ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING ANDTECHNOLOGY

DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

UNDER GRADUATE PROGRAM

Course Structure and Syllabus
Of

(NEP) BCA

W.e.f. AY 2023-24

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
UG Program: BCA

COURSE STRUCTURE

FIRST YEAR

SEMESTER I								
S.No.	Course Code	Course Title	Type	L	T	P	H	C
1	MTH151	Mathematics-I	Core	3	1	0	4	4
2	CSE101	Introduction to Programming	Core	3	0	0	3	3
3	CSE102	Open-Source Software	Minor	3	0	0	3	3
4	ENG103	Academic and Professional Writing: An Introduction	MDC	3	0	0	3	3
5	AEC101	Communicative English-I	AEC	2	1	0	3	3
6	VAC101	Environmental Education-I	VAC	2	0	0	2	2
7	CSE103	Introduction to Programming Lab	Core	0	0	2	2	1
8	CSE104	Open-Source Software Lab	Minor	0	0	2	2	1
		Total		**16**	**2**	**4**	**22**	**20**

SEMESTER II								
S.No.	Course Code	Course Title	Type	L	T	P	H	C
1	MTH152	Mathematics-II	Core	3	1	0	4	4
2	CSE105	Programming and Logic Design	Core	3	0	0	3	3
3	CSE106	Full Stack Development	Minor	3	0	0	3	3
4	ENG109	Editing and Publishing: An Introduction	MDC	2	0	1	3	3
5	AEC102	Communicative English-II	AEC	2	1	0	3	3
6	VAC105	Community Engagement and Social Responsibility	VAC	1	0	1	2	2
7	SEC151	Basics of Data Analytics	SEC	0	0	2	2	2
8	CSE107	Programming and Logic Design Lab	Core	0	0	2	2	1
9	CSE108	Full Stack Development Lab	Minor	0	0	2	2	1
		Total		**18**	**2**	**4**	**24**	**22**

1st Year Credits = 42

SECOND YEAR

		SEMESTER III						
S.No.	**Course Code**	**Course Title**	**Type**	**L**	**T**	**P**	**H**	**C**
1	CSE201	Data Structures and Algorithms	Core	3	0	0	3	3
2	CSE202	Digital Electronics	Core	3	0	0	3	3
3	CSE203	Business Intelligence	Minor	3	0	0	3	3
4	MGT211	Creativity and Innovation	MDC	3	0	0	3	3
5	LWJ11024	Cyber Law(IT)	MDC	3	0	0	3	
6	AEC106	Professional Communication Skills	AEC	2	0	0	2	2
7	VAC102	Human Values and Ethics	VAC	2	0	0	2	2
8	SEC168	Website Development	SEC	2	0	0	2	2
9	CSE204	Data Structures and Algorithms Lab	Core	0	0	2	2	1
10	CSE205	Digital Electronics Lab	Core	0	0	2	2	1
11	CSE206	Business Intelligence Lab	Minor	0	0	2	2	1
		Total		**18**	**0**	**6**	**24**	**21**

		SEMESTER IV						
S.No.	**Course Code**	**Course Title**	**Type**	**L**	**T**	**P**	**H**	**C**
1	CSE209	Design of Logic Circuits	Core	3	0	0	3	3
2	CSE210	Python Programming	Core	3	0	0	3	3
3	CSE211	Computer Organization	Core	3	1	0	4	4
4	CSE212	Introduction to IOT	Minor	3	0	0	3	3
5	TBD	TBD	SEC	2	0	0	2	2
6	TBD	TBD	AEC	2	0	0	2	2
7	CSE213	Design of Logic Circuits Lab	Core	0	0	2	2	1
8	CSE214	Python Programming Lab	Core	0	0	2	2	1
9	CSE215	Introduction to IOT Lab	Core	0	0	2	2	1
		Total		**16**	**1**	**6**	**23**	**20**

2nd Year Credits : 41

THIRD YEAR

		SEMESTER V						
S.No.	**Course Code**	**Course Title**	**Type**	**L**	**T**	**P**	**H**	**C**
1	CSE301	Object Oriented Programming with Java	Core	3	0	0	3	3
2	CSE302	Computer Architecture	Core	3	0	0	3	3
3	CSE303	Database Management System	Core	3	0	0	3	3
4	CSE304	Introduction to Data Science	Minor	3	1	0	4	4
5	TBD	(SEC) TBD	SEC	2	0	0	2	2
6	CSE305	Industrial Internship	Internship	0	0	0	4	4
7	CSE306	Object Oriented Programming with Java Lab	Core	0	0	2	2	1
8	CSE307	Computer Architecture Lab	Core	0	0	2	2	1
9	CSE308	Database Management System Lab	Core	0	0	2	2	1
		Total		**12**	**1**	**8**	**25**	**22**

		SEMESTER VI						
S.No.	**Course Code**	**Course Title**	**Type**	**L**	**T**	**P**	**H**	**C**
1	CSE309	Computer Network	Core	3	0	0	3	3
2	CSE310	Design and Analysis of Algorithms	Core	3	0	0	3	3
3	CSE311	Operating System	Core	3	0	0	3	3
4	CSE312	Cloud Architecture and Deployment	Minor	3	1	0	4	4
5	TBD	TBD	SEC	2	0	0	2	2
6	CSE313	Project	Project	0	0	0	4	4
7	CSE314	Computer Network Lab	Core	0	0	2	2	1
8	CSE315	Design and Analysis of Algorithms Lab	Core	0	0	2	2	1
9	CSE316	Operating System Lab	Core	0	0	2	2	1
		Total		**14**	**1**	**6**	**25**	**22**

3rd Year Credits: 44

		SEMESTER VII						
S.No.	**Course Code**	**Course Title**	**Type**	**L**	**T**	**P**	**H**	**C**
1	CSE401	Introduction to Cloud Computing	Core	3	0	0	3	3
2	CSE402	Web Designing	Core	3	0	0	3	3
3	CSE403	Software Engineering	Core	3	0	0	3	3
4	CSE404	E-commerce and Its Applications	Core	3	1	0	4	4
5	CSE405	Introduction To Language Models	Minor	3	1	0	4	4
6	CSE406	Introduction to Cloud Computing Lab	Core	0	0	2	2	1
7	CSE407	Web Designing Lab	Core	0	0	2	2	1
8	CSE408	Software Engineering Lab	Core	0	0	2	2	1
		Total		**15**	**2**	**6**	**23**	**20**

		SEMESTER VIII						
S.No.	Course Code	Course Title	Type	L	T	P	H	C
1	CSE409	Cryptography and Cyber Security	Core	3	0	0	3	3
2	CSE410	Mobile Application Development	Core	3	0	0	3	3
3	CSE411	Artificial Intelligence and Machine Learning	Core	3	0	0	3	3
4	CSE412 (a)	Introduction To AR/VR	Minor	0	0	0	4	4
5	CSE413 (b)	TBD	Minor	0	0	0	4	4
6	CSE414	Cryptography and Cyber Security Lab	Core	0	0	2	1	1
7	CSE415	Mobile Application Development Lab	Core	0	0	2	1	1
8	CSE416	Artificial Intelligence and Machine Learning Lab	Core	0	0	2	1	1
		Total		9	0	6	23	20

With research

		SEMESTER VII						
S.No.	Course Code	Course Title	Type	L	T	P	H	C
1	CSE401	Introduction to Cloud Computing	Core	3	0	0	3	3
2	CSE402	Web Designing	Core	3	0	0	3	3
3	CSE403	Software Engineering	Core	3	0	0	3	3
4	CSE417	Research Methodology	Core	3	1	0	4	4
5	CSE405	Introduction To Language Models	Minor	3	1	0	4	4
6	CSE406	Introduction to Cloud Computing Lab	Core	0	0	2	2	1
7	CSE407	Web Designing Lab	Core	0	0	2	2	1
8	CSE408	Software Engineering Lab	Core	0	0	2	2	1
		Total		15	2	6	23	20

		SEMESTER VIII						
S.No.	Course Code	Course Title	Type	L	T	P	H	C
1	CSE409	Cryptography and Cyber Security	Core	3	0	0	3	3
2	CSE412 (a)	Introduction To AR/VR	Minor	0	0	0	4	4
3	CSE413 (b)	TBD	Minor	0	0	0	4	4
4	CSE414	Cryptography and Cyber Security Lab	Core	0	0	2	1	1
5	CSE419	Dissertation	Dissertation					12
		Total		9	0	6	23	20

4th Year Credits: 40

CREDIT DISTRIBUTION (SEMESTER-WISE)

SEM I	SEM II	SEM III	SEM IV	SEM V	SEM VI	SEM VII	SEM VIII	TOTAL
20	22	20	21	22	22	20	20	130

CREDIT DISTRIBUTION (YEAR-WISE)

YEAR I	YEAR II	YEAR III	YEAR IV	TOTAL
42	41	44	40	167

CSE101	Introduction to Programming	L	T	P	C
Version 1.0	Contact Hours - 45	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

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

Course Outcomes

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

CO1. **Define** basics concepts of programming structure and implement the basics concepts of Programming.
CO2. **Solve** various problems using programming language and select the best solution.
CO3. **Apply** modularized solution and design such programs to appraise the solution
CO4. **Understand** the basic usage of memory and construct such memory in terms of array in aprogram.
CO5. **Define** the different data structures for various collection of data.

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

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

Reference Books

- 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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 101	Introduction to Programming	CO101.1	3	3	2	3	1	3	2	-	2	-	-	3	3	2	1
		CO101.2	3	3	2	3	3	1	3	-	1	-	-	2	3	1	3
		CO101.3	3	3	1	2	1	2	1	-	3	-	-	3	3	1	1
		CO101.4	3	2	3	1	3	1	3	-	3	-	-	1	2	2	2
		CO101.5	3	1	3	1	1	3	1	-	3	-	2	2	1	2	2
		CO101	3.0	2.4	2.2	2.0	1.8	2.0	2.0	-	2.4	-	2.0	2.2	2.4	1.6	1.8

MTH151	Mathematics-I	L	T	P	C
	Contact Hours - 60	3	1	0	4
Pre-requisites/Exposure	10th level Mathematics				

Course Content

Module-I: **[15 Lecture Hours]**

Algebra of Set: Mapping and Function, Sets, Subset, Power Set, Union, Intersection, Complement, Set Operations, Venn Diagram, Properties of Set, Laws of Algebra of Sets, Inclusion-Exclusion Principle. Mapping, Different types of Mapping with examples, Function and its properties.

Module -II: **[14 Lecture Hours]**

Differential Calculus: Limits of Function and Continuity, Fundamental Properties of Continuous Functions (without proof), geometric meaning of derivative and differential, rules of differentiation, Examples.

Module -III: **[16 Lecture Hours]**

Differentiation: Definition of Derivative, Rules of Differentiation (Without Proof), Derivatives of Algebraic, Trigonometric, Parametric, Logarithmic, Explicit / Implicit Functions, Second order Derivative with examples, Application: Maxima/Minima of Functions, and its applications.

