P. V. Patil, Building Services, Nirali publication.
5. Fred Hall, Roger Greeno, Building Services Handbook, Taylor & Francis publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1

CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name:

Enrolment No:

Course: CEE – Building Services Lab

Program: B.Tech. (CE)

Time: 03 Hrs. Max. Marks: 50

Attempt any two questions from **Section A** (each carrying 50 marks).

Section A (attempt any two)

1.	Prepare House wiring layout. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**
2.	Prepare plumbing system for a 1 BHK residential building. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**
3.	Prepare Sanitary one pipeline system. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**
4.	Prepare Sanitary two pipeline system. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**
5.	Plan electric lighting system inside the building. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**

6.	Plan the installation of AC, Greaser, and other electrical appliances. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO1**
7.	Plan electric pipeline layout of slab. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO2**
8.	Plan the entire electrical duct. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO3**
9.	Plan the Rainwater harvesting system in a building. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO3**
10.	Plan the layout of Bathroom and W.C. The write up should contain the objective/aim, basic theory, observation & results, and conclusion.	**Analysing**	**CO2**

CEE12096	Waterproofing Appraisal Lab	L	T	P	C
Version 1.0		0	0	2	1
Requisites	Building Services				
Co-requisites	---------------------------				

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the properties of Concrete	Remember (L1)
CO2	Understand the basics of Water absorption	Understand (L2)
CO3	Apply the waterproofing coatings into different structures	Applying (L3)
CO4	Checking of quality tests in waterproofing applications	Analyzing (L4)
CO5	Evaluate the concrete strength by performing different NDT	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

List of Practical

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1. Comparative analysis of water absorption in control concrete and mortar vs. concrete and mortar made with permeability reducing admixtures by methods conforming to IS: 2645
2. Application of different liquid waterproofing coatings – cementitious, acrylic, polyurethane etc.
3. Application of prefabricated membranes – HDPE, Bitumen, TPO, EPDM etc.
4. Critical detailing elements in waterproofing applications e.g. pipe joints, in-out corners, expansion joints etc.
5. Checking of quality tests in waterproofing applications e.g. Wet film thickness, dry film thickness,
6. Non-destructive testing of concrete structures by Rebound hammer, UPV meter etc.
7. Carbonation test by spraying phenolphthalein.
8. Tests on polymer modified mortar/concrete and coating for adhesion by Pull-off test method.
9. Outdoor exposure test to measure weathering of coating.
10. Flexibility test for coating by applying on a tin sheet.
11. Elongation test for liquid coatings by applying on an elastic surface.
12. Test for effectiveness by measuring temperature difference of a thermal protection coating and concrete substrate on terrace.
13. Test for effectiveness by measuring water absorption of coating applied on a cardboard.

Recommended Books

- Construction waterproofing Handbook, 2nd Edition by Michael T. Kubal, **ISBN:** 9780071489737, Publication Date & Copyright: 2008; 2000 - The McGraw-Hill Companies, Inc.

- **Waterproofing For External Wall Guidebook – Good Industry Practices by Building and Construction Authority, Singapore**
- Waterproofing of Internal Wet Areas, 2nd Edition by Building and Construction Authority, Singapore
- Concrete Repair and Maintenance: Peter H. Emmons and Gajanan M. Sabnis, Galgotia Publication.
- Repairs and Rehabilitation - Compilation from Indian Concrete Journal-ACC Publication.
- Guide to Concrete Repair and Protection, HB84-2006, A joint publication of Australia Concrete Repair Association, CSIRO and Standards Australia.
- CPWD handbook on Repairs and Rehabilitation of RCC buildings published by DG(Works), CPWD, Government of India (Nirman Bhawan), http://www.cpwd.gov.in/handbook.pdf
- Guide to Concrete Repair, Glenn Smoak, US Department of the Interior Bureau of Reclamation, Technical Service Center, http://books.google.co.in
- Management of Deteriorating Concrete Structures: George Somerville, Taylor and Francis Publication
- Concrete Building Pathology: Susan Macdonald, Blackwell Publishing.
- Testing of Concrete in Structures: John H. Bungey, Stephen G. Millard & Michael G. Grantham, Taylor & Francis Publication.
- Durability of concrete and cement composites: C. L. Page & M.M. Page, Woodhead Publishing

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

SEMESTER VII

MGT11402	HSSM – V (Industrial Management)	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basic Calculation Skill				
Co-requisites	-				

Course Objective:

1. To enable students to understand operational complexities of a business.
2. To enable students to conceptualize the process, functions and theories of management.
3. To enable students to provide knowledge about quality control processes.
4. To enable students to conceptualize different strategies relating to people management

Course Outcomes:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the concepts related to Industrial Management.	Remember (L1)
CO2	Demonstrate skills to perform Different Managerial Functions	Understand (L2)
CO3	Define and analyze the importance of Quality control procedures.	Applying (L3)
CO4	Illustrate different techniques to be used in Materials Management process	Analyzing (L4)
CO5	Understand the concepts of production planning and implications of the samein industrial management processes.	Evaluating (L5)
CO6	Evaluate importance of project management and its applications through PERT CPM method.	Creating (L6)

Course Description:

The purpose of this course is to provide an understanding of the theories and principles of modern management and encourage the course participants to make an appreciation of these principles in relation to their own experiences and selected managerial case studies.

The aims of the course is to understand the basic principles of management, and the four major functions of managers e.g. planning, organizing, leading and controlling and how managers actually operate. Students will be required to think critically and strategically about management theories and issues which will enable them to develop their decision-making and analytical skills. They will be involved in application exercises and case studies, which will assist them to develop graduate attributes.

Course Content:

Module 1: Introduction [6Lecture Hours]

Industrial management - Introduction: Concept, Development, application and scope of Industrial Management. Productivity: Definition, measurement, productivity index, types of production system, Industrial Ownership.

Module 2: Managerial Functions [10 LectureHours]

Management Function: Principles of Management – Time and motion study, work simplification – process charts and flow diagrams, Production Planning. Inventory Control: Inventory, Cost, Deterministic Models, and Introduction to supply chain management.

Module 3: Quality Assurance [6Lecture Hours]

Quality Control: Process control, SQC, Control charts, Single, Double and Sequential Sampling, Introduction to TQM.

Module 4: Materials Management [8Lecture Hours]

Fundamentals of Materials Management; Material cycle; Forecasting; Material Classification-need and usage, Single and Multidimensional classifications; Materials Codification-Usage, Codification types;

Module 5: Production Planning [8Lecture Hours]

Production Planning and Materials Requirements, Materials Procurement; Tendering; Types of Tenders, Storage and warehousing concepts, Receipt, Warehouse type, Layout, issue of materials and Updation of records; Manpower and equipment;

Module 6: Project Management [7Lecture Hours]

Project Management concept, Project Feasibility Studies, Project Identification, Market and Demand Analysis, Technical Analysis, Project Scheduling with PERT/CPM, Project Cost Estimate, Financial Appraisal of Single Project, Financial Appraisal of Multiple Projects, Project Cost Control (PERT/Cost).

Text Books:

1. Arnold, Chapman: Introduction to Materials Management: Pearson, 5th edition, 2008

Reference Books:

1) Gopal Krishnan &Sundarsan: Material Management: An Integrated Approach, Prentice Hallof India Private Limited, New Delhi, 2003
2) Industrial Engineering and Management by OP Khanna, DhanpatRai Publications, Delhi. Management Information Systems by Larry Long (Prentice Hall)

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	Mid-Term	ETE
Weightage (%)	30	20	50

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE11034	Estimation & Valuation	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Construction Planning & Management, Construction Technique Equipment & Practices				
Co-requisites					

Course Objectives:

1. To administer business and management skills in various positions within the construction industry.
2. To practice informed decision-making in personal and professional endeavours.
3. To apply scientific planning methods to optimize time and cost in construction relatedproblems.
4. To plan resource requirements including men, machine and materials based on resources allocation and budget and budgetary control methods.
5. To understand the labour laws and regulations, safety requirements and its financial aspects in construction industry.

Course Outcomes:

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Classify the 'Estimate' and calculation of BBS.	Remember (L1)
CO2	Explain the quantity of materials for construction.	Understand (L2)
CO3	Estimate the rates of construction materials.	Applying (L3)
CO4	Show the specification of works and materials.	Analyzing (L4)
CO5	Determine the value of property.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Estimating is the technique of calculating or computing the various quantities and the expected Expenditure to be incurred on a particular work or project. In case the funds available are less than the estimated cost the work is done in part or by reducing it or specifications are altered, the following requirement are necessary for preparing an estimate.
All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Module 1: 12 Lecture Hours

Types of estimates: Types of estimates, approximate estimates, items of work, unit of measurement, unit rate of payment, quantity estimate of a single storied building, bar bending schedule, details of measurement and calculation of quantities with cost, bill of quantities.

Module II: 10 Lecture Hours

Analysis of rate: abstract of quantities, estimate of quantities of road, underground reservoir, surface drain, septic tank Analysis of rates: Earthwork, brick flat soling, DPC, PCC and RCC, brick work, plastering, flooring and finishing

Module III: 10 Lecture Hours

Specification of materials: Brick, cement, fine and coarse aggregates

Specification of works: Cement concrete, reinforced cement concrete, first class brickwork, cement plastering, pointing, white washing, colour washing, distempering, lime punning, painting and varnishing

Module IV: 10 Lecture Hours

Valuation: Values and cost, gross income, outgoing, net income, scrap value, salvage value, market value, Book Value, sinking fund, capitalized value, Y. P., depreciation, obsolescence, deferred income, freehold and leasehold property, mortgage, rent fixation, valuation table

Reference Books

1. Estimating, Costing, Specification & Valuation M. Chakraborty Self
2. Estimating Costing And Valuation N R Rangwala Charotar Publishing House Pvt.Ltd
3. Civil Estimating & Costing: Including Quality Surveying, Tendering A.K. Upadhyay S KKataria and Sons
4. SP: 34 (BIS)

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	ETE
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1

CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE11080	Smart Materials and Smart Structures	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Applied Science				
Co-requisites	----------------------------------				

Course Objectives

1. To provide a familiarity in the execution of new technology concepts which are applied in field of Civil Engineering.
2. To study about different types of structures and systems with functions.
3. To obtain knowledge about various types of sensors, their technologies and measurement using several sensing systems.
4. To understand about different type of actuator materials and signal processing and control systems.
5. To engage in lifelong learning and adapt to changing professional and societal needs.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand mechanism of sensor and actuator system for the application in Smart Structure.	Remember (L1)
CO2	Demonstrate principles of all types of sensors.	Understand (L2)
CO3	Identify different type of actuators required for smart structures.	Applying (L3)
CO4	Discuss signal processing and control system for smart structures.	Analyzing (L4)
CO5	Apply the use of smart materials in Civil Engineering field.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Smart Materials and Smart Structures covers the idea of smart materials, structures, measuring techniques for obtaining several engineering properties of materials. This course also includes the study of various sensors and application of this technology as well as the concept of various actuators and related materials with techniques, signal processing and control systems. All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content

Unit I: **9 Lecture Hours**

Introduction: Introduction to Smart Materials and Structures – Instrumented structures functions and response – Sensing systems – Self-diagnosis – Signal processing consideration – Actuation systems and effectors - Pressure transducers – Load cells – Temperature Compensation – Strain Rosettes.