Module -IV: **[15 Lecture Hours]**

Integration and its application: Definition of Integration, Standard Formulas, Method of Substitution, integration by parts, Partial fraction, Reduction Formulas (Without Proof), Area Bounded by the Curve (Excluding volume) and its applications

Text Books:

- Grewal, B. S., Higher engineering mathematics, Khanna publishers
- B. K. Pal and K. Das, BCA Mathematics (Volume – I), U. N. Dhur& Sons Publishers

- B. K. Pal and K. Das, BCA Mathematics (Volume – II), U. N. Dhur& Sons Publishers
- P.K. Sharma, Remedial Mathematics, Nirali Prakashan

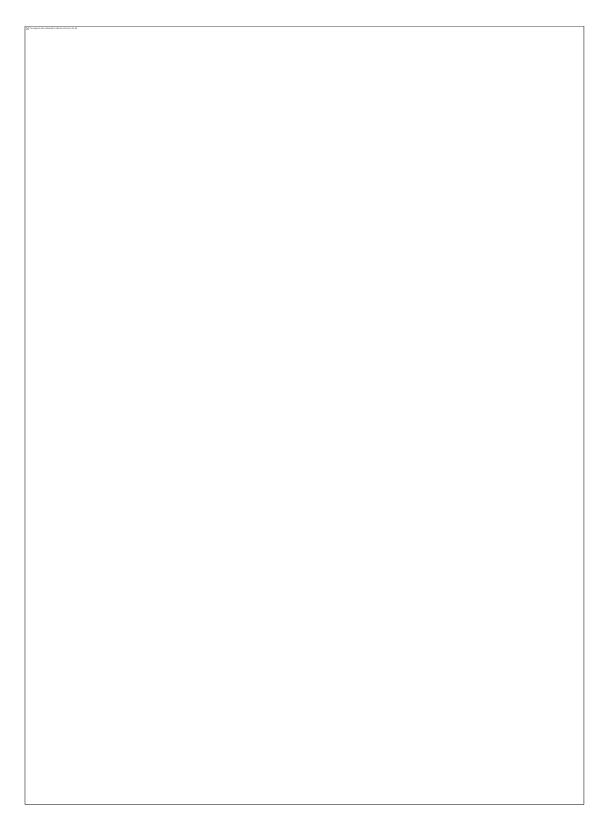**Reference Books:**

1. Shanti Narayan, "Differential Caluculs", S.Chand & Company, 1998.
2. Shanti Narayan, P.K. Mittal, Integral Calculus, S.Chand & Company, 1999

MTH152	Mathematics -II	L	T	P	C
Version 1.0	Contact Hours -60	3	1	0	4
Pre-requisites/Exposure	10th level Mathematics & Mathematics-I				
Co-requisites	----				

Course Content

Module 1:   [lecture hours-12]

Complex Numbers: Definition, Representation of Complex Numbers, Argand plane, sun, subtraction, product and division of complex numbers, Magnitude, argument and square root of complex numbers.

Module2:   [lecture hours -18]

Matrices: Determinant and its properties, Matrices, Addition and Multiplication of Matrices, Inverse Matrix, Solution of Linear Equations in three variables by Cramer's Rule, Rank and Inverse of Matrices by Elementary Transformation, System of Linear Equations, Solution by Matrix Inversion Method, Eigen Values & Eigen Vectors, Caley-Hamilton Theorem and related Problems.

Module3:   [lecture hours -18]

Ordinary Differential Equations: Introduction to differential equation, Order / Degree of differential equations, solution of first order ordinary differential equations, Linear differential equation, solution of second order differential equation using operator method and its applications.

Module4:   [lecture hours -12]

Co-ordinate Geometry: Rectangular axes, distance formulae, section formulae, shifting of origin, slope of a line and angle between two lines, various forms of equations of a line, parallel to axes, point-slope form, slope-intercept form, two-point form, intercepts form and normal form, general equation of a line, circle, related problems.

Text Books:

1. Grewal, B. S., Higher engineering mathematics, Khanna publishers
2. B. K. Pal and K. Das, BCA Mathematics (Volume – I), U. N. Dhur& Sons Publishers
3. B. K. Pal and K. Das, BCA Mathematics (Volume – II), U. N. Dhur& Sons Publishers
4. P.K. Sharma, Remedial Mathematics, Nirali Prakashan

Reference Books:

1. Shanti Narayan, "Differential Caluculs", S.Chand & Company, 1998.
2. Shanti Narayan, P.K. Mittal, Integral Calculus, S.Chand & Company, 1999

D. C. Sancheti & V. K. Kapoor, Busines

ENG103	**Academic and Professional Writing: An Introduction**	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Basic Knowledge in English Language				
Co-requisites	-				

AEC101	Communicative English I	L	T	P	C
Version 1.0		2	1	0	3
Pre-requisites/Exposure	Basic Knowledge in English Language				
Co-requisites	-				

Course Description

The Communicative English course aims to equip the language learners with the knowledge of comprehension and production of English language. The course is designed to develop the primary aspects of any language learning: listening, speaking, reading, writing, grammar, and vocabulary. The modules indicate the gradual evolvement of the acquisition of English language and communication skills.

Course Outcomes:

CO1. Learning the various elements of communicative skills

CO2. Learning the basics of listening, speaking, reading, and writing competence

CO3. To provide the learners with an ability to build and enrich their communication skills

CO4. To help them think and write imaginatively and critically

CO5. To enable the learners to develop style in speech and writing and manipulate the tools of language for effective communication

Program Outcomes:

1. To sensitize learners to the nuances of spoken and written forms of English
2. To enable them to produce grammatically correct language
3. To help them master writing techniques to meet academic and professional needs
4. To provide sufficient practice in Listening, Speaking, Grammar, Vocabulary, Reading and Writing.

Unit 1

1. Listening: practice listening to short conversations and identifying the purpose of communication.
2. Speaking: Exchanging greetings, introducing oneself and others, sharing personal and professional information.
3. Grammar: parts of speech.

4. Reading: Practice reading short passages. Reading words clearly with pause. Answering questions from the passage.
5. Writing: Practice writing short meaningful sentences using different forms of tense.

Unit 2

3. Listening: practice listening to longer conversations and the theme/s of communication.
4. Speaking: describing people, places and objects; comparing people, places and objects.
5. Grammar: articles and prepositions
6. Vocabulary: synonym and antonyms.
   6. Reading: Practice reading short passages. Identifying the known and the unknown words. Answering questions from the passage.
7. Writing: Practice writing descriptive and comparative sentences.

Unit 3

8. Listening: practice listening to jumbled fragmented parts of a text and working together to put the parts coherently.
9. Speaking: Narration. Talking about past (immediate and distant)
10. Grammar: tense
    7. Reading: practice reading passages and Answering questions from the passage.
11. Writing: practice writing short paragraphs, describing people place objects, narrating events

Unit 4

12. Listening: Practice following instructions and directions
13. Speaking: practice conversation on the following situations- instruction, suggestion, enquiring, requesting, seeking permission, invitations, apologize and complaints.
14. Grammar: verbs. Subject verb agreement. Active and passive voice.
    8. Reading: practice reading passages and elicit information from the passages by identifying topic so on. Answering questions from the passage.
15. Writing: practice replacing the sentences from given passages by new sentences (but no meaning change). Correcting incorrect sentences

Recommended Readings

16. Fluency in English-Part II, Oxford University Press, 2006.
17. Business English, Pearson, 2008.
18. Grammar and Composition, Wren and Martin.

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
AEC 101	Communicative English I	CO101.1	3	2	3	2	3	3	2	-	2	-	-	1	1	3	2
		CO101.2	2	2	2	2	3	1	1	-	2	-	-	3	3	3	3
		CO101.3	3	3	3	3	1	2	1	-	3	-	-	2	3	1	1
		CO101.4	3	2	3	2	2	2	3	-	3	-	-	3	2	2	1
		CO101.5	2	2	2	3	1	2	3	-	3	-	-	3	1	2	2
		CO101	2.6	2.2	2.6	2.4	2.0	2.0	2.0	-	2.6			2.4	2.0	2.2	1.8

CSE102	Open Source Software	L	T	P	C
Version 1.0	Contact Hour -45	3	0	0	3
Pre-requisites/Exposure	H. Sc. level Computer Knowledge or Basic Computer Skills				
Co-requisites	--				

Course Objectives:

19. To provide a basic idea of Open source technology.

20. Software development process to understand the role and future of open source software in the industry

21. The impact of legal, economic and social issues for such software

Course Outcomes

To Technology and to interpret, contrast and

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

22. **Recognize** the benefits and features of Open Source Technology.
23. **Identify** different tools of open source software and their uses**.**
24. **Compare** open source products among themselves

Course Description:

Students will come to understand open source as a licensing model for software that harnesses the power of distributed peer review and transparency of process. Students will assess and understand the promise of open source as an approach for development and distribution, leading to higher quality, better reliability, more flexibility, lower cost, and an end to vendor lock-in. Students will be able to abstract and extend open source ideals on development and distribution in order to apply those principles and practices to other artifacts and disciplines.

Course Content:

Module-I: **[6 Lecture Hours]**

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project.

Module-II: **[15 Lecture Hours]**

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licenses and Patents: What Is A License, Important FOSS Licenses (Apache, BSD, GPL, LGPL), copyrights and copy lefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

Module -III: **[15 Lecture Hours]**

Example Projects: Apache web server, GNU/Linux, Android, Mozilla (Firefox), Wikipedia, Drupal, wordpress, GCC, GDB, github, Open Office. Study: Understanding the developmental models, licensing, and mode of funding, commercial/noncommercial use. Open Source Hardware, Open Source Design, Open source Teaching. Open source media. Collaboration, Community and Communication.

Module -IV: **[9 Lecture Hours]**

Open Source Operating Systems: GNU/Linux, Android, Free BSD, Open Solaris. Open Source Hardware, Virtualization Technologies, and Containerization Technologies: Dockers, Development tools, IDEs, debuggers, Programming languages, LAMP, Open Source database technologies

Text Books:

- Kailash Vadera, Bhavyesh Gandhi, "Open Source Technology", Laxmi Publications Pvt Ltd 2012, 1st Edition.
- Unix Concepts and Applications by Sumitabha Das, Tata McGraw Hill Education, 2006

Reference Books:

25. Fadi P. Deek and James A. M. McHugh, "Open Source: Technology and Policy", Cambridge Universities Press 2007.

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 102	Open Source Software	CO102.1	3	2	1	1	2	3	3	-	2	-	-	2	3	2	1
		CO102.2	3	3	1	3	3	2	1	-	3	-	-	1	3	3	3
		CO102.3	2	2	1	2	3	2	1	-	3	-	-	3	1	1	1
		CO102.4	3	1	3	3	1	2	2	-	1	-	-	3	2	2	3
		CO102	2.75	2.0	1.5	2.25	2.25	2.25	1.75	-	2.25	-	-	2.25	2.25	2.0	2.0

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

Name: **Enrolment No:**	
Course: – Open Source Software **Program: BCA** **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**)	

1.	**Define** Open source software? **Explain** the Need of Open Source Systems?	**4**	**CO1**
2.	**Give** some characteristics of Linux.	**4**	**CO2**
3.	**Compare** and contrast among Linux and Open Solarise.	**4**	**CO3**
4.	**Describe** the Process states?	**4**	**CO1**
	SECTION B (Attempt any **Two Questions)**		
5.	a) **Explain** the steps to contribute to Wikipedia**.** b) **Discuss** about Apache Web server.	**5** **5**	**CO2**
6.	a) **Describe** Open Source Teaching b) **Explain** with diagram Open Source Development Model.	**5** **5**	**CO1** **CO1**
7.	Given . **Utilize** the definition of limit to evaluate , and . **(AP)**	**10**	**CO3**
	SECTION C is Compulsory		
8.	a) **Show** that a and b are the roots of equation b) Using Venn-diagram **show**that .**(U)**	**5** **3**	**CO2** **CO1**

VAC101	Environmental Education I	L	T	P	C
Version 1.1	Contact Hours – 30	2	0	0	2
Pre-requisites/Exposure	None				
Co-requisites	--				
Academic year	2023-2024				

Course Objectives

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

Course Outcomes:

CO1	Understand the interdependence between humans and the environment and demonstrate an awareness of the impact of human activities on the environment.
CO2	Analyse and evaluate the concepts of natural resources, sustainable development, and their application in environmental management and decision-making.
CO3	Identify and assess various environmental issues at the local, regional, and global levels, and propose strategies for addressing them.
CO4	Demonstrate knowledge of biodiversity conservation and ecosystem management and apply principles of conservation in real-world scenarios.
CO5	Recognize the sources and impacts of environmental pollution on human health and ecosystems and propose effective pollution control measures.

Course 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.

Detailed syllabus

Unit I: Humans and the Environment (2 hours)
33. Introduction to environmental education
34. Relationship between humans and the environment
35. Human impacts on the environment
36. Environmental ethics and values

Unit II: Natural Resources and Sustainable Development (4 hours)
37. Concepts of natural resources and their types
38. Sustainable development and its principles
39. Conservation and management of natural resources
40. Role of technology in sustainable development

Unit III: Environmental Issues: Local, Regional and Global (4 hours)
41. Identification and analysis of local, regional, and global environmental issues
42. Environmental impacts of population growth and urbanization
43. Environmental justice and equity
44. Role of government, organizations, and individuals in addressing environmental issues
Unit IV: Conservation of Biodiversity and Ecosystems (3 hours)
45. Importance of biodiversity and ecosystems
46. Threats to biodiversity and ecosystem degradation
47. Conservation strategies and approaches
48. Role of protected areas and wildlife conservation

Unit V: Environmental Pollution and Health (4 hours)
49. Types and sources of environmental pollution
50. Impacts of pollution on human health and ecosystems
51. Pollution control measures and technologies
52. Public health awareness and environmental pollution

Unit VI: Climate Change: Impacts, Adaptation, and Mitigation (3 hours)
53. Understanding climate change and its causes
54. Impacts of climate change on natural and human systems

55. Adaptation strategies for dealing with climate change
56. Mitigation measures and renewable energy alternatives

Unit VII: Environmental Management (3 hours)
57. Principles and concepts of environmental management
58. Environmental impact assessment and sustainable development
59. Environmental planning and policy-making
60. Corporate social responsibility and environmental management

Unit VIII: Environmental Treaties and Legislation (2 hours)
61. Overview of international environmental treaties and agreements
62. National and local environmental legislation and regulations
63. Compliance and enforcement mechanisms
64. Role of stakeholders in environmental governance

Unit IX: Case Studies and Fieldwork (5 hours)
65. Analysis of case studies related to environmental issues and solutions.
66. Discussion on one national and one international case study related to the environment and sustainable development.
67. Field visits to identify local/regional environmental issues, make observations including data collection and prepare a brief report.
68. Documentation of campus biodiversity.
69. Campus environmental management activities such as solid waste disposal, water management, and sewage treatment.
70. Field visits and practical exercises to observe and assess local environmental conditions.
71. Data collection and analysis techniques.
72. Reporting and presentation of fieldwork findings.

Suggested Reading:
1. Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press.
2. William P. Cunningham and Mary A. (2015) Cunningham Environmental Science: A Global Concern, Publisher (Mc-Graw Hill, USA).
3. Harper, Charles L. (2017) Environment and Society, Human Perspectives on Environmental Issues 6th Edition. Routledge.
4. Bawa, K.S., Oomen, M.A. and Primack, R. (2011) Conservation Biology: A Primer for South Asia. Universities Press.
5. Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/standards/
6. Ahluwalia, V. K. (2015). *Environmental Pollution, and Health*. The Energy and Resources Institute (TERI).
7. Miller, G. T., & Spoolman, S. (2015) Environmental Science. Cengage Learning.
8. Masters, G. M., & Ela, W. P. (2008). *Introduction to environmental engineering and science* (No. 60457). Englewood Cliffs, NJ: Prentice Hall.

9. Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.

10. Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press.

11. Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press.

12. Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp-content/uploads/2020/02/convention-V-16-CURVE-web.pdf

13. Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press.

CSE104	Open Source Software Lab	L	T	P	C
Version 1.0	Contact Hour -30	0	0	2	1
Pre-requisites/Exposure	-				
Co-requisites					

Course Objectives:

To expose students to FOSS environment and introduce them to use open source packages in open source platform

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

CO1. **Implement** various applications using build systems

CO2. **Understand** the installation of various packages in open source operating systems

CO3. **Create** simple GUI applications

CO4. **Understand** the kernel configuration and virtual environment

Course Description:

The course aims to introduce open source software concept to students. Students will study and learn to setup open source account, OSS license, understand Project structure and enhance open source projects. It will develop skill to make a significant contribution to open source community.

Course Content:

Experiment 1:
Getting started with Linux basic commands for directory operations, displaying directory structure in tree format etc
Experiment 2:
Linux commands for operations such as redirection, pipes, filters, job control, changing Ownership/permissions of files/links/directory.
Advanced linux commands curl, wget, ftp, ssh and grep
Experiment 3:
Shell Programming : Write shell script to show various system configuration like
73. Currently logged user and his login name
74. Your current shell
75. Your home directory
76. Your operating system type
77. Your current path setting

78. Your current working directory
79. Number of users currently logged in.

Experiment 4:

Write shell script to show various system configurations like
☐ your OS and version, release number, kernel version
☐ all available shells
☐ computer CPU information like processor type, speed etc
☐ memory information
☐ hard disk information like size of hard-disk, cache memory, model etc
☐ File system (Mounted)

Experiment 5:

Write a shell script to implement a menu driven calculator with following functions
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Modulus

Experiment 6:

Version Control System setup and usage using GIT. Try the following features.
☐ Creating a repository
☐ Checking out a repository
☐ Adding content to the repository
☐ Committing the data to a repository
☐ Updating the local copy
☐ Comparing different revisions
☐ Revert
☐ Conflicts and a conflict Resolution

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

Examination Scheme:

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Mapping between COs, POs and PSOs

Course Outcomes (COs)		Mapped POs and PSOs
CO-1	**Implement** various applications using build systems.	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**
CO-2	**Understand** the installation of various packages in open source operating systems	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**
CO-3	**Create** simple GUI applications	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**
CO-4	**Understand** the kernel configuration and virtual environment	**PO1, PO2, PO3, PO4, PO7,PO9, PO11, PSO1,PSO2**

1=weakly mapped
2= moderately mapped

Course Code	Course Title	Computational knowledge PO1	Design/development of solutions PO2	Conduct investigations of complex problems PO3	Problem analysis PO4	The engineer and society PO5	Communication PO6	Modern tool usage PO7	Environment and sustainability PO8	Ethics PO9	Individual and team work PO10	Project management and finance PO11	Life-long learning PO12	To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications. PSO1	To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors. PSO2	Analyze and synthesis computing systems through quantitative and qualitative techniques. PSO3
CSE12403	Programming Lab	3	3	2	3	-	-	2	-	-	-	-	-	3	-	-

3=strongly mapped

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

Name of the Program: BCA   Semester: I   Stream: CSE
PAPER TITLE: Programming Lab
PAPER CODE:CSE12403
Maximum Marks: 50   Time duration: 3 hours
Total No of questions: 5   Total No of Pages: 01

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

Section A (Answer All the Questions) (5 x 10 = 50)		
1. Write to program to **Show** how comment can be implemented to make your programs readable.	U	CO2
2. **Build** a program to generate Fibonacci series.	AP	CO3
3. **Develop** a program to display the following pattern. *	AP	CO3

	* *		
	* * *		
	* * * *		
	* * * * *		
4.	**Find** a procedure to calculate sum of digits of the number using Recursive Function.	**R**	**CO4**
5.	**Solve** a C Program to count number of lines in a file	**AP**	**CO5**

CSE103	Introduction to Programming Lab	L	T	P	C
Version 1.0	Contact Hours - 30	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

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

Course Outcomes

On completion of this course, the students will be able to
   CO1. List and memorize various Unix commands. Also, students be able to construct various basicprograms and appraise them.
   CO2. Design and execute iterative statement in a program. Also, students be able to differentiateamong different iterative structure.
   CO3. Construct such programs that used to define user defined functions and to design libraryfunctions.
   CO4. Apply array concept in 1-Dimensional and 2-Dimensional construct. Hence be able to designstring functions to cater to various character array related problem.
   CO5. Apply the concept of Stack, Queue, and Linked List and appraise them in different cases.

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:

88. Familiarization with LINUX commands and vi editor.
89. Programs to demonstrate Decision Making, Branching and Looping, Use of break and continue statement etc.
90. Implementation involving the use of Arrays with subscript, String operations and pointers.
91. Implementation involving the use Functions and Recursion.
92. Implementation involving the use Structures and Files.
93. Implementation based on Stack Queues and Linked List for example Insertion and Deletion.

Text Books

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

Reference Books

98. 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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE103	Introduction to Programming Lab	CO103.1	3	1	3	2	2	2	1	-	3	-	-	3	1	1	2
		CO103.2	2	2	3	2	1	2	1	-	1	-	-	1	1	1	3
		CO103.3	3	1	3	1	2	2	3	-	2	-	-	2	2	2	2
		CO103.4	2	2	3	1	1	1	3	-	2	-	-	2	2	2	1
		CO103.5	2	2	3	3	3	1	3	-	3	-	3	1	1	2	3
		CO103	2.4	1.6	3.0	1.8	1.8	1.6	2.2	-	2.2	-	3.0	1.8	1.4	1.6	2.2

CSE105	Programming and Logic Design	L	T	P	C
Version 1.0	Contact Hour -45	3	0	0	3
Pre-requisites/Exposure	H. Sc. level Computer Knowledge or Basic Computer Skills				
Co-requisites	--				

Course Objectives:

99. To introduce the basic concepts of programming logic and design.
100. To develop the ability to write clear and concise programs.
101. To understand the different types of programming languages and their features.
102. To be able to debug and troubleshoot programs.
103. To be able to document and maintain programs.

Course Outcomes

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

CO1 **Define** the basic concepts of programming logic and design.
CO2 **Write** clear and concise programs in a variety of programming languages.
CO3 **Understand** the different types of programming languages and their features.
CO4 **Debug** and troubleshoot programs.
CO5 **Document** and maintain programs.

Course Description:

Students will learn how to use programming to solve problems. They will learn how to identify the problem, break it down into smaller steps, and write a program to solve the problem. Students will learn how to use logic and reasoning to solve problems. They will learn how to identify the assumptions and limitations of a problem, and how to generate creative solutions. Students will learn how to use programming to express their creativity. They will learn how to design programs that are both functional and aesthetically pleasing.

Course Content:

Module-I: [4 Lecture Hours]

Introduction: Introduction to programming logic and design; Algorithms; Flowcharts; Pseudo code; Data structures; Programming paradigms.

Module-II: [8 Lecture Hours]

Program Development lifecycle: Understand the problem, Plan the logic, Code the program, Use software (a compiler/ interpreter) to translate the program into machine language, Test the program, Put the program into production, Maintain the program.

Types of programming techniques: Modular approach, Top-down approach, Bottom-up approach, Structured programming techniques, Object-Oriented Programming Techniques, Program or software development models, Sequential Logic, Selection Logic, Iterative Logic, Recursive Logic.

Module -III: [15 Lecture Hours]

Flowcharts, Algorithms and Pseudocode: Definition, Notations, Analysing a problem, Creating the flowchart, Creating the pseudocode, Creating the Algorithm, Examples

Module -IV: [12 Lecture Hours]

Writing a program: Program control statements, Decision making- if, logical operator, switch, Repitition code – loops, do while, Arrays, Functions, Implementation

Module -V: [6 Lecture Hours]

Key concepts of computational thinking: Decomposition; Abstraction; Pattern Recognition, Algorithmic Thinking; Logic.