Unit II: **9 Lecture Hours**

Sensors: Sensing Technology, Types of Sensors, Physical Measurement using Piezo Electric Strain measurement – Inductively Read Transducers, The LVOT – Fiber optic Techniques. Chemical and Bio-Chemical sensing in structural Assessment, Absorptive chemical sensors, Spectroscopes, Fiber Optic Chemical Sensing Systems and Distributed measurement.

Unit III: **9 Lecture Hours**

Actuators: Actuator Techniques, Actuator and actuator materials , Piezoelectric and Electrostrictive Material, Magneto-structure Material, Shape Memory Alloys, Electro rheological Fluids– Electromagnetic actuation, Role of actuators and Actuator Materials.

Unit IV: **9 Lecture Hours**

Signal processing and control systems: Data Acquisition and Processing, Signal Processing and Control for Smart Structures, Sensors as Geometrical Processors, Signal Processing – Control System – Linear and Non-Linear.

Unit V: **9 Lecture Hours**

Application of Smart materials in Civil Engineering fields: Application of smart materials in Natural Disasters; Use of smart materials for Waste Materials reduction, repair of Structure; Smart materials usage in Building, Dam, Bridge.

Text Books

1. Brain Culshaw, Smart Structure and Materials, Artech House Publication.
2. L. S. Srinath, Experimental Stress Analysis, Tata McGraw Hill.
3. J. W. Dally & W. F. Riley, Experimental Stress Analysis, Tata McGraw Hill.

Reference Books

1. Peter L. Reece, Smart Material and Structure, Nova Publishers.
2. https://nptel.ac.in/courses/112104251/
3. https://nptel.ac.in/courses/105106115/

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Name:

Enrolment No:

ADAMAS UNIVERSITY
PURSUE EXCELLENCE

Course: – Smart Materials and Smart Structures

Program: B.Tech. (CE)

Time: 03 Hrs. **Max. Marks: 50**

Instructions:

Attempt all the Questions**.**

Group A
Answer All the Questions (5 x 1 = 5)

1	**Give** a strain measuring techniques.	**R**	**CO1**
2	**What** is the full form of LVOT infer?	**R**	**CO2**
3	**Name** the piezoelectric materials used in smart structures.	**R**	**CO3**
4	**What** are Geometrical processors?	**R**	**CO4**

5	**What** is Photochromic material?	**R**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	**Elucidate** Pressure transducers.	**U**	**CO1**
(OR)			
6 b)	**Interpret** Instrumented structures functions and response.	**U**	**CO1**
7 a)	**Enumerate** absorptive chemical sensors.	**Ap**	**CO2**
(OR)			
7 b)	**Explain** Fibre Optic Chemical Sensing Systems and Distributed measurement.	**Ap**	**CO2**
8 a)	**How** the actuators are used in structures?	**U**	**CO3**
(OR)			
8 b)	**What** is an electro rheological phenomenon?	**U**	**CO3**
9 a)	**How** Data Acquisition and Processing is developed?	**R**	**CO4**
(OR)			
9 b)	**Describe** how Sensors are used as Geometrical Processors.	**R**	**CO4**
10 a)	**What** is the function of thermo-chromic material in Civil Engineering field?	**R**	**CO5**
(OR)			
10 b)	**What** is the function photochromic material in Civil Engineering field?	**R**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	**Explain** the functions of various sensing sytems and actuation systems in smart structures.	**An**	**CO1**
(OR)			
11 b)	**Discuss** in detail the functions and response of instrumental structures.	**Ap**	**CO1**
12 a)	**Explain** (i) passive sensory smart structure (ii) active sensing and reactive smart structure.	**An**	**CO2**

(OR)			
12 b)	**What** are fibre optic sensors? **Explain** in detail the light propagation in an optical fibre. **What** are its advantages?	**An**	**CO2**
13 a)	**What** are the different actuator materials? **Explain** reactive actuator based smart structures.	**U**	**CO3**
(OR)			
13 b)	**What** is an electro rheological phenomenon? **Discuss** the electro rheological fluids and fluid actuators.	**R**	**CO3**
14 a)	**What** is an optimized control algorithm? **How** does it help to perform the required functions after sensing changes?	**R**	**CO4**
(OR)			
14 b)	**Write** brief technical note on: (i) Data acquisition (ii) Signal processing	**R**	**CO4**
15 a)	**Describe** about Signal Processing and Control for Smart Structures.	**U**	**CO4**
(OR)			
15 b)	**How** linear and non-linear control System utilized to construct any smart structures.	**U**	**CO4**
16 a)	**How** might smart materials assist humans during natural disasters?	**R**	**CO5**
(OR)			
16 b)	**Which** properties of smart materials are useful in their construction applications?	**R**	**CO5**
17 a)	**Where** should smart materials & **which** type to be employed in buildings to be most useful?	**R**	**CO5**
(OR)			
17 b)	**How** might smart materials assist in repair of Structure?	**R**	**CO5**

CEE11081	Prof. Elective – V: Air and Noise Pollution	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Prof. Core – XIII: Environmental Engineering				
Co-requisites	Prof. Elective IV Lab: Air and Noise Pollution Lab				

Course Objectives

1. To describe the basic concepts and physics of air and noise pollution.
2. To analyze the different concepts of air and noise pollution by solving mathematical problems.
3. To understand the basic concepts of air and noise quality management.
4. To compare the air and noise quality with allowable standards and limits.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Identify the major sources, effects and monitoring of air pollutants.	Remember (L1)
CO2	Infer the key transformations and meteorological influence on air.	Understand (L2)
CO3	Explain the pollution regulation on its scientific basis.	Applying (L3)
CO4	Apply the methods of noise pollution measurement.	Analyzing (L4)
CO5	Design proper techniques for the control of noise pollution.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course covers the basic concepts and terminologies and importance of air and noise pollution. The students will be able to model air and noise pollution and design the control devices. Demonstration of various irrigation systems and other elements will be provided by pictorial representations as per requirements. Numerical problems will be solved in connection with the several aspects of water resources engineering. Classes will be conducted by lectures as well as power point presentation as per the requirements. Discussions related to development of various empirical equations regarding water resources engineering will be done as well. Students will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Through these teaching methods students will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in the working field in future.

Course Content

Unit I: **11 Lecture Hours**

Air Pollutants: Sources, Classification, Effects on human, vegetation and material, Effects on atmosphere: photochemical smog, ozone layer depletion, acid rain, greenhouse effect, global warning.
Major Environmental Air Pollution Episodes: London smog, Los Angeles smog and Bhopal gas tragedy.

Unit II: **7 Lecture Hours**

Air Pollution Meteorology: Lapse rate, Atmospheric stability, Inversion, Plume pattern.

Dispersion of Air Pollutants: Point source Gaussian Plume model, Stability classes, Stability charts, Design of Stack height.

Unit III: **12 Lecture Hours**

Air Quality: Methods of measurement: gaseous pollutants, particulate pollutants; Air quality standards and indices: ambient air quality standard, NAAQS, emission standard, air quality indices.
Air Pollution Control: Control of gaseous pollutants: adsorption, absorption, condensation; Control of particulate pollutants: settling chambers, cyclone separators, wet collectors, fabric filters, electrostatic precipitators; Control of pollution from automobiles.

Unit IV: **8 Lecture Hours**

Physics of Noise: Basics of acoustics, Sound pressure, Power and intensity and their interrelations.
Measurement of Noise: Noise level, interrelation between noise, pressure, power and intensity levels, Noise meter, Noise networks, Frequency band analysis, Decibel addition, Measurement of community noise.

Unit V: **7 Lecture Hours**

Source and Effect of Noise: Psychoacoustics and noise criteria, Effects of noise on health, Annoyance rating schemes.

Noise Pollution Control: Noise standards and limits, Methods of noise pollution control.

Reference Books

1. Santosh Kumar Garg , Sewage Disposal and Air Pollution Engineering, Environmental Engineering (Vol.II), Khanna Publishers,2013
2. S.V.S. Rana, Essentials of Ecology and Environmental Science ,Fourth Edition , 2010
3. Arthur C. Stern Fundamentals of air pollution 2nd edition, Elsevier, 1984
4. Murphy, E., King,E., Environmental Noise Pollution, Elsevier, 2014
5. Liptak, B G, Instrument Engineers Hand Book (Vol. I & II), Chilton Book Company, Philadelphia,4th ed., 2005.

M.N. Rao & H.V.N. Rao, Air Pollution, Tata McGraw Hil

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

	ADAMAS UNIVERSITY **END SEMESTER EXAMINATION** (Academic Session: 2020 – 21)		
Name of the Program:	B.Tech in CE	**Semester:**	VII
Paper Title:	Air & Noise Pollution	**Paper Code:**	CEE11081
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	17	**Total No of Pages:**	2

(Any other information for the student may be mentioned here)	• At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. • All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. • Assumptions made if any, should be stated clearly at the beginning of your answer.

Group A **Answer All the Questions (5 x 1 = 5)**			
1	**Explain** about particulate scrubbers?	**U**	**CO1**
2	**Define** stack plume	**R**	**CO2**
3	**Explain** about “Self cleansing property of Environment”?	**U**	**CO3**
4	**What** is the unit for measuring noise?	**R**	**CO4**
5	**Describe** annoyance rating scheme.	**R**	**CO5**
Group B **Answer All the Questions (5 x 2 = 10)**			
6 a)	Write a **short note** on Bhopal gas tragedy.	**U**	**CO1**
(OR)			
6 b)	**What** are the main causes of global warming?	**U**	**CO1**
7 a)	**Discuss** the effect of moisture on dispersion of air pollutants.	**U**	**CO2**
(OR)			
7 b)	**Describe** the aims and objectives of stack monitoring.	**U**	**CO2**
8 a)	**Explain** short notes on “Dilution Method” for the removal of air pollutants.	**R**	**CO3**
(OR)			
8 b)	Write a brief note on NAAQS.	**U**	**CO3**
9 a)	**Describe** the various components of acoustics.	**R**	**CO4**
(OR)			
9 b)	**Differentiate** between Intensity and Level of Noise.	**U**	**CO4**

10 a)	**Explain** two techniques of controlling Noise Pollution in brief	**R**	**CO5**
(OR)			
10 b)	**Enumerate** the various sources of noise pollution.	**U**	**CO5**
Group C **Answer All the Questions (7 x 5 = 35)**			
11 a)	**Define** a high volume sampler? **Explain** its salient features and procedure adopted for the sampling and measurement of suspended particulate matter in air.	**U**	**CO1**
(OR)			
11 b)	**Explain** the effects of air pollution on human, vegetation and materials.	**R**	**CO1**
12 a)	**Discuss** the importance of Isokinetic conditions and procedure adopted for the determination of mass emission rate in stack monitoring.	**U**	**CO2**
(OR)			
12 b)	**Explain** the point source Gaussian Plume model.	**U**	**CO2**
13 a)	**Discuss** the pollution control process of gaseous contaminants through absorption.	**U**	**CO3**
(OR)			
13 b)	**Explain** with the help of suitable diagrams about the working principles of spray tower, tray tower, packed tower and venture scrubber used for the absorption of gaseous contaminants.	**An**	**CO3**
14 a)	**What** are the different ways to achieve the perfect measurement of a community noise?	**U**	**CO4**
(OR)			
14 b)	**Explain** the frequency band analysis in detail.	**U**	**CO4**
15 a)	**Elaborate** the effect of noise pollution on human health.	**U**	**CO5**
(OR)			
15 b)	**What** are various ways to control the noise pollution?	**U**	**CO5**
16 a)	**Explain** the principle of operation, advantages and limitations of gravitational setting chamber.	**U**	**CO3**
(OR)			
16 b)	**Explain** the principle of operation, advantages and limitations of fabric filter.	**U**	**CO3**

17 a)	**Explain** the approaches for controlling the oxides of nitrogen in combustion gases?	**U**	**CO3**
(OR)			
17 b)	**Discuss** the control methodology of oxides of nitrogen by combustion modification.	**An**	**CO3**

CEE11082	**Contract Laws and Regulations**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Construction Planning, Scheduling and Control,				
Co-requisites	Quality Control and Assurance in Construction				

Course Objectives

1. To study different type of construction contracts and legal aspects and provisions.
2. To study of tenders, arbitration, legal requirements and labour regulations.

Course Outcomes

On completion of this course, the student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Understand** about construction contracts related to acts, elements, types and laws.	Remember (L1)
CO2	**Develop** and improve knowledge about different type of tenders and contracts as well as standard guidelines.	Understand (L2)
CO3	**Build** concepts about arbitration acts, agreements, laws, regulations as per statutory bodies.	Applying (L3)
CO4	**State** various important legal requirements related to insurance, bonding, taxes, duties and their effects on construction costs.	Analyzing (L4)
CO5	**Discuss** legal regulations comprise of securities, compensation acts and laws.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course deals with fundamental idea about construction contracts related to Indian contracts act, elements of contracts, types of contracts, features, suitability, design of contract documents, international contract document, standard contract document – law of torts. Various tender related aspects such as prequalification, bidding, accepting, evaluation of tender from technical, contractual and commercial points of view, contract formation and interpretation, potential contractual problems, World Bank procedures and guidelines, state transparency in tender act will be discussed in detail. Also comparison of actions and laws, agreements, subject matter, violations, arbitration act, appointment of arbitrators, conditions of arbitration, powers and duties of arbitrator, rules of evidence, enforcement of award, costs, legal requirements for planning, property law, agency law, local government laws for approval, statutory regulations. are included in this course. This course will cover study of legal requirements comprised of insurance, bonds, taxes, duties and its influences on construction costs. Also various Labour Regulations related study like social security, welfare legislation, laws relating to wages, bonus and industrial disputes, labour administration, insurance and safety regulations, workmen's compensation act, Indian factory act, child labour act, other labour laws. Through this course student will understand and apply the entire knowledge about project based laws and regulations that will be helpful during his/her working in any organization. Student will be subjected to class tests, assignments and tutorials problems and solving by course coordinator. Classes will be conducted through online as well as class room lectures by means of board work and power point presentation. Through these teaching methods student will have a strong understand regarding the fundamental concepts of this course and will be able apply these concepts in their professional life in future.

Course Content

UNIT –I: 9 Lecture Hours

Construction Contracts: Indian Contracts Act – Elements of Contracts – Types of Contracts – Features – Suitability – Design of Contract Documents – International Contract Document – Standard Contract Document – Law of Torts.

Unit II: 9 Lecture Hours

Tenders: Prequalification – Bidding – Accepting – Evaluation of Tender from Technical, Contractual and Commercial Points of View – Contract Formation and Interpretation – Potential Contractual Problems – World Bank Procedures and Guidelines – Transparency in Tenders Act.

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Unit III: 9 Lecture Hours

Arbitration: Comparison of Actions and Laws – Agreements – Subject Matter – Violations – Arbitration Act - Appointment of Arbitrators – Conditions of Arbitration – Powers and Duties of Arbitrator – Rules of Evidence – Enforcement of Award – Costs -Legal Requirements for Planning – Property Law – Agency Law – Local Government Laws for Approval – Statutory Regulations.

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Unit IV: 9 Lecture Hours

Legal Requirements: Insurance and Bonding – Laws Governing Sale, Purchase and Use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax, Excise and Custom Duties and their Influence on Construction Costs.

Unit V: 9 Lecture Hours

Labour Regulations: Social Security – Welfare Legislation – Laws relating to Wages, Bonus and Industrial Disputes, Labour Administration – Insurance and Safety Regulations – Workmen's Compensation Act – Indian Factory Act – West Bengal Factory Act – Child Labor Act **-** Other Labor Laws.

Reference Books

1. Gajaria G.T., "Laws Relating to Building and Engineering Contracts in India", M.M.Tripathi Private Ltd., Bombay, 1982
2. PWD Code, 1986
3. Jimmie Hinze, "Construction Contracts", Second Edition, McGraw-Hill, New York, 2001. Mamlouk, M.S. and Zaniewski, J.P.
4. Joseph T. Bockrath, "Contracts and the Legal Environment for Engineers and Architects", Sixth Edition, McGraw-Hill, New York, 2000.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Mid Term	Attendance	Class Assessment	End Term
Weightage (%)	20	10	30	40

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

Model Question Paper

Name: **Enrolment No:**	ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: CEE11082 – Contract Laws and Regulations

Program: M.Tech. (CEM) **Semester: VII**

Time: 03 Hrs. **Max. Marks: 40**

Instructions:

Attempt All Questions from **Section A** (Each Carrying 1 Marks); any **Three Questions** from **Section B** (Each Carrying 5 Marks). Any **Two Questions from Section C** (Each Carrying 10 Marks).

Section A (Answer all Questions) (5 x 1 = 5)

1.	**List out** different types of contracts.	**U**	**CO1**

2.	**What** is Bidding?	**R**	**CO2**
3.	**Define** the conditions of arbitration.	**R**	**CO3**
4.	**What** is Insurance and Bonding?	**R**	**CO4**
5.	**What** is Social Security?	**U**	**CO5**
	SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
6.	**Illustrate** about law of torts.	**U**	**CO1**
7.	**Identify** about Potential Contractual Problems.	**R**	**CO2**
8.	**Show** the Comparison of Actions and Laws.	**U**	**CO3**
9.	**Explain** about Income Tax, Sales Tax.	**U**	**CO4**
10.	**Explain** about Insurance and Safety Regulations.	**U**	**CO5**
	SECTION C (Answer any Two Questions) (2 x 10 = 20)		
11.	**Explain** about Design of Contract Documents.	**U**	**CO1**
12.	**Discuss** about World Bank procedures and guidelines as well as evaluation of tender from technical point of view.	**U**	**CO2**
13.	**Explain** about powers and duties of arbitrator. Also explain about legal requirements for planning.	**U**	**CO3**
14.	**Discuss** about Excise and Custom duties and their Influence on construction costs.	**U**	**CO4**
15.	**Discuss** about workmen's compensation act, Indian factory act and child labour act.	**U**	**CO5**

CSE11202	Introduction To AI & ML	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Statistics and Probability				
Co-requisite	High School Mathematics				

Course Objectives:

1. To enable students to understand the basic of Artificial Intelligence and Machine Learning
2. To provide the fundamentals of learning algorithms used to solve real world problems.
3. To enhance the skill of students to analyse and interpret the results.
4. To allow students to understand the applications of AI/ML in industries.

Course Outcomes:

On the completion of this course the student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Understand** the basics of Artificial Intelligence and its allied domains.	Remember (L1)
CO2	**Analyze** the way to represent knowledge to a machine.	Understand (L2)
CO3	**Explain** the learning models to make a machine learn.	Applying (L3)
CO4	**Construct** and gain knowledge to build artificial neural network for civil engineering applications	Analyzing (L4)
CO5	**Discuss** machine learning techniques in civil engineering.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Description:

This course is based on proliferation of Artificial Intelligence and Machine Learning. These are powerful tools to make machine intelligent. The course covers the range of concepts, approaches and techniques of Artificial Intelligence and Machine Learning. The learners are required to demonstrate their knowledge and understanding of various machine learning algorithms to predict and interpret the results. Students will learn the techniques to predict, classify, and analyse the results. The objective of this course is to provide students fundamental training on AI/ML techniques and their real-world applications in civil engineering.

Course Content:

Unit-I	**9 Lecture Hours**
Introduction to Artificial Intelligence: Introduction To AI, Various tools to implement AI, Agents and Environment, Problem Formulation, Search strategies: uninformed, heuristics, informed, state-space search, satisfying constraints	
Unit-II	**9 Lecture Hours**
Knowledge, Reasoning and Planning: Introduction and Overview: Knowledge, knowledge model, syntax and semantics, logical agents, first-order-logic, classical planning Uncertain Knowledge and Reasoning: Dealing uncertainty, probabilistic reasoning, simple and complex decision.	
Unit-III	**9 Lecture Hours**
Introduction to Machine Learning: Forms of Learning, supervised learning, regression analysis and interpretation, logistic regression, K-nearest neighbour, naïve bayes, support vector machines, decision trees, unsupervised learning, clustering algorithms, density-based clustering.	
Unit-IV	**9 Lecture Hours**
Artificial Neural Network: Introduction to neuron, activations functions, back propagation, Fundamentals of CNN, hyper-parameter tuning, batch normalization, Fundamentals of RNN.	
Unit-V	**9 Lecture Hours**
Machine Learning Applications and Case studies: Implementation of civil engineering projects, applications to structural damage detection, soil classification, Applications to Traffic Prediction, soil strength prediction, rainfall-runoff modelling, disaster detection, etc.	

Text Books:
1. Artificial Intelligence: A Modern Approach, *Stuart J. Russell*, *Peter Norvig*, Pearson Education, Inc., India 2. The Elements of Statistical Learning: Data Mining, Inference and Prediction", *Trevor Hastie*, *Robert Tibshirani, Jerome Friedman*, Springer 3. Deep Learning, *Ian Goodfellow*, *Yoshua Benjio*, *Aaron Courville*, MIT Press
Reference Books:
1. Pattern Recognition and Machine Learning, *Christopher M.Bishop*, Springer

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

Components	**Mid Term**	**Class Assessment**	**End Term**
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / **Course Outcomes**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1

CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2022 – 23)		
Name of the Program:	B.Tech. in Civil Engineering	**Semester:**	VII
Paper Title:	Introduction to Artificial Intelligence and Machine Learning	**Paper Code:**	CSE11202
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	**17**	**Total No of Pages:**	
(Any other information for the student may be mentioned here)	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. **2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.		