Text Books:

- Paul Deitel and Harvey Deitel, "The Art of Programming", Pearson Publications 2022, 6th Edition.
- Andrew Hunt and David Thomas, "The Pragmatic Programmer", Addison-Wesley Professional, 2022, 20th Edition.

Reference Books:

104. Steve McConnell, "Code Complete", Microsoft Press 2017, 3rd Edition.

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

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	**50**	**50**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Cour se Code	Course Name	COs	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	PS O3
CSE1	Program	CO10	3	3	2	3	2	2	1	-	2	-	-	1	3	2	1

05	ming and Logic Design	5.1															
		CO10 5.2	3	3	1	2	2	2	2	-	3	-	-	1	1	2	1
		CO10 5.3	2	3	3	2	3	2	2	-	2	-	-	1	1	2	3
		CO10 5.4	3	3	3	2	2	1	3	-	2	-	-	2	2	1	2
		CO10 5.5	3	2	3	2	1	3	3	-	2	3	-	2	1	1	2
		CO10 5	2.8	2.8	2.4	2.2	2.0	2.0	2.2	-	2.2	3.0	-	1.4	1.6	1.6	1.8

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

Name: Enrolment No:	
Course: – Programming Logic and Design **Program: BCA** **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)**		
1.	**Define** the basic concepts of programming logic and design.	**4**	**CO1**
2.	**Draw** a flowchart to calculate the factorial of a number.	**4**	**CO2**
3.	**What** are the features of procedural programming languages?	**4**	**CO3**
4.	**What** are common debugging errors?	**4**	**CO4**
SECTION B (Attempt any **Two Questions)**			
5.	**a)Explain** the difference between top-down design and bottom-up design. b) **Discuss** the importance of modularization in program design.	**5** **5**	**CO2**
6.	a) **Compare and contrast** the features of procedural programming languages, object-oriented programming languages, and functional programming languages. b) **Explain** the importance of portability and scalability in programming languages.	**5** **5**	**CO5** **CO3**
7.	**How** to use a debugger to find and fix errors in a		

	program? Explain with examples.	10	CO5
SECTION C is Compulsory			
8.	**What** are the different types of programming paradigms?	8	CO4

CSE106	Full Stack Development	L	T	P	C
Version 1.0	Contact Hour -45	3	0	0	3
Pre-requisites/Exposure	H. Sc. level Computer Knowledge or Basic Computer Skills				
Co-requisites	--				

Course Objectives:

105. To provide a basic idea of Full stack technology.

106. Software development process to understand the role and future of Full stack development in the industry

107. The impact of web application in our socio economic life.

Course Outcomes

To Technology and to interpret, contrast and

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

108. **Recognize** the applications of web development.

109. **Identify** different tools of web application development and their uses**.**

110. **Apply** the knowledge of client server architecture to design a web application**.**

111. **Develop** web application based on the social requirement for development of the Economical perspective**.**

Course Description:

The course focuses on designing and developing Web-based applications using a variety of programming languages and tools. Students will be exposed to Internet application development architecture. Class projects include developing business-to-consumer (B2C) and Business-to-Business (B2B) applications, among others. The goals for the class is as such are that on completion of the course, students will understand the challenges, technologies, and issues in developing and deploying Web-based applications. Also, the student will be able to apply the systems approach to business problems; be part of a team that helps solve a business problem that involves information technology; and be able to improve their oral, written and group communication skills with in-class participation and final group presentation.

Course Content:

Module-I: **[6 Lecture Hours]**

Basics

Internet and Web Protocols, Client-Server Architecture, Web Software

Module-II: [15 Lecture Hours]

Introduction HTML,HTML Basics, HTML Elements,HTML5 Semantic, HTML Attributes ,HTML Headings, HTML Paragraph, HTML Styles, HTML Formatting, HTML Classes , HTML Layout, HTML Responsive, HTML iframes, CSS3 Syntax,CSS3 Colours,CSS3 Backgrounds, CSS3 Boarders,CSS Padding, CSS Height/Width, CSS3 Gradients, CSS3 Shadows , CSS3 Text , CSS3 Fonts

Module -III: [15 Lecture Hours]

Introduction to Bootstrap, Bootstrap Basics, Bootstrap Grids, Bootstrap Themes, Bootstrap CSS, Bootstrap JS. Basic JavaScript Introduction, JavaScript Data Types and Variables, JavaScript Operators, JavaScript Statement, JavaScript Function, Objects in JavaScript, JavaScript Window and Frame Objects, JavaScript Event Handling, JavaScript Exception Handling

Module -IV: [9 Lecture Hours]

Introduction to PHP, Storing and retrieving data, Array in PHP, String manipulation and Regular Expression, Reusing code, Introduction to MySQL, Working with MySQL, Accessing MYSql database from the web with PHP.

Text Books:

- Leon Shklar, Rich Rosen, "Web Application Architecture Principles, Protocols and Practices", Wiley.
- Mike McGrath , "HTML, CSS and JavaScript in Easy Steps:, ·
- Frank M. Kromann, W Jason Gilmore "Beginning PHP and MySQL From Novice to Professional"

Reference Books:

112. Jono Bacon "Practical PHP and MySQL Building Eight Dynamic Web Applications", Prentice Hall

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE106	Full Stack Development	CO106.1	3	3	3	2	1	3	2	-	1	-	-	2	1	1	1
		CO106.2	3	3	1	2	2	2	2	-	3	-	-	3	3	3	2
		CO106.3	3	2	3	2	3	1	1	-	2	-	-	1	3	2	1
		CO106.4	3	3	3	2	1	1	2	-	2	-	-	2	2	2	3
		CO106	3.0	2.75	2.5	2.0	1.75	1.75	1.75	-	2.0	-	-	2.0	2.25	2.0	1.75

1=weakly mapped

2= moderately mapped

3=strongly mapped

Model Question Paper

Name: Enrolment No:	
Course: – Open Source Software Program: BCA 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**)		
1.	**ifferentiate between ID and Class selector?**	**4**	**CO1**
2.	**Give** some characteristics of Linux.	**4**	**CO2**
3.	**Compare** and contrast among Linux and Open Solarise.	**4**	**CO3**
4.	**Describe** the Process states?	**4**	**CO1**
	SECTION B (Attempt any **Two Questions**)		
5.	a) **Explain** the steps to contribute to Wikipedia**.** b) **Discuss** about Apache Web server.	**5** **5**	**CO2**
6.	a) **Describe** Open Source Teaching b) **Explain** with diagram Open Source Development Model.	**5** **5**	**CO1** **CO1**

7.	Given . **Utilize** the definition of limit to evaluate , and . **(AP)**	**10**	**CO3**
	SECTION C is Compulsory		
8.	a) **Show** that a and b are the roots of equation 	**5**	**CO2**
	b) Using Venn-diagram **show** that .**(U)**	**3**	**CO1**

SEC151	Basics of Data Analytics	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	None				
Co-requisites	-				

113. Understanding spreadsheet
114. Introduction to data Ribbon
115. Understanding Rows, Column, Cell
116. Adding new worksheet, Renaming worksheet
117. Making a Data Frame
118. Formula of count, count if, count ifs.
119. Formula of sum, sum if, sum ifs
120. Maximum, Minimum, Average, Mode (Mean –Median)
121. Conditional format
122. How to use filter
123. How to sorting (ascending & descending)
124. Exploring formatting
125. Summarizing data through charts (column, bar, pie, line)
126. V-look
127. Pivot table

ENG109	Editing and Publishing: An Introduction	L	T	P	C
Version 1.0		3	1	0	4
Pre-requisites/Exposure	Understanding of Language, Literature and Culture				
Co-requisites	-				

Course Objectives

128. To write, edit, and design print and online media for a range of genres.
129. To prepare the students for the industry.
130. To offer the students professional training.
131. To aid the students with a holistic approach to the skill-based editing-publishing course.
132. To involve the students into both the theoretical and practical aspects of editing-publishing.

Course Outcomes

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

CO1: **Demonstrate** basic knowledge of the history of publishing, including print, digital, and other media.

CO2: **Assess** the quality in a range of genres for publication in a variety of media.

CO3: **Employ** editing skills.

CO4: **Collaborate** with teams of editors and designers to create a quality publication.

Catalog Description

Editing and Publishing: An Introduction, by encouraging students to think critically, understand the responsibilities of professionals working in the publishing industry, and be skilled in the grammar and rhetoric of English language, prepares them as potential professionals. The course combines theory and practical seamlessly and offers a hand-on experience to the students. It gives a wholesome perspective to the students about the making of a book, documentation, publication and the book markets.

Course Content

Unit I: Introduction

Knowing the terms: Copyediting, Proofreading, Editing, Publishing

Electronic Editing

Translation and Transliteration

Editing from the author's perspective

Specialised editing

Unit II: Book Design and Layout

The art of documentation: Books, Journals

Citation (MLA/APA/CMS)

Creating a style guide

Indexing

Illustration and cover design

Unit III: Commissioning

Who is a commissioning editor?

Commissioning vs acquisitions

Shortlisting proposals – textbooks, fiction, nonfiction, academic monographs, edited volumes

Gauging the market – local and international

Logistics of commissioning

Unit IV: Marketing and Publishing Models

Trade publishing

Niche publishing

Digital publishing

Traditional publishing

Partnership publishing

(Case studies to be examined)

Texts and Reference Books:

133. Bell, Susan P. *The Artful Edit: On the Practice of Editing Yourself.* W.W. Norton and Company, 2007.
134. Harnby, Louise. *Editing Fiction at Sentence Level*. Independently published, 2020.
135. Germano, William. *On Revision: The Only Writing that Counts*. The University of Chicago Press, 2021.
136. Thompson, John B. *The Merchant of Culture*. Plume, 2012.
137. Woll, Thomas, and Dominique Reccah. Publishing for Profit. Chicago Review Press, 2014.
138. Germano, William. Getting it Published. The University of Chicago Press, 2016.
139. Thompson, John B. Book Wars: The Digital Revolution of Publishing. Polity, 2021.

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

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	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	PS O3
ENG109	Editing and Publishing An Introduction	CO109.1	2	1	3	2	3	3	2	-	2	-	3	1	3	2	2
		CO109.2	2	1	2	3	1	3	3	-	3	-	-	2	3	1	1
		CO109.3	2	3	3	3	2	3	2	-	2	-	3	2	1	2	2
		CO109.4	3	2	2	3	3	3	1	-	1	-	-	2	2	2	3
		CO109	2.25	1.75	2.25	2.75	2.25	3.0	2.0	-	2.0	-	3.0	1.75	2.25	1.75	2.0

1=weakly mapped

2= moderately mapped3=strongly mapped

CSE107	Programming and Logic Design Lab	L	T	P	C
Version 1.0	Contact Hour -	0	0	2	1
Pre-requisites/Exposure	H. Sc. level Computer Knowledge or Basic Computer Skills				
Co-requisites	--				

Course Objectives:

140. To introduce the basic concepts of programming logic and design.
141. To develop the ability to write clear and concise programs.
142. To understand the different types of programming languages and their features.
143. To be able to debug and troubleshoot programs.
144. To be able to document and maintain programs.

Course Outcomes

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

CO1 **Define** the basic concepts of programming logic and design.
CO2 **Write** clear and concise programs in a variety of programming languages.
CO3 **Understand** the different types of programming languages and their features.
CO4 **Debug** and troubleshoot programs.
CO5 **Document** and maintain programs.