Ques No.	Question	Knowledge Level	Course Outcome
	Group A: Answer ALL the questions (5 x 1 = 5)		
1	**Define** Artificial Intelligence.	**R**	**CO1**
2	**Explain** learning.	**U**	**CO2**
3	**List** some algorithms of supervised learning.	**R**	**CO3**
4	**Explain** unsupervised learning.	**U**	**CO4**
5	**Demonstrate** linear regression as mathematical equation**.**	**Ap**	**CO5**
	Group B: Answer ALL the questions (5 x 2 = 10)		
6	**a)** **i) What** is Agent? **ii) Explain** the heuristics strategies.	**R & U**	**CO1**
	(OR)		

	b) **i) Illustrate** uninformed strategies**.** **ii) Explain** briefly the tools used to implement Artificial Intelligence. [1+1]	**R** **&** **U**	
7	**a) Explain** syntax and semantics**.**	**U**	**CO2**
	(OR)		
	b) Compare classification and clustering analysis.	**An**	
8	**a) Explain** logistic regression.	**U**	**CO3**
	(OR)		
	b) Discuss function that is used for logistic regression**.**	**U**	
9	**a) Explain** neural network**.**	**U**	**CO4**
	(OR)		
	b) Examine how decision tree can be implemented as classification and prediction.	**An**	
10	**a) Interpret** the metrices for regression equation.	**An**	**CO5**
	(OR)		
	b) Demonstrate conditional probability**.**	**Ap**	
Group C : Answer ALL the questions (7 x 5 =35)			
11	**a)** **i) Discuss** satisfying constraints. **ii) Explain** characteristics of first-order logic**.** [3+2]	**R** **&** **U**	**CO1**
	(OR)		
	b) **i) Why** sensor is required in AI agents. **ii) Explain** utility of sensors for agents in AI. [2+3]	**An** **&** **U**	
12	**a) Explain** probabilistic reasoning.	**U**	**CO2**

	(OR)		
	b) Identify the algorithms that solve the problem for supervised problems.	**R**	
13	**a) Explain** decision trees.	**U**	**CO3**
	(OR)		
	b) Explain conditional probability and naïve bayes algorithm.	**U**	
14	**a) Explain** Artificial Neural Network**.**	**U**	**CO4**
	(OR)		
	b) Explain recurrent neural network architecture in detail.	**U**	
15	**a) Examine** neurons and activation function.	**An**	**CO4**
	(OR)		
	b) Examine CNN.	**An**	
16	**a) Demonstrate** traffic prediction as a case study for machine learning.	**Ap**	**CO5**
	(OR)		
	b) Demonstrate any real-world application that uses CNN as a working algorithm.	**Ap**	
17	**a) Demonstrate** neural network architecture and map it's working with neuron architecture of human brain.	**Ap**	**CO5**
	(OR)		
	b) Demonstrate soil strength prediction.	**Ap**	

ECE11051	Fundamentals of Wireless Communication	L	T	P	C
Version 2.0	**Contact Hours – 45**	3	0	0	3
Pre-requisites/Exposure	1. Knowledge of analog and digital communication 2. Basic understanding of radio communication				
Co-requisites	1. Understanding of how TCP/IP networks operate 2. Understanding of circuit-switched networks and signalling protocols				

Course Objectives

1. An understanding on functioning of wireless communication system and evolution of different wireless communication systems and standards.
2. To expose the students to understand mobile radio communication principles and to study the recent trends adopted in cellular systems.
3. To study the type and appropriate model of wireless fading channel based on the system parameters and the property of the wireless medium.
4. To explain the various terminology, principles, devices, schemes, concepts, algorithms and different methodologies of GSM, GPRS etc. used in Wireless Communication Networks.
5. To study the various multiple access techniques and an ability to explain the architecture, functioning, protocols, capabilities and application of various wireless communication networks.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Compare** the evolution of mobile communication generations from 1G to 4G with different characteristics and limitations.	Remember (L1)
CO2	**Apply** cellular concepts to evaluate the signal reception performance in a cellular network and traffic analysis to design cellular network with given quality of service constraints.	Understand (L2)
CO3	**Explain** different types of fading, indoor and outdoor propagation models and calculate losses.	Applying (L3)
CO4	**Analyze** the measures to increase the capacity in GSM systems and the entire protocol architecture of GSM- communication protocols for radio resource management and mobility management	Analyzing (L4)
CO5	**Explore** the various concepts of wireless communication, its design with respect to fading and link performance	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The wireless telecommunications industry has grown tremendously since the first cellular system was deployed in 1983. Digital techniques were introduced in 1993 to accommodate the huge boom in U.S. subscribers of portable telephone service in the mid 1990's. The same growth has occurred in Europe and Japan. Systems evolved from providing voice (2G) to all-IP data service (4G), creating a need for researchers and engineers with knowledge about cellular radio systems and digital wireless communication techniques. Wireless systems that provide personal and machine-to-machine communication constitutes a major research area of vital importance. This Course is to expose the students to the most recent technological developments in Mobile communication systems. The Course considers the basic concepts of cellular system. Following this, various propagation effects and propagation models used in mobile communication are included in the course. It deals with various methodologies to improve the received signal quality in mobile communication. The Course provides various multiple access techniques and Standards in Cellular mobile Communication.

Course Content

Unit I: **6 lecture hours**

Introduction to Wireless Communication System:

Evolution of mobile communications, Mobile Radio System around the world, Types of Wireless communication System, Comparison of Common wireless system, Trend in Cellular radio and personal communication. Second generation Cellular Networks, Third Generation (3G) Wireless Networks, Wireless Local Loop (WLL), Wireless Local Area network (WLAN), Bluetooth and Personal Area Networks.

Unit II: **11 lecture hours**

The Cellular Concept- System Design Fundamentals:

Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, S/I ratio consideration and calculation for Minimum Cochannel and adjacent interference, Handoff Strategies, Umbrella Cell Concept, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular System-cell splitting, Cell sectorization, Repeaters, Micro cell zone concept, Channel antenna system design considerations.

Unit III: **9 lecture hours**

Characteristics of wireless channels:

Different Multi-path propagation mechanisms, propagation over water or flat open area, propagation near in distance, long distance propagation, point to point prediction model – characteristics, free space propagation model, two ray ground reflection model. Multi-path effects on mobile communication, Fading, different types of fading, small and large-scale fading, slow and fast fading, narrowband and wideband fading, inter symbol interference, fast fading model, Doppler effect due to velocity of mobiles, Rayleigh envelop.

Unit IV: **9 lecture hours**

Wireless Systems:

Mobile Wireless Systems, 2G network GSM, Architecture, Protocols, Air Interface, GSM Multiple Access, GSM Channel Organization, GSM Call Set up Procedure, GSM Protocols and Signaling, Location Update Procedure, Routing a call to a Mobile Subscriber, The concept of packet data services - 2.5G GPRS networks: The 2.5 G General Packet Radio Services, GPRS Networks Architecture. Session Management and PDP Context, GPRS Location Management Procedures, GPRS Interfaces and Related Protocols, GPRS Applications, IS-136 (Digital-AMPS), Mobile Management, Voice signal processing, FDMA, TDMA, and CDMA.

Unit V: **10 lecture hours**

Improvement on Link performance:

Introduction to diversity, equalization and capacity, Space and scanning diversity, Maximal ratio combiner, Equal gain diversity, Rake Receiver, Capacity in AWGN, Capacity of flat fading channels, Equalizer and its mode, Adaptive equalizer block diagram, Types of Equalizers - elementary level only, Introduction to MIMO antennas.

Text Books

1. William, C. Y. Lee, “Mobile Cellular Telecommunications”, 2nd Edition, McGraw Hill, 1990.

2. Schiller, "Mobile Communications", Pearson Education Asia Ltd., Reprint 2012'
3. Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Edition, Pearson, 2002.
4. A. Goldsmith, Wireless Communications, Cambridge University Press, 2005.

Reference Books

1. Mischa Schwartz, "Mobile Wireless Communications", Cambridge University Press, UK, 2005.
2. William Stallings, "Wireless Communication Networks and Systems", 2nd Edition, PPH, 2005.
3. TRAI, "Information paper On Effects of Electromagnetic Field Radiation from Mobile Towers and Handsets", 30th July, 2014
4. Andreas.F.Molisch., "Wireless Communications", Wiley, 2nd Edition-2005, Reprint-2014.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	**Mid Term**	**Class Assessment**	**End Term**
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name:

Enrolment No:

Course: ECE11051 – Fundamentals of Wireless Communication

Program: B.Tech. (E.C.E.) | **Semester: ODD 2020-21**

Time: 03 hrs. | **Max. Marks: 50**

Instructions:

Attempt **Five Questions** compulsory from **Section A** (each carrying 1 mark); any **Three Questions** from **Section B** (each carrying 5 marks)**, any Two Questions** from **Section C** (each carrying 15 marks)**.**

SECTION A (Compulsory)

1 a)	**What** is the importance of EIRP?	**[U]**	**CO3**
b)	**Explain** the process of making a call to Cellular Mobile user.	**[R]**	**CO4**
c)	**Determine** the distance from the nearest co-channel cell for a cell having a radius of 0.64 km and a co-channel reuse factor of 12.	**[U]**	**CO2**
d)	**What** are the types of persistence method?	**[U]**	**CO5**
e)	**What** is the difference between soft and hard hand-off?	**[R]**	**CO2**

SECTION B (Answer any Three Questions)

2.	**a) What** are the various types of control channel for mobile communication? **b) What** is Half-rate and Full-rate traffic channels? **c)** Compute the total time duration allotted for one TDMA frame.	**[U+R]**	**CO5**
3.	**a)** A geographical area of a cellular system is 4200 km^2. A total of 1001 radio channels are available for handling traffic. Suppose the area of a cell is 12 km^2. **i) How** many times would the cluster of size 7 have to be replicated in order to cover the entire service area? Calculate the number of channels per cell and the system capacity. **ii)** If the cluster size is decreased from 7 to 4, then does it result into increase in system capacity? **b) What** are Umbrella cells? **c) Which** modulation technique is used in GSM?	**[Ap]**	**CO2 & CO4**
4.	**a) How** is data transfer handled in GPRS architecture? **b) How** is data routing done and in what respect is it different from voice routing?	**[Ap]**	**CO4**
5.	**Explain** the evolution from 2G to 3G cellular networks using neat block diagram. What do you mean by Doppler shift?	**[U]**	**CO1& CO2**
6.	**a) Show** the relationship between frequency reuse ratio q and cluster size K. (where, $K=i^2+j^2+i*j$). **b)** Prove that sectoring increases signal to co-channel interference ratio.	**[U]**	**CO2**