Course Description:

Students will learn how to use programming to solve problems. They will learn how to identify the problem, break it down into smaller steps, and write a program to solve the problem. Students will learn how to use logic and reasoning to solve problems. They will learn how to identify the assumptions and limitations of a problem, and how to generate

creative solutions. Students will learn how to use programming to express their creativity. They will learn how to design programs that are both functional and aesthetically pleasing.

List of Practicals:

Sl. No.	Practical
1.	Write an algorithm for addition of 2 numbers. Draw the flowchart for the same.
2.	Write an algorithm to check whether the given number is odd or even. Draw the flowchart for the same.
3.	Write the algorithm for finding the factorial of a number. Draw the flowchart for the same.
4.	Draw a flowchart for a program that prints the Fibonacci sequence. Write the pseudo code for the same.
5.	Write a pseudo code for a program that sorts a list of numbers in ascending order. Draw the flowchart for the same.
6.	Draw a flowchart for a pseudo code that implements the greatest of 3 numbers.
7.	Write the pseudo code to calculate the GCD of 'n' numbers where 'n' is the user input. Draw the flowchart for the same.
8.	Write a C program that calculates the factorial of a number.
9.	Write a C program that prints the Fibonacci sequence.
10.	Write a C program that sorts a list of numbers in ascending order.
11.	Write a C program to calculate GCD of 2 numbers.
12.	Write a C program to reverse an 'n' digit number.

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 107	Programming and Logic Design Lab	CO107.1	2	3	2	1	3	2	1	-	1	-	-	2	3	1	1
		CO107.2	2	3	3	3	3	3	2	-	3	-	-	2	2	2	1
		CO107.3	2	3	3	3	1	2	2	-	2	-	-	2	1	3	2
		CO107.4	2	1	2	2	1	1	1	-	2	-	-	2	2	2	2
		CO107.5	3	3	2	2	2	3	3	-	3	2	-	3	2	1	2
		CO107	2.2	2.6	2.4	2.2	2.0	2.2	1.8	-	2.2	2.0	-	2.2	2.0	1.8	1.6

CSE108	Full Stack Development Lab	L	T	P	C
Version 1.0	**Contact Hour -45**	**0**	**0**	**2**	**1**
Pre-requisites/Exposure	**Knowledge of HTML Programming Language.**				
Co-requisites					

Course Objectives:

145.   To **introduce** students to HTML and CSS, bootstrap to develop front end of web application.

146.   To **impart** the knowledge of MySQL database to design backend of web application.

147.   To **design** a complete web application for any e-commerce side or for the benefit of the society.

Course Outcomes:

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

CO1. **Design** the static front end with the help of HTML and CSS.

CO2. **Enhance** the activity of web application by incorporating java script.

CO3. **Implement** the backend with the help of MySQL.

CO4. **Develop** a complete web application with backend support.

Course Description:

The objective of this course is to provide the necessary knowledge to design and develop dynamic, database-driven web applications using PHP version 5. Students will learn how to connect to any ODBC-compliant database, and perform hands on practice with a MySQL database to create database-driven HTML forms and reports etc. Students also learn how to configure PHP and Apache Web Server. Comprehensive lab exercises provide facilitated hands on practice crucial to develop competence web sites.

Course Content:

Experiment 1:
To be familiar with syntax and structure of HTML and design static web page.

Experiment 2:
Implement CSS with HTML and design a web page.

Experiment 3:
Apply the knowledge of Java Script to implement client side verification and validation.

Experiment 4:
Familiarize and usage of Bootstrap.

Experiment 5:
To be familiar with syntax and structure of PHP and design web page.

Experiment 6:
Understand and develop page using PHP.

Experiment 7:
Familiarize with MySQL.

Experiment 8:
Develop web application using PHP and MySql.

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

Examination Scheme:

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	**50**	**50**

Relationship between the Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs)

Mapping between COs, POs and PSOs

Course Outcomes (COs)		Mapped POs and PSOs
CO-1	**Design** the static front end with the help of HTML and CSS.	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**
CO-2	**Enhance** the activity of web application by incorporating java script.	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**

CO-3	**Implement** the backend with the help of MySQL.	**PO1, PO2, PO3, PO4, PO7,PSO1,PSO2**
CO-4	**Develop** a complete web application with backend support.	**PO1, PO2, PO3, PO4, PO7,PO9, PO11, PSO1,PSO2**

1=weakly mapped

Course Code	Course Title	Computational knowledge	Design/development of solutions	Conduct investigations of complex problems	Problem analysis	The engineer and society	Communication	Modern tool usage	Environment and sustainability	Ethics	Individual and team work	Project management and finance	Life-long learning	To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications.	To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors.	Analyze and synthesis computing systems through quantitative and qualitative techniques.
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE12403	Programming Lab	3	3	2	3	-	-	2	-	-	-	-	-	3	-	-

2= moderately mapped
3=strongly mapped

CSE201	Data Structures and Algorithms	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Programing Concepts in C				
Co-requisite	Logical Ability				

Course Objectives:

148. Introduce the fundamental concept of data structures
149. To emphasize the importance of data structures in developing and implementing efficient algorithms.
150. Describe common applications for arrays, records, linked structures, stacks, queues, trees, and graphs.

Course Outcomes:

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

151. Define the concept of Dynamic memory management, data types, and algorithms.

152. Illustrate advantages and disadvantages of specific algorithms and data structures.

153. Solve bugs in program, recognize needed basic operations with data structures.

154. Interpret algorithms and data structures in terms of time and memory complexity of basic operations.

155. Compare the computational efficiency of the principal algorithms for sorting, searching, and hashing.

Course Description:

Study of advanced programming topics focused on logical structures of data as well as the design, implementation and analysis of algorithms operating on these structures. Students will gain the fundamental concept of data structures and to emphasize the importance of data structures in developing and implementing efficient algorithms.

Unit-I	5 Lecture Hours

Course Content:

INTRODUCTION: Data and Information, Representation of Data, Data Type, Data Structure, Classifications of Data Structures, Application of Data Structures, Abstract Data Type, Operations Perform on Data Structure, Overview of Different Data Structures, Algorithm, Types of Algorithm, Algorithm Development Life Cycle.

ARRAY AND STRING : Array, One-dimensional array, Address calculation in One-dimensional array

Multi-dimensional array, Address calculation in two-dimensional array, Operations Perform on Array, Applications of Array, Representation of Polynomials , Sparse Matrix, Strings, Array of strings, Operations Perform on Strings. Pointer Declaration, Address of Operator, Indirection Operator, Null Pointer, void Pointer, Generic Functions, Dangling Pointer, Arithmetic Operation with Pointer, Pointer to Pointer, Pointers and Arrays, Array of Pointers, Pointer to an Array , Pointer to Function, Passing addresses to Function, Function returning Pointer, Dynamic Memory Allocation, Creating one-dimensional array, Creating two-dimensional array, Pointers, Arrays and Strings.

Unit-II	10 Lecture Hours

STACK AND QUEUE: Stack, Operations on Stack, Stack Representation with Array, Stack Representation with Linked List, Processing of function calls, ,Evaluation of Arithmetic expressions, Queue, Operations on Queue, Queue Representation with Array, Queue Representation with Linked List, Application of Queue, Drawback of Linear Queue Circular Queue, Circular Queue Representation with Array, Dequeue, Operation on DeQueue, Priority Queue, Representation of Priority Queue.

LINKED LIST: Limitations of Array, Linked List, Singly Linked list, Operations on Singly linked list, Representation of polynomials using linked list, Circular Linked list, Operation on Circular Link List, Josephus Problem, Doubly Linked list, Operation on Doubly Link List, Circular Doubly Linked List, Disadvantages of Linked List

Unit-III :	15Lecture Hours

TREE: Terminology of Tree, Binary Tree, Strictly Binary Tree, Extended Binary Tree, Complete Binary Tree, Full Binary Tree, Skewed Binary Tree, Binary Expression Tree, Balanced Binary Tree, Threaded Binary Tree, Properties of Binary Tree, Representation of Binary Tree, Binary Tree Traversal, Binary Search Tree, Operations on Binary Search Tree, Heap, Operations on Heap, AVL Tree, Operations on AVL Tree,

GRAPH: Terminology of Graph, Terminology of a Directed Graph, Operations on Graph, Representation of Graph, Graph Traversal, Spanning Trees and Minimum Spanning Trees, Kruskal's Algorithm, Prim's Algorithm.

Unit-IV	10 Lecture Hours

SEARCHING AND SORTING: Linear Search, Binary Search, Interpolation Search, Bubble Sort, Insertion Sort

Selection Sort, Quick Sort, Merge Sort, Heap Sort, Radix Sort, Shell Sort, Time complexity of Sorting Algorithms

RECURSION: Recursion Essentials, Infinite Regress, Depth of Recursion, Recursion Tree, Types of Recursion, Factorial, Fibonacci Sequence, GCD, Integer Power, Tower of Hanoi, Non-attacking Eight Queens, Converting Recursive function to Iterative.

Unit-V	5 Lecture Hours

HASHING: Hash Table, Hash Function, Division Method, Mid Square method, Folding method

Collision Resolution, Linear Probing, Quadratic Probing, Double Hashing, Separate Chaining, Load Factor

FILE STRUCTURE: Elements of File System, Category of File Organisation, Sequential File Organisation

Heap File Organisation, Hash File Organisation, Index Sequential File Organisation

Primary Index, Secondary Index.

Text Books:

Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, SartajSahni and Computer Science Press.
Introduction To Algorithms, Thomas H.Cormen, Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein.

Reference Books:

Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.
How to Solve it by Computer, 2nd Impression by R. G. Dromey, Pearson Education.

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 201	Data Structures and Algorithms	CO201.1	3	2	3	3	1	3	3	-	2	-	-	2	1	3	3
		CO201.2	2	3	2	3	1	2	1	-	2	-	-	3	2	3	3
		CO201.3	3	3	2	2	3	3	2	-	2	-	-	3	1	3	2
		CO201.4	3	3	3	2	1	1	2	-	2	-	-	1	1	1	3
		CO201.5	2	3	2	3	3	3	3	-	3	-	-	3	2	1	1
		CO201	2.6	2.8	2.4	2.6	1.8	2.4	2.2	-	2.2	-	-	2.4	1.4	2.2	2.4

1 = Weakly Mapped, 2 = Moderately Mapped, 3 = Strongly Mapped

CSE212	**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

156. To study fundamental concepts of IoT.
157. To study the basic networking
158. To learn different protocols used for IoT design.
159. To be familiar with data handling and analytics tools in IoT.
160. To recognise the factors that contributed to the emergence of IoT.

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

CO1. **Understand** the various concepts, terminologies and architecture of IoT systems and use sensors and actuators for design of IoT.

CO2. **Understand and apply** various protocols for design of IoT systems.

CO3. **Understand** about the technology behind the IoT and associated technologies in practical domains of society.

CO4. **Apply** various techniques of data storage and analytics in IoT.
CO5. **Analyze** applications of IoT in real time scenario.

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
161.   Internet of Things - A Hands-on Approach, Ars deep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
162.   Rajkumar Buyaa and Amir V Dastjerdi, Internet of things: Principles and Paradigms, Morgan Kaufmann
163.   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

164.   Adrian McEwen and Hakim Cassimally, Designing the Internet of Things, Wiley

165.   Olivier Hersent, David Boswarthick and Omar Elloumi, The Internet of Things: Key applications and Protocols, Wiley

166.   Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer

167.   Fadi Al-Turjman, Intelligence in IoT- enabled Smart Cities, 2019, 1st edition, CRC Press, ISBN-10: 1138316849

168.   Giacomo Veneri, and Antonio Capasso, Hands-on Industrial Internet of Things: Create a powerful industrial IoT infrastructure using Industry 4.0, 2018, Packt Publishing.

169.   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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 212	Introduction to Internet of Things	CO212.1	2	2	2	3	2	3	1	-	1	3	-	1	2	3	2
		CO212.2	2	3	2	3	2	3	1	-	3	3	-	3	1	2	2
		CO212.3	2	2	2	2	3	1	3	-	1	2	-	3	3	2	1
		CO212.4	3	2	2	3	3	1	3	-	3	2	-	3	1	2	2
		CO212.5	3	3	3	3	2	2	1	-	2	-	-	1	1	3	3
		CO212	2.4	2.4	2.2	2.8	2.4	2.0	1.8	-	2.0	2.5	-	2.2	1.6	2.4	2.0

1=weakly mapped
2= moderately mapped
3=strongly mapped

AEC102	Communicative English II	L	T	P	C
Version 1.0		2	1	0	3
Pre-requisites/Exposure	Basic Knowledge in English Language				
Co-requisites	-				

Course Description

This course is the continuation of the Communicative English I course, which is offered in semester I. In this course, the learners will have repeated practice of what they have already acquired in the last course and will simultaneously develop news skills. The writing section of this course particularly focuses on academic writing and professional writing. The course intends to develop critical thinking ability of learners through various speaking tasks.

Course Outcomes:

170.   Ability to use receptive skills through listening to acquire good exposure to the target language
171.   Ability to speak and write correct English in all situation
172.   To enhance the knowledge on vocabulary and grammar to address social and humanistic problems
173.   To develop an understanding of written communication etiquettes

Program Outcomes:

174.   Students can read and understand any text in English
175.   Students imbibe the rule of English language unconsciously and can deduce language structure and usage
176.   Students will be able to present arguments and observation through writing
177.   Students will be able to decipher the mechanisms of language usage in different contexts and discourse.

Unit 1

178.   Listening: Practice listening to passages. practicing summarizing listening passages. Reading: practice reading and solving sample passages
179.   Speaking: Describing concepts and thoughts
180.   Grammar: practice tense practice types of sentences (declarative, negation, questions, active and passive voice)

181.   Writing: practice paraphrasing paragraphs from reading passages

Unit 2

182.   Speaking: asking for and giving opinion, agreeing and disagreeing with opinions, persuading and dissuading people. Describing concepts and thoughts
183.   Vocabulary: idioms
184.   Reading: practice reading and solving sample passages
185.   Writing: practice types of letter writing.

Unit 3

186.   Listening: Listen to passages and Speaking: expressing likes, dislikes, sympathy, emotions, hopes, wishes, regrets, and concerns. practice solving questions of listening passages
187.   Speaking: expressing likes, dislikes, sympathy, emotions, hopes, wishes, regrets, and concerns
188.   Grammar: practice different forms of conjunctions, disjunctions, and articles.
189.   Writing: practice report writing and other professional writing styles

Unit 4

190.   Listening: practice collaborative discussion of those passages
191.   Speaking: explaining words and actions with reasons.
192.   Writing: practice sessions on sample academic writing

Recommended Readings

193.   Fluency in English-Part II, Oxford University Press, 2006.
194.   Business English, Pearson, 2008.
195.   Grammar and Composition, Wren and Martin.

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
AEC 102	Communicative English II	CO102.1	2	2	2	2	3	1	3	-	1	-	-	1	2	1	2
		CO102.2	3	3	3	1	2	2	3	-	2	-	-	2	3	1	3
		CO102.3	3	3	2	2	2	2	2	-	2	-	-	1	3	2	1
		CO102.4	3	2	2	2	1	3	1	-	3	-	-	3	3	3	3
		CO102	2.75	2.5	2.25	1.75	2.0	2.0	2.25	-	2.0	-	-	1.75	2.75	1.75	2.25

CSE215	Introduction to IOT Lab	L	T	P	C
Version 1.0	**Contact Hours – 45**	0	0	3	2
Pre-requisites/Exposure	Knowledge of introduction IOT Knowledge of Sensors and Actuators				
Co-requisites	1. Understanding of Python Programming 2. Understanding of Arduino or ESP				

Course Objectives

196.   To understand the concept of data acquisition .
197.   To understand use of RPi or Arduino.
198.   To acquire knowledge of data transmission over Bluetooth or Wifi.
199.   To acquire the knowledge of visualization application.

Course Outcomes

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

CO1. **Illustrate** the requirement of a data acquisition using RPis/Arduino
CO2. **Make use of** Arduino/ESP IoT platform.
CO3. **Develop** data transmission using Bluetooth /Wifi.
CO4. **Develop** MQTT Client
CO5. **Utilize** smart systems in a distributed environment

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

List of experiments:

200. Data Acquisition- I2C/SPI/UART/USB using RPi or Arduino with hats.
201. Create Hello world and download code to an Arduino or ESP.
202. Serial Interface.
203. Data acquisition using digital sensor.
204. Characterization of PIR Sensor.
205. Data acquisition using an ADC and an Analog sensor.
206. Data transmission over Bluetooth or Wifi.
207. Implementing a MQTT client.
208. Visualization application to subscribe to the MQTT topic and show the data.

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

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 215	Introduction to IOT Lab	CO215.1	3	2	2	1	3	3	3	-	3	-	-	2	3	2	2
		CO215.2	2	2	2	2	1	3	1	-	1	-	-	2	1	1	3
		CO215.3	3	2	2	2	2	1	3	-	1	-	-	1	1	2	1
		CO215.4	2	3	2	2	3	3	1	-	3	-	-	2	3	2	1
		CO215.5	3	3	3	3	2	1	3	-	1	-	-	1	3	1	2
		CO215	2.6	2.4	2.2	2.0	2.2	2.2	2.2	-	1.8	-	-	1.6	2.2	1.6	1.8

1=weakly mapped
2= moderately mapped
3=strongly mapped

CSE204	Data Structures and Algorithm Lab	L	T	P	C
Version 1.0	Contact Hours – 30 Hours	0	0	2	1
Pre-requisite/Exposure	Knowledge on programming basics				
Co-requisite	NIL				

Course Objectives:

The objective of the course is to teach programming (with an emphasis on problem solving) and introduce elementary data structures. The student should, at a rudimentary level, be able to prove correctness (loop invariants, conditioning, etc).

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

CO1. **Explain** asymptotic performance of the algorithms.
CO2. **Illustrate** Linear data structures and their applications such as Stacks, Queues and Linked Lists
CO3. **Solve** and understand Non-Linear Data Structures and their Applications such as Trees and
      Graphs
CO4. **Interpret** searching and sorting algorithms.

Course Description:

Data Structures (also called Data Structures and Algorithms in some places) is a core course in all computer science undergraduate curricula. The course is the basis for understanding several data structures and also algorithms that operate on them. The course forms the foundation for almost all computer science subjects: compilers, operating systems, databases, AI and software engineering.

Course Content:

List of Programs:

1.   Write a menu based C program to insert a node at the beginning, after a specified position, at the end of a singly linked list.

2.   Write a menu based C program to delete a node from the beginning, from a specified position, from the end of a singly linked list.

3.   Write a menu based C program to display the data part of the nodes in reverse order, reverse the list and sort the elements of a singly linked list.

4. Write a menu based C program to insert a node at the beginning, after a specified position, at the end of a doubly linked list.

5. Write a menu based python program to delete a node from the beginning, from a specified position, from the end of a doubly linked list.

6. Write a menu based C program to display the data part of the nodes in reverse order, reverse the list and sort the elements of a doubly linked list.

7. Write a menu based C program to insert, delete and display operation of a linear queue by using singly linked list.

8. Write a menu based C program to insert, delete and display operation of a linear queue by using an array.

9. Write a menu based C program to implement push, pop and display operation of a linear queue by using singly linked list.

10. Write a menu based C program to implement push, pop and display operation of a linear queue by using an array.

11. Write a menu based C program to implement insert, delete and display operation of a circular queue by using an array.

12. Write a menu based C program to implement insert, delete and traverse operation of a binary search tree using doubly linked list.

13. Write a menu based C program to implement linear search, binary search and interpolation search algorithm.

14. Write a menu based C program to implement bubble sort, selection sort, and quick sort, merge sort, insertion sort, heap sort and radix sort algorithm.

15. Implement Tree Traversals, BFS, Graph Traversal, Shortest path and some topics on Spanning Tree using C.

Text Books:

1. Fundamentals of Data Structures", Illustrated Edition by Ellis Horowitz, SartajSahni and Computer Science Press.

2. Introduction To Algorithms", Thomas H.Cormen, Thomas H Cormen, Charles E Leiserson, Ronald L Rivest, Clifford Stein.

Reference Books:

1. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.

2. How to Solve it by Computer, 2nd Impression by R. G. Dromey, Pearson Education.

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

Components	Internal	End Term
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 204	Data Structures and Algorithm Lab	CO204.1	2	2	2	2	1	2	2	-	2	-	-	3	1	1	3
		CO204.2	2	3	3	2	3	2	3	-	2	-	-	3	3	1	2
		CO204.3	2	2	2	3	2	2	2	-	3	-	-	2	1	2	2
		CO204.4	3	3	3	1	3	1	3	-	3	-	-	1	1	1	1
		CO204.5	2	2	1	2	1	2	1	-	1	-	-	3	3	3	2
		CO204	2.2	2.4	2.2	2.0	2.0	1.8	2.2	-	2.2	-	-	2.4	1.8	1.6	2.0

1 = Weakly Mapped
2 = Moderately Mapped
3 = Strongly Mapped

CSE209	Design of Logic Circuits	L	T	P	C
Version 1.0	**Contact Hours -45**	**3**	**0**	**0**	**3**
Pre-requisites/Exposure	**Digital Electronics**				
Co-requisites	**----**				

Course Objectives:

209. To introduce an overview of logic families.
210. To develop students for building k-map.
211. To provide the students a detailed analysis of sequential circuit.
212. To introduce the students to formalize with ASM chart.

Course Outcomes:

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

CO1**. Interpret** and construct the basic design principles of logic gate.
CO2**. Interpret** the different fabrication techniques used in Bipolar, CMOS and PLA.
CO3.**Formaliz**e with mealy and Moore machine.
CO4**. Construct** ROM design.

Catalog Description:

The world of electronics is a lot easier to understand if we start by dividing it into two distinct categories: the "analog" world and the "digital" world. The analog world generally refers to any natural phenomenon that varies its own properties over a period of time. Take the outside temperature, for example. We notice that it changes rather slowly throughout the day, and at any instant we can measure how hot or cold it really is by using a simple thermometer.
The same changing properties can be observed, measured, and recorded in other natural phenomenon such as barometric pressure, wind speed, solar radiation, etc. If you were to record

and graph each of the above events over a 24 hour period, you would notice one similar characteristic: the physical properties of each phenomenon change over time.

Course Content:

Unit I: **06 lecture hours**

==Switching Circuits==: Logic families: TTL, nMOS, CMOS, dynamic CMOS and pass transistor logic (PTL) circuits, inverters and other logic gates, area, power and delay characteristics, concepts of fan-in, fan-out and noise margin.