SECTION C (Answer any Two Questions)			
7.	**a) Derive** an expression for mobile point to point propagation model (two-ray model) to determine the received signal power. Explain the use of two-ray model to justify mobile radio path loss and antenna height effects. **b)** Mention the Uplink and Downlink frequencies allotted for GSM 900 frequency band. **c) Why** the uplink frequency for GSM is less than the downlink frequency?	**[Ap+U +R]**	**CO3 & CO4**
8.	**a) What** do you mean by fading? How does it effect on signal strength in GSM system? **b) Determine** the proper spatial sampling interval required to make small scale propagation measurements which assumes that consecutive sample are highly correlated with time. How many samples will be required over 20 m travel distance if f_c = 1800 MHz, v = 60 m/s. How long would it take to make these measurements? What is the Doppler spread B_D for the channel? **c) Derive** the expression relates the Doppler shift to the mobile velocity and the spatial angle between the direction of motion of the mobile and arrival of the wave. **d) What** are the factors affecting small scale fading? Discuss each factor.	**[U+Ap +R+R]**	**CO3 & CO4**
9.	**a) Describe** the PDP context activation procedure in GPRS system. **b)** Give one example of migration process from IPv4 to IPv6 and explain using suitable diagram. **c) What** is the wireless broadband Wi-max technology? How is it different from wireless LAN technology? **d) Describe** some applications of GPRS network.	**[Ap+ R]**	**CO3 & CO5**
10.	**a)** In the AMPS system, the system bandwidth is 12.5 MHz, the channel spacing is 30 KHz and the edge guard spacing is 10 KHz. The number of channels allocated for control signaling is 21. Find, **i)** the number of channels available for message transmission, **ii)** the spectral efficiency in FDMA. **b)** Differentiate between co-channel & adjacent channel interference. **What** are the methods available to reduce the co-channel interference in cellular communication? **Explain** each method. **c)** In cell splitting, prove that $\frac{P_{t1}}{P_{t2}}$ = 12 dB, for K=4. (K→ Path loss exponent, P_{t1} and P_{t2} be the transmitted power of the large base station and the medium cell base station.)	**[R]**	**CO1 & CO2**

ECE11052	Introduction to Internet of Things	L	T	P	C
Version 1.0	**Contact Hours – 45**	3	0	0	3
Pre-requisites/Exposure	1. Sensors, Devices & Actuators 2. Basic programming language				
Co-requisites	Computer Networks				

Course Objectives

1. To study fundamental concepts of IoT.
2. To study the basic networking
3. To learn different protocols used for IoT design.
4. To be familiar with data handling and analytics tools in IoT.
5. To recognise the factors that contributed to the emergence of IoT.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Understand** the various concepts, terminologies and architecture of IoT systems and use sensors and actuators for design of IoT.	Remember (L1)
CO2	**Understand and apply** various protocols for design of IoT systems.	Understand (L2)
CO3	**Understand** about the technology behind the IoT and associated technologies in practical domains of society.	Applying (L3)
CO4	**Apply** various techniques of data storage and analytics in IoT.	Analyzing (L4)
CO5	**Analyze** applications of IoT in real time scenario.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Internet of Things (IoT) is presently a hot technology worldwide. The explosive growth of the "Internet of Things" is changing our world and the rapid drop in price for typical IoT components is allowing people to innovate new designs and products at home. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defence sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

Course Content

Module 1: Fundamentals of IoT: 11 lecture hours

Introduction, Definitions & Characteristics of IoT, IoT Architectures, Physical & Logical Design of IoT, Enabling Technologies in IoT, History of IoT, About Things in IoT, The Identifiers in IoT, About the Internet in IoT, IoT frameworks, IoT and M2M.

Sensors Networks: Definition, Types of Sensors, Types of Actuators, Examples and Working, IoT Development Boards: Arduino IDE and Board Types, Raspberry Pi Development Kit, RFID Principles and components, Wireless Sensor Networks: History and Context, The node,
Connecting nodes, Networking Nodes, WSN and IoT.

Module 2: Internet/Web and Networking Basics: **11 lecture hours**
Overview and working principle of Wired Networking equipment's; Router, Switches, Overview and working principle of Wireless Networking equipment's; Access Points, Hubs etc. Linux Network configuration Concepts: Networking configurations in Linux Accessing Hardware & Device Files interactions.
OSI Model, Data transfer referred with OSI Model, IP Addressing, Point to Point Data transfer, Point to Multi Point Data transfer & Network Topologies, Sub-netting, Network Topologies referred with Web, Introduction to Web Servers, Introduction to Cloud Computing.

Module 3: IoT Protocols: **7 lecture hours**
Infrastructure (6LowPAN, IPv4/IPv6, RPL), Identification (EPC, uCode, IPv6, URIs), Communication/ Transport (Wi-Fi, Bluetooth, ZigBee, LPWAN), Data Protocols (MQTT, CoAP, AMQP, Websocket, Node).

Module 4: Data Handling & Analytics: **8 lecture hours**
Introduction, Bigdata, Types of data, Characteristics of Big data, Data handling Technologies, Flow of data, Data acquisition, Data Storage, Introduction to Hadoop. Introduction to data Analytics, Types of Data analytics, Local Analytics, Cloud analytics and applications.

Module 5: Case Study / Industrial Applications: **8 lecture hours**
Cisco IoT system - IBM Watson IoT platform – Manufacturing - Converged Plantwide Ethernet Model (CPwE) - Power Utility Industry - GridBlocks Reference Model - Smart and Connected Cities: Layered architecture – Smart Lighting - Smart Parking Architecture and Smart Traffic Control.

Text Books

6. Internet of Things - A Hands-on Approach, Ars deep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
7. Rajkumar Buyaa and Amir V Dastjerdi, Internet of things: Principles and Paradigms, Morgan Kaufmann
8. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books

1. Adrian McEwen and Hakim Cassimally, Designing the Internet of Things, Wiley
2. Olivier Hersent, David Boswarthick and Omar Elloumi, The Internet of Things: Key applications and Protocols, Wiley
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Fadi Al-Turjman, Intelligence in IoT- enabled Smart Cities, 2019, 1st edition, CRC Press, ISBN-10: 1138316849
5. Giacomo Veneri, and Antonio Capasso, Hands-on Industrial Internet of Things: Create a powerful industrial IoT infrastructure using Industry 4.0, 2018, Packt Publishing.
6. Subhas Chandra Mukhopadhyay, Smart Sensing Technology for Agriculture and Environmental Monitoring, 2012, Springer, ISBN-10: 3642276377

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CSE11203	Applications of AI and ML	L	T	P	C
Version 1.0	**Contact Hours – 45 Hours**				
Pre-requisite/Exposure	**Statistics and Probability**				
Co-requisite	**High School Mathematics**				

Course Objectives:

1. To help the student to acquire knowledge of basics of artificial intelligent computing.
2. To provide the fundamentals of learning algorithms used to solve real world problems.
3. To enhance the skill of students to analyse and interpret the results.
4. To allow students to acquire knowledge and problem-solving techniques to implement AI/ML projects.
5. To enable students to apply machine learning models to solve real-life problems.

Course Outcomes:

On the completion of this course the student will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Understand** the basics of Artificial Intelligence and its allied domains for industries.	Remember (L1)
CO2	**Analyze** the way to represent knowledge in form of various parameters to a machine.	Understand (L2)
CO3	**Explain** the learning models to make a machine learn.	Applying (L3)
CO4	**Construct** and gain knowledge to build artificial neural network for civil engineering applications	Analyzing (L4)
CO5	**Discuss** machine learning techniques to solve real world application for various sectors.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Course Description:

There is a growing need for talented machine learning/data scientist developers across every industry. As technology advances, the ability to build quality machine learning driven software while considering design, development, security, and maintenance is sought after amongst all kinds of companies, from finance and banking to healthcare and national security. Machine Learning applies the knowledge and theoretical understanding gained through computer science to building high-quality intelligent software products. As a maturing discipline, Artificial Intelligence is becoming more and more important in our everyday lives. Our software development and engineering professional program is University's response to the tremendous growth of the software development industry.

Course Content:

Unit-I	9 Lecture Hours
Introduction to Data Science: Introduction to data science, Various tools to implement AI in data science, types of data analytics, methods in data science: data exploration and visualization, regression: linear/multiple/logistic, support vector machine, data warehousing and data mining.	
Unit-II	**9 Lecture Hours**
Applications of AI/ML in NLP: Introduction: Overview NLP, Text Analytics, Speech and voice recognition, pre -processing techniques, bi gram analysis, sentiment analysis, case studies	
Unit-III	**9 Lecture Hours**
Application of Neural Network: Basic neural network architecture, Mc-culloch pits network, perceptron, multilayer perceptron, CNN, RNN	
Unit-IV	**9 Lecture Hours**
Applications of AI/ML in Workforce: Basics of forecasting, predicting workload, forecasting models: weighted moving average model, box-Jenkins, HR Analytics, Workforce management	
Unit-V	**9 Lecture Hours**
Case studies in various sectors: Case studies: civil engineering projects, electronics, healthcare, human resource, social media, mechanical engineering projects, business management.	
Text Books: 1. Artificial Intelligence: A Modern Approach, *Stuart J. Russell*, *Peter Norvig*, Pearson Education, Inc., India 2. The Elements of Statistical Learning: Data Mining, Inference and Prediction", *Trevor Hastie*, *Robert Tibshirani, Jerome Friedman*, Springer 3. Workforce Management: AI based forecasting for dummies, *Learning made easy*, Wiley **Reference Books:** 1. Pattern Recognition and Machine Learning, *Christopher M.Bishop*, Springer	

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	**20**	**30**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
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CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END SEMESTER EXAMINATION** (Academic Session: 2022 – 23)		
Name of the Program:	B.Tech in Civil Engg.	**Semester:**	VII
Paper Title:	Applications of AI and ML	**Paper Code:**	CSE11203
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:		**Total No of Pages:**	
(Any other information for the	**1.** At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam.		

student may be mentioned here)	**2.** All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. **3.** Assumptions made if any, should be stated clearly at the beginning of your answer.

Ques No.	Question	Knowledge Level	Course Outcome
Group A: Answer ALL the questions (5 x 1 = 5)			
1	**Define** analytics.	R	CO1
2	**Explain** learning.	U	CO2
3	**List** some applications of machine learning.	R	CO3
4	**Explain** unsupervised learning.	U	CO4
5	**Demonstrate** predictive modeling**.**	Ap	CO5
Group B: Answer ALL the questions (5 x 2 = 10)			
6	**a) i) What** is NLP? **ii) Explain** some applications of natural language processing.	R & U	CO1
	(OR)		
	b) i) Illustrate data science. **ii) Explain** briefly the tools used to implement Artificial Intelligence. [1+1]	R & U	
7	**a) Explain** some pre-processing techniques used in text analytics.	U	CO2
	(OR)		
	b) Compare classification and clustering analysis.	An	
8	**a) Explain** logistic regression.	U	CO3
	(OR)		
	b) Discuss function that is used for logistic regression**.**	U	
9	**a) Explain** neural network**.**	U	CO4
	(OR)		
	b) Examine how decision tree can be implemented as classification and prediction.	An	

10	**a) Interpret** the metrices for regression equation.	**An**	**CO5**
	(OR)		
	b) Demonstrate conditional probability**.**	**Ap**	
Group C : Answer ALL the questions (7 x 5 =35)			
11	**a) i) Discuss** satisfying constraints. **ii) Explain** characteristics of first-order logic**.** [3+2]	**R & U**	**CO1**
	(OR)		
	b) i) Why sensor is required in AI agents. **ii) Explain** utility of sensors for agents in AI. [2+3]	**An & U**	
12	**a) Explain** probabilistic reasoning.	**U**	**CO2**
	(OR)		
	b) Identify the algorithms that solve the problem for supervised problems.	**R**	
13	**a) Explain** decision trees.	**U**	**CO3**
	(OR)		
	b) Explain conditional probability and naïve bayes algorithm.	**U**	
14	**a) Explain** Artificial Neural Network**.**	**U**	**CO4**
	(OR)		
	b) Explain recurrent neural network architecture in detail.	**U**	
15	**a) Examine** neurons and activation function.	**An**	**CO4**
	(OR)		
	b) Examine CNN.	**An**	
16	**a) Demonstrate** traffic prediction as a case study for machine learning.	**Ap**	**CO5**
	(OR)		

	b) Demonstrate any real-world application that uses CNN as a working algorithm.	**Ap**	
17	**a) Demonstrate** neural network architecture and map it's working with neuron architecture of human brain.	**Ap**	**CO5**
	(OR)		
	b) Demonstrate any application from healthcare based on machine learning.	**Ap**	

ECE11053	**Application of Drone Technology**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Aerodynamics, Python programming language				
Co-requisites	--				

Course Objectives

1) Acquiring basic skills in exploring the potential of the drone technology in professional activities.
2) Establish and understand parameters for flying.
3) Equip drones with accessories.
4) Use smartphones and tablets to pilot a drone.