Unit II: **12 lecture hours**

==Switching theory==: Switching algebra, logic gates, switching functions, truth tables and switching expressions, minimization of completely and incompletely specified switching functions, Karnaugh map and Quine-McCluskey method, multiple output minimization, representation and manipulation of functions using BDD's, two-level and multi-level logic circuit synthesis

Unit III: **06 lecture hours**

==Combinational logic circuits==: Realization of Boolean functions using NAND/NOR gates, Decoders, multiplexers. logic design using ROMs, PLAs and FPGAs. Case studies, fault diagnosis of combinational circuits

Unit IV: **15 lecture hours**

==Sequential circuits==: Clocks, flip-flops, latches, counters and shift registers, finite-state machine model, Mealy and Moore machines, synthesis of synchronous sequential circuits, Conversion of Mealy m/c to Moore m/c and vice-versa, minimization and state assignment, Incompletely specified m/c's, asynchronous sequential circuit synthesis.

Unit V: **06 lecture hours**

ASM charts: Representation of sequential circuits using ASM charts, synthesis of output and next state functions, data path control path partition-based design

Text Books:
213. H. Taub and D. Schilling, Digital Integrated Electronics, McGraw-Hill.
214. Z. Kohavi, Switching and Finite Automata Theory, Tata McGraw-Hill.
215. Randy H. Katz and Gaetano Borriello, Contemporary Logic Design, Prentice Hall of India

Reference Books:
216. Giovanni De Micheli, Synthesis and Optimization of Digital Circuits, Tata McGraw-Hill.

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 209	Design of Logic Circuits	CO209.1	2	3	2	3	1	3	2	-	3	-	-	1	3	3	2
		CO209.2	3	3	3	3	1	1	2	-	2	-	-	3	3	2	3
		CO209.3	2	3	2	3	1	3	1	-	1	-	-	2	1	2	3
		CO209.4	3	3	3	3	1	2	2	-	3	-	-	1	2	3	3
		CO209	2.5	3.0	2.5	3.0	1.0	2.25	1.75	-	2.25	-	-	1.75	2.25	2.5	2.75

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Model Question Paper

Name: **Enrolment No:**	

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION

Name of the Program: BCA	Semester: II
Code- CSE11405	Stream- CSE
Time: 03 Hrs.	
Paper title– Design of Logic Circuit	Total pages- 1
Max. Marks: 50	Total no. of questions- 12

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)

1. At top of sheet, clearly mention Name, Roll No., Enrolment No., Paper Name & Code, and Date of Exam.

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

3. **All parts of a Question should be answered consecutively**

SECTION A (Answer All questions) (5 x 1 = 5)

1.	**List** the different logic gates?	U	CO3
2.	**Explain** switching algebra and switching function.	U	CO1
3.	**Define** logic design using ROM?	R	CO2
4.	**Elucidate** the essential components of multi-level component of logic synthesis.	R	CO4
5.	**What** is ROM logic?	U	CO2
	SECTION B (Attempt any **Three Questions**) **(3 x 5 = 15)**		
6.	**Describe**about mealy and Moore machine?	U	CO4
7.	**Examine**flip-flop and their use in real life?	Ap	CO2
8.	**Elucidate** the factors influencing on C-MOS delay.	Ap	CO3
9.	**Explain**in detail about bi-polar S-RAM cell transistor.	U	CO2
	SECTION C (Attempt any **Two Questions**) **(2 x 10 = 20)**		
10.	**Build** a synchronous Modulo-10 up/down counter using T FFs.	Ap	CO4
11.	**Explain** BCD to excess-3 code conversion in PLA.	U	CO4
12.	**Compare** between Karnaugh map and Quine- McCluskey method and write the advantage of K-map over the Quine-McCluskey method.	U	CO1

CSE210	Python Programming	L	T	P	C
Version 1.0	Contact Hours – 45	3	0	0	3
Pre-requisite/Exposure	10+2 Level Mathematics, Knowledge of Basics of Computer				
Co-requisite	NIL				

Course Objectives:

To understand the concept of programming using python
To apply numerical computations using numpy
To apply scientific computations using scipy
To visualize trends in data using matplotlib
To perform machine learning operations using sklearn

Course Outcomes:

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

CO1 :	Understand the basic concepts of python
CO2 :	Understand database management using python
CO3 :	Apply numerical computation with python
CO4 :	Compare scientific computation methods with python
CO5 :	Visualize trends in the data with python

Course Description:

Data is the new Oil. This statement shows how every modern IT system is driven by capturing, storing and analysing data for various needs. Be it about making decision for business, forecasting weather, studying protein structures in biology or designing a marketing campaign. All of these scenarios involve a multidisciplinary approach of using mathematical models, statistics, graphs, databases and of course the business or scientific logic behind the data analysis. So we need a programming language which can cater to all these diverse needs of data science. Python shines bright as one such language as it has numerous libraries and built in features which makes it easy to tackle the needs of Data science. In this course we will cover these the various techniques used in data science using the Python programming language.

Course Content:

Unit I: **9 lecture hours**
Introduction to Python : Datatypes**, e**xpressions, statements, conditions, loops, classes, objects, functions, data structures, I/O, packages.
Unit II: **9 lecture hours**
Data Handling with Pandas: DataFrames, Series, loading and saving, alignment, missing data, reshaping, pivoting, slicing, indexing, subsetting, insertion/deletion, merge and join, time series.
Unit III: **9 lecture hours**

Numerical computation: ndarrays, datatypes, mathematical and logical operations, linear algebra, fourier transforms, random, searching, sorting, import and export data.

Unit IV   **9 lecture hours**

Scientific computations: Physical and mathematical constants, Fourier transform, Integration routines, Interpolation, Data input and output, Linear algebra routines, Optimization, Signal processing, Sparse matrices, Spatial data structures and algorithms, Any special mathematical functions, Statistics

Unit V   **9 lecture hours**

Data visualization: Chart properties, styling, box plots, heatmaps, scatterplots, bubble charts, 3d charts, time series, geographical data, graph data.

Text Books:

1. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython - Wes McKinney – O'Reilly

2. Machine Learning with Python Cookbook: Practical Solutions from Preprocessing to Deep Learning – Chris Albon- O'reilly

Reference Books:

1. Introduction to Machine Learning with Python: A Guide for Data Scientists by Andreas C. Müller, Sarah Guido-O'Reilly

2. Learning Python: Powerful Object-Oriented Programming, Mark Lutz- O'Reilly

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 210	Python Programming	CO2 10.1	3	3	3	3	1	2	2	-	3	-	-	2	1	1	3
		CO2 10.2	2	3	2	2	3	3	2	-	3	-	-	3	1	2	3
		CO2 10.3	2	1	2	3	2	3	2	-	1	-	-	2	1	2	1
		CO2 10.4	2	3	3	2	2	1	1	-	1	-	-	3	3	3	1
		CO2 10.5	2	2	3	3	1	2	1	-	3	-	-	1	2	1	1
		CO2	2.	2.	2.	2.	1.	2.	1.	-	2.	-	-	2.	1.	1.	1.

		10	2	4	6	6	8	2	6		2			2	6	8	8

1 = Weakly Mapped
2 = Moderately Mapped
3 = Strongly Mapped

CSE211	Computer Organization	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Digtal Logic				
Co-requisite	NIL				

Course Objectives:

To study the basic organization and architecture of digital computers (CPU, memory, I/O, software). Discussions will include digital logic and microprogramming. Such knowledge leads to better understanding and utilization of digital computers, and can be used in the design and application of computer systems or as foundation for more advanced computer-related studies.

Course Outcomes:

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

217. Define functional block of a computer and relate data representation

218. Explain and understand memory hierarchy design, memory access time formula, performance improvement techniques, and trade-offs.

219. **Illustrate** pipelined execution, parallel processing and principles of scalable performances.

220. Analyze the concepts of memory utilization in a computer system.

221. Define the implementation of parallel processors and Analyze the synchronization techniques

Course Description:

The architecture of computer systems and associated software. Topics include addressing modes, interrupt systems, input/output systems, external memory systems, assemblers, loaders, multiprogramming, performance evaluation, and data security.

This task is challenging for several reasons. First, there is a tremendous variety of products that can rightly claim the name of computer, from single-chip microprocessors costing a few dollars

to supercomputers costing tens of millions of dollars. Variety is exhibited not only in cost, but also in size, performance, and application. Second, the rapid pace of change that has always characterized computer technology continues with no letup. These changes cover all aspects of computer technology, from the underlying integrated circuit technology used to construct computer components, to the increasing use of parallel organization concepts in combining those components. In spite of the variety and pace of change in the computer field, certain fundamental concepts apply consistently throughout. The application of these concepts depends on the current state of the technology and the price/performance objectives of the designer. The intent of this paper is to provide a thorough discussion of the fundamentals of computer organization and architecture and to relate these to contemporary design issues.The subtitle suggests the theme and the approach taken in this book. It has always been important to design computer systems to achieve high performance, but never has this requirement been stronger or more difficult to satisfy than today. All of the basic performance characteristics of computer systems, including processor speed, memory speed, memory capacity, and interconnection data rates, are increasing rapidly. Moreover, they are increasing at different rates. This makes it difficult to design a balanced system that maximizes the performance and utilization of all elements.

Unit-I	10 Lecture Hours

Course Content:

Introduction:	
Basic Operational Concepts, Bus Structures, Central processing unit: General register and stack organizations- instruction formats - Addressing modes- Data transfer and manipulation - program control- Performance – Processor Clock, Basic Performance Equation, Clock Rate, Performance Measurement.	
Unit-II	**10 Lecture Hours**
Numbers, Arithmetic Operations and Characters, Addition and Subtraction of Signed Numbers, Data representation: Data types – Complements- fixed point and floating-point representation other binary codes, Code conversions - BCD to Binary and Binary to BCD conversions - ASCII to BCD and BCD to ASCII conversions - Binary to ASCII and ASCII to Binary conversions.	
Unit-III	**15 Lecture Hours**
Interrupts: The 8085 Interrupt – 8085 Vectored Interrupts, priority interrupts, Direct Memory Access(DMA) and DMA controller, Accessing I/O Devices, Buses, Interface Circuits, Standard I/O Interfaces – PCI Bus, SCSI Bus, USB.	
Unit-IV	**10 Lecture Hours**
Semiconductor RAM Memories, Read Only Memories, Speed, Size, and Cost, Cache Memories - Replacement Algorithms, Performance Considerations.	
Unit-V	**5 Lecture Hours**
Execution of a Complete Instruction, Multiple Bus Organization, CISC, RISC, Pipelining - Arithmetic and instruction- RISC pipeline – Pipelining hazards.	

Text Books:

Computer Organization 1.and Design: The Hardware/Software Interface, 5th Edition by David A. Patterson and John L. Hennessy, Elsevier.
Computer Organization and Embedded Systems, 6th Edition by Carl Hamacher, McGraw Hill Higher Education.

Reference Books:

Computer Architecture and Organization, 3rd Edition by John P. Hayes, WCB/McGraw-Hill
Computer Organization and Architecture: Designing for Performance, 10th Edition by William Stallings, Pearson Education.

3. Computer System Design and Architecture, 2nd Edition by Vincent P. Heuring and Harry F. Jordan, Pearson Education

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 211	Computer Organization	CO211.1	3	3	2	1	2	2	3	-	2	-	-	2	3	1	3
		CO211.2	2	3	2	3	2	3	1	-	2	-	-	3	1	2	3
		CO211.3	2	1	2	1	3	3	1	-	2	-	-	3	1	2	2
		CO211.4	2	3	2	2	2	2	2	-	2	-	-	2	1	2	3
		CO211.5	3	3	3	3	2	2	1	-	3	-	-	2	2	3	3
		CO211	2.4	2.6	2.2	2.0	2.2	2.4	1.6	-	2.2			2.4	1.6	2.0	2.8

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3 = Strongly Mapped

CSE214	Python Programming Lab	L	T	P	C
Version 1.0	**Contact Hour -45**	**0**	**0**	**3**	**2**
Pre-requisites/Exposure	**Knowledge of Python Language**				
Co-requisites	**--**				

Course Objectives:

222. To **acquire** programming skills in core Python.
223. To **acquire** Object Oriented Skills in Python
224. To **develop** the skill of designing Graphical user Interfaces in Python
225. To **develop** the ability to solve and analyse mathematical problem in Python

Course Outcomes:

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

CO1. **Classify** how to Write, Test and Debug Python Programs
CO2. **Apply**Conditionals structure Loops and various operators used in Python Programs.
CO3.**Experiment with** functions and **demonstrate** compound data using Lists, Tuples and Dictionaries
CO4. **Solve** how Read and write data from & to files in Python.
 CO5. **Explain** and **develop** the concept of OOP in Python.