Course Outcomes

After the successful completion of this course, the student will be able to:

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	Understand drone concepts, terminology and vocabulary	Remember (L1)
CO2	Describe the development of unmanned aircraft systems (UAS)	Understand (L2)
CO3	Describe the steps for drone design	Applying (L3)
CO4	Understand the technical characteristics of the parts	Analyzing (L4)
CO5	Describe the algorithm for drone programming and understand the technology to transmit and receive data	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Application of Drone Technology is the important subject in engineering, which providers that teachnical issues related to unmanned aerial systems and their development. Moreover, this curricula is designed to help students to take advantage of the huge opportunities created by Industry 4.0, through the adaptation of drone technology, in order to start a new business or to expand already existing companies. The course is meant to help students understand and get acquainted with the droning technology currently used and at the same time acquire and develop high-quality skills and competences, including entrepreneurial and digital competencies.

Course Content

Unit I: **9 lecture hours**

Introduction to Drone Technology:

Drone Concept ,Vocabulary Terminology, History of drone, Types of current generation of drones based on their method of propulsion.

Unit II: **9 lecture hours**

Drone design and fabrication:

Classifications of the UAV Overview of the main drone parts Technical characteristics of the parts Function of the component parts Assembling a drone The energy sources Level of autonomy.

Unit III: **8 lecture hours**

Drone programming:

Drones configurations The methods of programming drone Download program Install program on computer Running Programs Multirotor stabilization Flight modes Wi-Fi connection.

Unit IV: **9 lecture hours**

Drone flying and operation:

Concept of operation for drone Flight modes Operate a small drone in a controlled environment. Drone controls Flight operations management tool**.**

Unit V: **10 lecture hours**

Safety and Regulations and Drone commercial applications:

The safety risks Guidelines to fly safely Specific aviation regulation in the European Union European system of standardization How to acquire the license required form for drone operation ,Drone license, Drones in delivering mail, parcels and other cargo Drones in agriculture Drones in inspection of transmission lines and power distribution, Drone during supervision of building construction.

Text Books

1. Guide to Drone Training, Russ Flahive, Todd Kishpaugh, Paperback – March 27, 2018

2. Internet of Things:Robotic and Drone Technology, Edited By Nitin Goyal,Sharad Sharma,Arun Kumar Rana,Suman Lata Tripathi,Copyright Year 2022 by CRC Press.

Reference Books

1. Build a Drone, A Step-by-Step Guide For Beginners: Aircraft Design & Construction Design Guide, Merlin Debrie.

2. Build a Drone: A Step-by-Step Guide to Designing, Constructing, and Flying Your Very Own Drone Paperback – November 22, 2016,by Barry Davies

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	MTE I	MTE II	Presentation/Assignment/ etc	ETE
Weightage (%)	10	30	20	40

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

ECE11054	**Application of Internet of Things**	L	T	P	C
Version 1.0	**Contact Hours – 45**	3	0	0	3
Pre-requisites/Exposure	1. Computer Networks 2. Sensors, Devices & Actuators 3. Basic programming knowledge				
Co-requisites					

Course Objectives

1. To understand the Architectural Overview of IoT.
2. To understand the IoT Reference Architecture and Real-World Design Constraints.
3. To understand the various IoT Protocols (Datalink, Network, Transport, Session, Service).
4. Build IoT based applications and understand how data flows between things.
5. To understand how connected devices work together to update other applications and the security aspect of IoT devices.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	**Details/Statement**	**Knowledge Level**
CO1	**Infer** IoT architecture and building blocks for various domains.	Remember (L1)

CO2	**Understand** about the technology behind the IoT and associated technologies in practical domains of society.	Understand (L2)
CO3	**Illustrate** knowledge about the state-of-the-art methodologies in IoT application domains.	Applying (L3)
CO4	**Analyze** multidisciplinary case to case modelling and execute wide range of application.	Analyzing (L4)
CO5	**Analyze** the need for smart systems in a distributed environment.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Internet of Things (IoT) is presently a hot technology worldwide. Government, academia, and industry are involved in different aspects of research, implementation, and business with IoT. IoT cuts across different application domain verticals ranging from civilian to defence sectors. These domains include agriculture, space, healthcare, manufacturing, construction, water, and mining, which are presently transitioning their legacy infrastructure to support IoT. Today it is possible to envision pervasive connectivity, storage, and computation, which, in turn, gives rise to building different IoT solutions. IoT-based applications such as innovative shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems, are gradually relying on IoT based systems. Therefore, it is very important to learn the fundamentals of this emerging technology.

Course Content

Module 1: Introduction: 10 lecture hours

Sensing & Actuation Sensor Networks; Design principles of connected devices; IoT Architecture: Reference Models; Physical design of IoT; Logical design of IoT; IoT enabling technologies; IEEE 802.15.4; Zigbee; 6LoWPAN; RPL; IoT and M2M Machine-to-Machine communication; Business processes in IoT, Everything as a Service(XaaS), M2M and IoT Analytics; Interoperability in IoT; SDN for IoT; IoT physical servers and cloud offerings; Cloud storage models and Fog Computing in IoT environment.

Module 2: IoT Application Development: 11 lecture hours

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization, Application Protocols: MQTT, REST/HTTP, CoAP, MySQL.

Back-end Application Designing: Apache for handling HTTP Requests, PHP & MySQL for data processing, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development, Application Development for mobile Platforms: Overview of Android / IOS App Development tools.

Module 3: Building IoT applications and Web of Things: 8 lecture hours

Introduction to Arduino IDE – writing code in sketch, compiling-debugging, uploading the file to Arduino board, role of serial monitor.

Web of Things - Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence.

Module 4: Domain specific applications of IoT: 8 lecture hours
Applications in agriculture: Smart Farming: Weather monitoring, Precision farming, Smart Greenhouse, Drones for pesticides.
Healthcare applications: Architecture of IoT for Healthcare, Multiple views coalescence, SBC-ADL to construct the system architecture. Use Cases: Wearable devices for Remote monitoring of Physiological parameter, ECG, EEG, Diabetes and Blood Pressure.

Module 5: Case Study & advanced IoT Applications: 8 lecture hours
Industrial Internet Application: IoT Fundamentals and Components, Industrial Manufacturing, Monitoring, Control, Optimization and Autonomy, Introduction to Hadoop and big data analytics.
Applications in IoT enabled Smart Cities: Energy Consumption Monitoring, Smart Energy Meters, Home automation, Smart Grid and Solar Energy Harvesting, Intelligent Parking, Data lake services scenarios.

Text Books

1. Internet of Things - A Hands-on Approach, Ars deep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Rajkumar Buyaa and Amir V Dastjerdi, Internet of things: Principles and Paradigms, Morgan Kaufmann
3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.

Reference Books

1. Adrian McEwen and Hakim Cassimally, Designing the Internet of Things, Wiley
2. Olivier Hersent, David Boswarthick and Omar Elloumi, The Internet of Things: Key applications and Protocols, Wiley
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Fadi Al-Turjman, Intelligence in IoT- enabled Smart Cities, 2019, 1st edition, CRC Press, ISBN-10: 1138316849
5. Giacomo Veneri, and Antonio Capasso, Hands-on Industrial Internet of Things: Create a powerful industrial IoT infrastructure using Industry 4.0, 2018, Packt Publishing.
6. Subhas Chandra Mukhopadhyay, Smart Sensing Technology for Agriculture and Environmental Monitoring, 2012, Springer, ISBN-10: 3642276377

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE12083	**Detailing of Steel Structure**	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Engineering Drawing and CAD				
Co-requisites	--				

Course Objectives:

1. To administer business and management skills in various positions within the construction industry.
2. To practice informed decision-making in personal and professional endeavours.
3. To apply scientific planning methods to optimize time and cost in construction related problems.
4. To plan resource requirements including men, machine and materials based on resources allocation and budget and budgetary control methods.
5. To understand the labour laws and regulations, safety requirements and its financial aspects in construction industry.

Course Outcomes:

On completion of this course, the students will be able to:

Course Outcomes	Details/Statement	Knowledge Level
CO1	Show the footing and foundation of R.C. columns	Remember (L1)
CO2	Illustrate the detailing of R.C. slab, stair and roof truss.	Understand (L2)
CO3	Develop the plan, elevation and sectional view of buildings.	Applying (L3)
CO4	Summarize the AutoCad and practice of 2D commands.	Analyzing (L4)
CO5	Develop building plan using CAD.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

A civil drawing, or site drawing, is a type of technical drawing that shows information about grading, landscaping, or other site details. These drawings are intended to give a clear picture of all things in a construction site to a civil engineer.

Civil drafters prepare drawings and topographical and relief maps used in major construction or civil engineering projects, such as highways, bridges, pipelines, flood control projects, and water and sewage systems.

All the lectures will be devoted on discussions of basic theories and advanced topics, focusing on practical implementation of knowledge. Classes will be conducted by lecture as well as power point presentation, audio visual virtual lab session as per requirement. The tutorials will familiarize the students with practical problem-solving techniques led by the course coordinator. Students will strongly grab the basic concepts of the subject via exercise and discussions with the coordinator.

Course Content:

Experiment No	Experiment	Knowledge Level
1	Problems on general consideration and basic concepts, Problems on general consideration and basic concepts.	**Apply**
2	Discussion on different loads (i.e. wind load, Dead load, live load and others) as per IS-875.	**U**
3	Design & drawing of the following components of a roof truss like- a) Members of the roof truss b) Joints of the roof truss members c) Purlins d) Gable bracings e) Column with bracings f) Column base plate, g) Column foundation	**Apply**

Reference Books

1) "Limit State Design of Steel Structures", S K Duggal, McGraw Hill Publication
2) Design of Steel Structures, N. Subramanian, Oxford University Press.
3) IS: 875 (Part-I, II, III)
4) IS: 800-2007,

5) SP: 6 (BIS)
6) AutoCAD- AUTODESK

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Components	Class Assessment	ETE
Weightage (%)	**50**	**50**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE12084	Ground Improvement Techniques Lab	L	T	P	C
Version1.0		0	0	2	1
Pre-requisites/Exposure	Ground Improvement Techniques				
Co-requisites					

Course Objectives

1. To impart knowledge on field tests involved in soil exploration and investigation to understand the characteristics of soil at site.
2. To explain about causes of landslides in different soil conditions.
3. To know about the use of instrumentation in the slope stability for executing suitable ground improvement techniques in the field.
4. To understand various methods of ground improvement techniques and its applications at site based on requirements.
5. To make the students familiar about the applications of different field compaction methods.
6. To gather knowledge about various ground improvement methodologies for cohesive and cohesion less soil sites.
7. To apply soil stabilization methods with the help of admixtures.

Course Outcomes

On completion of this course, the students will be able to –

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the important field tests involved in soil exploration and investigation for determining bearing capacity of soil at site.	Remember (L1)
CO2	Analyze stability of slopes and understand the use of instrumentation in the slope stability for executing suitable ground improvement techniques in the field.	Understand (L2)
CO3	Estimate the applicability of Compaction methods and Hydraulic modification techniques for ground improvement.	Applying (L3)
CO4	Demonstrate suitable methods of Grouting, Soil reinforcements and application of Geo-synthetics for improving soil properties as required.	Analyzing (L4)
CO5	Identify the process of soil stabilization by selecting suitable admixtures.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Suitable soil stabilization and ground improvement techniques need to be adopted at sites where stability of slopes are difficult to be maintained or where the soil is prone to sliding. In some cases where sufficient bearing capacity is not available in soil at field to carry loads from structures like buildings, bridges, highways, tunnels and dams, the soil needs to be improved by using different ground improvement methods. Specific types of soil stabilization techniques are also required in the case of expansive soils, collapsible soil and in the case of earthquake prone areas. This course addresses the requirement of ground improvement at field and its practical applications at site. The students will get idea about important tests required to analyze the bearing capacity of soil at site and based on that they can plan for the required ground improvement techniques. Such techniques include compaction methods at site, drainage & dewatering techniques, soil reinforcement by providing soil nailing and anchors, grouting process, blasting, prefabricated drains, compaction piles, granular columns etc. The practical aspects of construction procedure and functions for applying such methods will be emphasized in this course.

Course Content

List of experiments

Sl. No.	Name of the experiment
1	Determination of bearing capacity of soil by Standard penetration test and Cone penetration test.
2	Determination of bearing capacity of soil by Plate load test.
3	Identification of causes for landslides for slopes in different soil conditions; Slope stability analysis by method of slices and friction circle method.
4	Field instrumentation for slope stabilization – observation studies during construction, post construction, piezometers, settlement plates, and inclinometer.
5	Demonstration of Mechanical stabilization of soil by Compaction methods.
6	Demonstration of Hydraulic modification techniques for ground improvement.
7	Application of Grouting for ground improvement.
8	Demonstration of ground improvement by using Soil reinforcements and application of Geo-synthetics.
9	Determinations of effectiveness of soil stabilization methods using different admixtures – lime, cement, fly ash, bitumen and emulsions.

Reference Books

1. Dr. Punmia. B. C., Jain. A. K., Jain. A. K., Soil Mechanics and Foundation Engineering, 16th Edition, Laxmi Publications Pvt. Ltd.
2. Ground improvement techniques by P. Purushottam Raj, Laxmi Publications, 1999.
3. Manfred R. Hausmann, Engineering Principles of Ground Modification, McGraw-Hill Pub, Co., 1990.
4. M C. R. Davies, F. Schlosser, Ground improvement geosystems.
5. Koerner, R. M., Designing with geosynthetics, Prentice Hall Inc. 1998.
6. Dr. B. C. Chattopadhyay and J. Maity, Ground Control and Improvement Techniques, PEEDOT, Howrah, 2011.
7. G. V. Rao and G. V. S. Rao, Text Book On Engineering with Geotextiles, Tata McGraw Hill.
8. T. S. Ingold and K. S. Miller, Geotextile Hand Book, Thomas Telfrod, London.

Modes of Evaluation: Quiz/ Assignment/ extempore/ Project/ Presentation/ Written Exam Examination Scheme:

Components	Mid Term	Class Assessment	End Term
Weightage (%)	20	30	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Model Question Paper

Name:

EnrolmentNo:

ADAMAS UNIVERSITY
PURSUE EXCELLENCE

Course: Ground Improvement Techniques Lab (CEE12084)

Program: B.Tech. (CE) Time: 03 Hrs.
Semester: VII **Max. Marks: 40**

Follow the instruction given by Lab Instructor during the exam

1	Determine the bearing capacity of soil by Standard penetration test and Cone penetration test. (20 +20)	**Evaluate**
2	Determine the bearing capacity of soil by Plate load test.	**Evaluate**

3	Identify the causes of landslides for slopes in different soil conditions and analyze the stability of slopes by method of slices and friction circle method assuming necessary data with suitable consideration.	**Apply & Analyze**
4	Explain about the field instrumentation used for slope stabilization emphasizing the use of piezometers, settlement plates and inclinometer.	**Understand**
5	Demonstrate various Compaction methods used for Mechanical stabilization of soil.	**Understand**
6	Demonstrate different Hydraulic modification techniques adopted for ground improvement.	**Understand**
7	Outline important applications of various Grouting techniques used for ground improvement.	**Understand**
8	Demonstrate ground improvement methods by using different Soil reinforcements and Geosynthetics.	**Understand**
9	Determine the effectiveness of soil stabilization methods using different admixtures – lime, cement, fly ash, bitumen and emulsions.	**Evaluate**

CEE12085	Prof. Elective IV: Air and Noise Pollution Lab	L	T	P	C
Version 1.0		0	0	2	1
Pre-requisites/Exposure	Prof. Core Lab – VIII: Environmental Engineering Lab				
Co-requisites	Prof. Elective – V: Air and Noise Pollution				

Course Objectives

1. To expose the students to the methods for monitoring of ambient air quality, ambient noise and demonstration of stack monitoring.
2. To provide knowledge of macro and micro meteorology for understanding the dispersion of pollutants.
3. To give idea of pollution control methods, mechanism and devices.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Understand the instruments required for monitoring air pollution.	Remember (L1)
CO2	Illustrate ambient air quality survey including the use of high volume air sampler, Respirable Dust Sampler, wind monitoring and noise monitoring.	Understand (L2)
CO3	Demonstrate stack sampling, auto exhaust monitoring, use of rain gauges and Light intensity measurements.	Applying (L3)
CO4	Conduct survey in various noise sources situation for monitoring the noise at different localities.	Analyzing (L4)
CO5	Evaluate Noise rate in a multiple noise sources situation	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course introduces student to the knowledge and skills that are required to successfully undertake air and noise pollution investigations that may be required as part of their professional engineering practice. Students learn about the key role that engineering plays in understanding the sources and impacts of air and noise pollution, and implementing methods of control. The subject objectives are met by enabling students to master underpinning theory, develop problem- solving and communication skills, undertake research work independently and in a team, and complete laboratory investigations. The subject is delivered in two modules with the first component focusing on air pollution and the second on noise pollution.

Course Content

Course Content

Experiment No.1: Demonstration of air pollution monitoring instruments.

Experiment No.2: Determination of SPM; PM10; SO2; ammonia and NOx in ambient air.
Experiment No.3: Respirable dust monitoring by RDS and FPM.

Experiment No.4: Demonstration of stack monitoring kits.

Experiment No.5: Demonstration of Indoor air quality CO, VOC and aerosol monitors. Experiment No.6: Determination of atmospheric stability class using portable anemometers. Experiment No.7: Development of wind rose diagram.

Experiment No.8: Demonstration of noise pollution monitoring equipment; namely modular precision sound level meter, noise dose meter, human vibration monitoring instrument, audiometer, etc.

Experiment No.9: Noise survey in a multiple noise sources situation in order to develop noise contour diagram for the entire locality.

Experiment No.10: Noise monitoring at residential localities.

Experiment No.11: Traffic noise situation monitoring; human vibration monitoring (whole body as well as hand-arm vibration).

Reference Books

6. Henry C. Perkins,"Air Pollution & Control", Mc Graw Hill Pvt. Ltd., New Delhi, 1974. Stern A. C.,
7. C. Stem, "Air Pollution" (Vol-I), "Air Pollution & it effects" (Vol-II), "Analysis, Monituring& Surveying" (Vol-III), "Sources of Air Pollution & their Control" Academic Press, New York, 1968.
8. Environmental Noise Pollution - PE Cunniff, McGraw Hill, New York, 1987.
9. APG Peterson and EE Gross, Handbook of Noise Measurement, General Radio Co., West Concord, Mass, 1967.
10. H Brauer and YBG Verma, Air Pollution Control Equipment, Berlin Heidelberg, New York, latest edition, 1981.
11. Liptak, B G, Instrument Engineers Hand Book (Vol. I & II), Chilton Book Company, Philadelphia,4th ed., 2005.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Attendance and Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Model Question Paper

Name:

Enrolment No:

ADAMAS UNIVERSITY PURSUE EXCELLENCE

Course: Air & Noise Pollution Lab (CEE12085)
Program: B. Tech. (CE) **Time: 03 Hrs.**
Semester: VII **Max. Marks: 50**

Follow the instruction given by Lab Instructor during the exam

1	**Determine** SPM and NO_x in ambient air	**U**
2	**Determine** PM10 in ambient air.	**U**
3	**Determine** SO2 and ammonia in ambient air.	**U**
4	**Estimate** the respirable dust monitoring by RDS and FPM.	**APP**
5	**Demonstrate** Indoor air quality CO, VOC and aerosol monitors.	**An**
6	**Determine** atmospheric stability class using portable anemometers.	**An**
7	**Develop** of wind rose diagram.	**U**

8	**Demonstrate** noise pollution monitoring equipment; namely modular precision sound level meter, noise dose meter, human vibration monitoring instrument, audiometer, etc.	**U**

CEE12086	**Structural Monitoring & Assessment Lab**	L	T	P	C
Version 1.0		0	0	2	1
Requisites	Construction Engineering Materials Lab, Maintenance & Rehabilitation of Structures				
Co-requisites	----------------------------				

Course Objectives

1. To impart knowledge of causes of distress and its assessment.

2. To enhance the knowledge of different repair materials and techniques.

3. To explain the different demolition, rehabilitation techniques, maintenance and protection of structures.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	**Know** the strategies of maintenance and repair.	Remember (L1)
CO2	**Infer** idea of repair techniques.	Understand (L2)
CO3	**Understand** the properties of repair materials.	Applying (L3)
CO4	**Demonstrate** the rehabilitation strategies and techniques.	Analyzing (L4)
CO5	Evaluate the beam shear capacity	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

This course will help students learn how to identify various deterioration mechanisms or damage mechanisms in concrete structures (say, deterioration of metallic reinforcement and cementitious materials). The course will discuss both the scientific aspects and its use while practicing repair works at site. Use of various non-destructive, partially-destructive tools to assess the condition of the structure will be discussed. Also, tips on selecting measurable parameters that are useful in deciding the further repair and maintenance practices will be provided. Following this, practices for typical near-surface repair, corrosion protection, structural strengthening, structural stabilization, etc. will be discussed in detail.

At the end of the course students will be able to suggest evaluation and repair/retrofitting methods for extending the service life of concrete structures. Importance for preventive maintenance practices (instead of corrective maintenance practices) will be discussed throughout the coursework.

Course Content:

Week 1 : Introduction, significance of corrosion, and corrosion mechanisms

Week 2 : Embedded metal corrosion

Week 3 : Deterioration of cementitious systems – Sulphate and Acid attack

Week 4 : Deterioration of cementitious systems – Alkali Silica Reaction (ASR), Shrinkage, and others

Week 5 : Concrete assessment using non-destructive tests (NDT)

Week 6 : Concrete assessment and load effects

Week 7 : Surface repair – Condition assessment

Week 8 : Surface repair – Analysis, strategy, and design

Week 9 : Surface repair – Material requirement, surface preparation, placement of repair material

Week 10 : Strengthening and stabilization – Introduction and beam shear capacity strengthening

Week 11 : Strengthening and stabilization – Column strengthening

Week 12 : Strengthening and stabilization – Flexural strengthening

Reference Books:

1. Handbook on Repairs and Rehabilitation of RCC buildings; CPWD, Government of India.

2. Concrete technology, A.R.Shanthakumar; Oxford University Press, India

3. Concrete Technology, M.L.Gambhir; Tata McGraw-Hill Education

4. Appraisal and Repair of Reinforced concrete R.Holland; Thomas Telford Ltd

5. Repair and Strengthening of Concrete structures FIP guide; Thomas Telford, London

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Scheme:

Component	Continuous Class Assessment	End Term
Weightage (%)	50	50

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

CEE14053	Summer Internship	L	T	P	C
Version 1.0		-	-	-	2
Pre-requisites/Exposure	All Civil Engineering Subjects				
Co-requisites					

Course Objectives

1. To apply the theory of Civil Engineering in relevance to practical solutions.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the basics of internship programme	Remember (L1)
CO2	Understand the professional requirements for access to and success in the field.	Understand (L2)
CO3	Apply techniques using different methods of applying skills and knowledge acquired in the classroom.	Applying (L3)
CO4	Infer the work ethic and skills required for success in the field.	Analyzing (L4)
CO5	Apply knowledge acquired in the academic classroom within the professional setting.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Summer internship allows the student an opportunity to bridge theory and practice. It is a learning experience that permits students to apply knowledge acquired in the academic classroom within the professional setting. Such experiential learning supplements academic theory, helps the student to identify personal strengths and guides her/him into specialized fields within the profession (Engineering, site works, marketing, media relations, financial management, etc.). Perhaps equally as important is the chance for the student to begin to establish the professional network so essential for access to, and movement within, the profession. The student may personally research internship opportunities and interview for any opportunity that furthers the student's professional aspirations in the field.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Attendance	Presentation	Report of Training	Viva
Weightage (%)	10	40	40	10

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE14054	Minor Project	L	T	P	C
Version 1.0		0	0	6	3
Pre-requisites/Exposure	All Civil Engineering Subjects				
Co-requisites					

Course Objectives

1. To address the real world problems and find the required solution.
2. To fabricate and implement the mini project intended solution for project based learning
3. To improve the team building, communication and management skills of the students

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Identify the requirements for the real world problems.	Remember (L1)
CO2	Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.	Understand (L2)
CO3	Illustrate software/ hardware skills.	Applying (L3)
CO4	Show the findings of the study conducted in the preferred domain.	Analyzing (L4)
CO5	Evaluate the idea of what civil engineering is all about	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The role of Minor Projects in life of Engineering or technical students are very crucial. Minor Project helps you to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. Everything around you is being made by our greatest civil engineers to date. And if you are one among those who are keen to design or construct your own masterpiece right here on this planet, let’s first give you an idea of what civil engineering is all about. In this article we, will be covering what is civil engineering and mini-projects that can be done by civil engineers during their academics.

It acts like a beginners guide to do larger projects later in their career. It not just affects the grades of Engineering but also matter a lot for good CV/Resume. So before choosing the minor and major project, you should explore the options and pick the correct domain where the opportunities are immense.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Attendance	Presentation	Report of Training	Viva
Weightage (%)	10	40	40	10

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	-	3	-	-	2	-	-	-	-	-	-	-	-	1
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

SEMESTER VIII

CEE14056	Industry Work Experience	L	T	P	C
Version 1.0		-	-	-	5
Pre-requisites/Exposure	All Civil Engineering Subjects, Summer Internship (ECE44301)				
Co-requisites					

Course Objectives

1. To assess interests and abilities in their field of study.
2. To address the real world problems and find the required solution.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Discuss career alternatives prior to graduation and integrate theory and practice.	Remember (L1)
CO2	Develop work habits and attitudes necessary for job success.	Understand (L2)
CO3	Develop communication, interpersonal and other critical skills in the job interview process.	Applying (L3)
CO4	Identify employment contacts leading directly to a full-time job following graduation from college.	Analyzing (L4)
CO5	Evaluate the experience of the industrial work culture and fashion practically.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

Industrial Work Experience (IWE) also known as an Engineering Industrial Training course is the requirement for all engineering students in order to complete their Bachelor of Engineering degree. Exposing the students to the practical experience and actual working environment shall open the avenues for developing their skills and capabilities, as well as enhancing their intellectual and emotional persona. The IWE also can provide strong linkages between university-industries that shall pave opportunities for "smart partnerships" and industrially driven research. Therefore, during this period, students are deputed to join the field works and getting experience of the industrial work culture and fashion practically.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Attendance	Presentation	Report of Training	Viva
Weightage (%)	**10**	**40**	**40**	**10**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE14057	Scientific Investigation & Research Experience	L	T	P	C
Version 1.0		-	-	-	5
Pre-requisites/Exposure	All Science and Civil Engineering Subjects				
Co-requisites					

Course Objectives

1. To encourage the students to involve in scientific investigation and research.
2. To make familiar with the culture of research and follow its methodologies.
3. To prepare the learner for the higher studies and understand their point of interest.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the process of Scientific Investigation	Remember (L1)
CO2	Discuss the natural scientific, mathematical, and/or computational methodologies function as mechanisms for inquiry.	Understand (L2)
CO3	Apply appropriate concepts, tools, and techniques of scientific inquiry.	Applying (L3)
CO4	Explain the interaction between the content of their selective course and other scientific disciplines or the broader society.	Analyzing (L4)
CO5	Evaluate the importance laboratory practical or analytical job	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

On completion of this course, the students will be able to pursue the higher studies and research based work, which will be helpful to them to get the fellowship. Most of this part will be of laboratory practical or analytical job and during this course student maybe get training of some essential software, which improve the students profile for the future

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Examination Scheme:

Components	Attendance	Presentation	Report of Training	Viva
Weightage (%)	**10**	**40**	**40**	**10**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO6	3	3	-	-	-	-	-	-	-	-	-	-	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1

CEE14058	Major Project	L	T	P	C
Version 1.0		0	0	12	5
Pre-requisites/Exposure	All Civil Engineering Subjects				
Co-requisites					

Course Objectives

1. To address the real world problems and find the required solution.
2. To fabricate and implement the mini project intended solution for project based learning
3. To improve the team building, communication and management skills of the students

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Identify the requirements for the real world problems.	Remember (L1)
CO2	Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.	Understand (L2)
CO3	Discuss the study conducted in the preferred domain.	Applying (L3)
CO4	Analyze The role of Major Projects in life of Engineering	Analyzing (L4)
CO5	Evaluate the understanding of fundamentals through practical application of theoretical concepts.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The role of Major Projects in life of Engineering or technical students are very crucial. It helps you to explore and strengthen the understanding of fundamentals through practical application of theoretical concepts. Everything around you is being made by our greatest civil engineers to date. And if you are one among those who are keen to design or construct your own masterpiece right here on this planet, let’s first give you an idea of what civil engineering is all about. In this article we, will be covering what is civil engineering and mini-projects that can be done by civil engineers during their academics.

It acts like a beginners guide to do larger projects later in their career. It not just affects the grades of Engineering but also matter a lot for good CV/Resume. So before choosing the minor and major project, you should explore the options and pick the correct domain where the opportunities are immense.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Attendance	Presentation	Report of Training	Viva
Weightage (%)	**10**	**40**	**40**	**10**

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12		
CO1	-	3	3	-	2	-	-	-	-	-	-	2		
CO2	3	3	-	-	-	-	-	-	-	-	-	-		
CO3	-	3	-	-	2	-	-	-	-	-	-	-		
CO4	3	-	3	-	-	-	-	-	-	-	-	-		
CO5	3	-	3	-	-	-	-	-	-	-	-	2		
CO6	3	-	3	-	-	-	-	-	-	-	-	2		
Average	3	3	3	1	2	-	-	-	-	-	-	2		

CEE15059	Comprehensive Viva Voce	L	T	P	C
Version 1.0		-	-	-	2
Pre-requisites/Exposure	All Civil Engineering Subjects				
Co-requisites					

Course Objectives

1. To check the overall knowledge of students during whole program and make them recall the knowledge in the related field of engineering and management obtained over the entire program.

2. To develop students' attitude and prepare for attending the technical interview and make it crack.

Course Outcomes

On completion of this course, the students will be able to

Course Outcomes	Details/Statement	Knowledge Level
CO1	Remember the all the subjects of the entire syllabus	Remember (L1)
CO2	Understand the importance of each subject for future applications	Understand (L2)
CO3	Develop the virtual technical interview and understand about the necessary procedures need to be followed in future.	Applying (L3)
CO4	Analyze various application based activities in site or office and solve the real world problem.	Analyzing (L4)
CO5	Evaluate and analyze their overall technical knowledge and industry readiness.	Evaluating (L5)
CO6	Analyze complex civil engineering problems, identify key issues, and develop effective solutions.	Creating (L6)

Catalog Description

The Comprehensive viva voce is arranged for brush up all subjects, which are already studied by the student. This recall procedure helps students to get success in interview and make them confident. Examination will be conducted by a committee formed by institution. The examination committee constituted by HOD and other faculties. This course will test the students learning and understanding throughout this course.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Mid Term	Attendance	Class Assessment	End Term
Weightage (%)	-	-	-	100

Co-Relationship Matrix

Indicate the relationships by1- Slight (Low) 2- Moderate (Medium) 3-Substantial (High)

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	3	3	1	2	-	-	-	-	-	-	2	3	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	1
CO3	-	3	-	-	2	-	-	-	-	-	-	-	3	-
CO4	3	-	3	-	-	-	-	-	-	-	-	-	-	1
CO5	3	-	3	-	-	-	-	-	-	-	-	2	-	1
CO6	3	-	3	-	-	-	-	-	-	-	-	2	-	1
Average	3	3	3	1	2	-	-	-	-	-	-	2	3	1