Catalog Description:

This course introduces basic concepts in programming language to solve numerical problems. 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. 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 course coordinator.

Course Content:

Experiment 1:
226.   Running instructions in Interactive interpreter and a Python Script.
227.   Develop a program to purposefully to raise Indentation Error and Correct it.

Experiment 2:
Implement different data types, Operators and Expressions using Python language.

Experiment 3:
Implement the knowledge using Decision Statements(if, if-else, if-elif ladder)

Experiment 4:
Familiarize and usage of Loop & nested loop Statements (for,while, do-while)

Experiment 5:
Implement Python program using different sequential data types like List, Tuple, Dictionary Set
Experiment 6:
Understand and develop function programming, its types and function-call.

Experiment 9:
Implement the concept of data files and file handling in Python language.

Experiment 10:
Implement the concept of OOP properties with the help of Python syntax.

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

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Outcomes (COs)		Mapped POs and PSOs
CO-1	**Classify** how to Write, Test and Debug Python Programs	**PO1, PO2**
CO-2	**Apply**Conditionals structure Loops and various operators used in Python Programs	**PO2, PO3, PSO1**
CO-3	**Experiment with** functions and **demonstrate** compound data using Lists, Tuples and Dictionaries	**PO1, PO2, PO3, PO4**
CO-4	**Solve** how Read and write data from & to files in Python.	**PO1, PO2, PO4, PSO1**
CO -5	**Explain** and **develop** the concept of OOP in Python.	**PO1, PO2, PO3, PO4, PSO1**

Course Code	Course Title	Computational knowledge PO1	Design/development of solutions PO2	Conduct investigations of complex problems PO3	Problem analysis PO4	The engineer and society PO5	Communication PO6	Modern tool usage PO7	Environment and sustainability PO8	Ethics PO9	Individual and team work PO10	Project management and finance PO11	Life-long learning PO12	To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications. PSO1	To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors. PSO2	Analyze and synthesis computing systems through quantitative and qualitative techniques. PSO3
CSE12456	Data Science with Python Lab	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

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

Name of the Program: BCA   Semester: III   Stream: CSE
PAPER TITLE: Data Science with Python Lab
PAPER CODE: CSE12456
Maximum Marks: 50   Time duration: 3 hours
Total No of questions: 5   Total No of Pages: 01

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

Section A (Answer All the Questions) (5 x 10 = 50)		
1. Write a program to purposefully to **Find** Indentation Error and Correct it.	**R**	**CO1**
2. **Solve** a program to swap values of two variables with and without using third variable.	**AP**	**CO2**
3. **Develop** a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)	**AP**	**CO2**
4. **Construct** a program to create a structure named company which has name, address, phone and no Of Employee as member variables. Read name of company, its address, phone and no Of Employee. Finally display these members" value.	**AP**	**CO3**
5. Write a program to **summarize** the concept of Multiple Inheritance with the help of Python syntax.	**U**	**CO5**

CSE301	Object Oriented Programming with JAVA	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Knowledge of procedural programming				
Co-requisite	NIL				

Course Objectives:

Students will be motivated to solve the problems in engineering using the concepts of object-oriented programming.

Course Outcomes:

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

CO1. **Interpret** fundamentals of object-oriented programming in Java, including defining Classes, invoking methods, using class libraries, etc.
CO2. **Construct** programming solutions with exception handling and multi-threading concept
CO3. Develop programming solutions using database connection
CO4. . **Solve** GUI program with proper event handling techniques
CO5. **Develop** programming solutions to real world problems effectively.

Course Description:

This course investigates object-oriented methods including object-oriented programming methodologies and techniques. Current methodology is emphasized. The use of object-oriented features such as encapsulation, information hiding, inheritance and polymorphism is reinforced by class assignments and programming exercises. The importance of multi-threading and exception handling is introduced in this course.

Unit-I	09 Lecture Hours

Course Content:

OOP Concepts - Data Abstraction, Encapsulation, Inheritance, Benefits of Inheritance, Polymorphism, Classes and Objects, Procedural and OOP Paradigms. Introduction To Java, Data Types, Variables & Constants, Scope & Life Time Of Variables, Precedence Of Operator, Expressions, Type Casting, Enumerated Types, Block Scope, Control Flow, Conditional Statements, Loops, Break & Continue Statements, Arrays, Console Input/Output, Formatting Output, Constructors Methods, Parameter Passing, Static Fields & Methods, Access Control, "This" Reference, Method Overloading, Recursion, Garbage Collection, Building Strings, String Class.

Unit-II	09 Lecture Hours

Exception Handling - Dealing With Errors, Advantages Of Exception Handling, The Classification - Exception Hierarchy, Checked And Unchecked Exceptions, Try, Catch, Throw, Throws And Finally, Exceptions-Throwing, Exception Specification, Built In Exceptions, Creating Exception Sub Classes.

Multithreading - Difference Between Multiple Processes And Multiple Threads, Thread States, Creating And Interrupting Threads, Thread Priorities, Synchronizing Threads, Inter-Thread Communication, Procedure Consumer Pattern.

Unit-III	09 Lecture Hours

Collection Framework - Introduction, Generics and Common Use Of Collection Classes, Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendars And Properties.

Files - Streams - Byte Streams, Character Streams, Text Input/Output, Binary Input/Output, Random Access of File Operations, File Management.

Connecting To Database – JDBC / ODBC Type 1 To 4 Drivers, Connection And Handling Databases With JDBC.

Unit-IV	09 Lecture Hours

GUI Programming - The AWT Class Hierarchy, Introduction To Swing, Swing Vs, AWT, Hierarchy Of Swing Components, Containers - Jframe, Japplet, Jdialog, Jpanel, Overview Of Swing Components: Jbutton, Jlabel, Jtextfield, Jtextarea, Swing Applications, Layout Management - Types - Border, Grid And Flow

Event Handling - Events, Sources, Classes, Listeners, Event Sources And Listeners, Delegation Event Model, Examples. Handling Mouse Events, Adapter Classes.

Applets - Inheritance Hierarchy For Applets, Differences Between Applets And Applications, Life Cycle, Passing Parameters To Applets, Applet Security Issues.

Unit-V	09 Lecture Hours

Application Development: Design of real life GUI applications using Swing/AWT/JDBC for Employee management system, Hotel management system, Hospital management system etc.

Text Books:

Java Fundamentals - A Comprehensive Introduction, Illustrated Edition By Daleskrien, Herbert Schildt, Mcgraw-Hill Education.

Reference Books:

Java For Programmers, 2nd Edition By Paul Deitel And Harvey Deitel, Pearson Education.
Thinking In Java, Low Price Edition By Bruce Eckel, Pearson Education

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 301	Object Oriented Programming with JAVA	CO301.1	2	1	3	2	1	3	2	-	1	-	-	2	2	2	2
		CO301.2	3	3	2	3	3	2	2	-	1	-	-	1	2	2	1
		CO301.3	2	3	1	2	1	3	3	-	3	-	-	3	3	3	1
		CO301.4	3	1	2	3	1	3	2	-	3	-	-	2	3	2	1
		CO301.5	2	2	1	3	2	3	1	-	2	-	-	2	1	2	2
		CO301	2.4	2.0	1.8	2.6	1.6	2.8	2.0	-	2.0	-	-	2.0	2.2	2.2	1.4

1 = Weakly Mapped
2 = Moderately Mapped
3 = Strongly Mapped

MODEL QUESTION PAPER

	ADAMAS UNIVERSITY		
	END SEMESTER EXAMINATION (Academic Session: 2022 – 23)		
Name of the Program:	BCA	**Semester:**	IV

Paper Title:	Object oriented programming with Java	Paper Code:	CSE11409
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	**17**	**Total No of Pages:**	02
(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.		

Ques No.	Question	Knowledge Level	Course Outcome
	Group A : Answer ALL the questions (5 x 1 = 5)		
1	**Discuss** about the concept of Encapsulation.	U	CO1
2	**Explain** the benefits of exception handling	U	CO2
3	**What** is byte stream?	R	CO3
4	**Explain** why Java Swing is considered light-weight.	U	CO4
5	**Explain** how Java can be used to build an application for Hospital.	U	CO5
	Group B : Answer ALL the questions (5 x 2 = 10)		
6	**a)** **Explain** the different types of inheritance.	U	CO1
	(OR)		
	b) **Explain** what is data hiding.		
7	**Explain** with suitable Java code about the significance of try, catch blocks.		CO2
	(OR)		
	Discuss how can you handle DivideByZeroException in Java program.	U	

8	**Elucidate** the purpose of Java generics.	U	CO3
	(OR)		
	Explain with suitable Java code about reading the contents of an existing text file.		
9	**Explain** why Java Swing is preferred to Java AWT.	U	CO4
	(OR)		
	How can you execute an applet in Java? Mention the steps.		
10	**Explain** what are the minimum number of classes required for designing a Java application for Bank.	An	CO5
	(OR)		
	Explain what are the minimum number of classes required for designing a Java application for Employee management system.		
Group C : Answer ALL the questions (7 x 5 =35)			
11	**What** gives Java its "write once and run any where nature"?	An	CO1
	(OR)		
	b) **Is** multiple inheritance possible in Java? Justify your answer**.**		
12	**Compare and** contrast single threading and multi threading**.**	An	CO2

	(OR)		
	Is finally block mandatory with a try-catch block in a Java program? When is it executed?		
13	**Discuss** about the JDBC-ODBC drivers.	**U**	**CO3**
	(OR)		
	How will you handle binary input/output?		
14	**Discuss** with an example for JButton and JLabel components in Java.	**U**	**CO4**
	(OR)		
	Write short notes on Event delegation model.		
15	**Draw** the AWT hierarchy diagram and explain any 5 of its components.	**U**	**CO4**
	(OR)		
	Explain what is event listener.		
16	**How** will you connect to database with a Java application? Explain with the help of a real life application.	**U**	**CO5**
	(OR)		
	What is JDBC-ODBC driver? Elucidate**.**		
17	**Consider** there is a hotel in you area, for which you have to design a Java GUI application to manage their system. Explain how will you implement this scenario.	**An**	**CO5**

	(OR)		
	Explain how to insert rows into a JTable by using JDBC-ODBC driver in a Java GUI application.		

Note: The Sample prepared by assuming 5 COs in a course, considering one CO for one Module.
231.   If the COs are higher in numbers that can be managed by equating sub-divisional questions
232.   If the COs are lower in numbers, the questions can be increased by equating the number of COs

CSE306	Object Oriented Programming Lab	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	0	0	3	2
Pre-requisite/Exposure	Knowledge of programming basics				
Co-requisite	NIL				

Course Objectives:

To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling, functions and object oriented approaches.

Course Outcomes:

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

CO1. **Define** classes, objects, members of a class and the relationships among them needed for a

finding the solution to specific problem.

CO2. **Illustrate** object oriented modelling techniques like classes and Instances modelling techniques

CO3. **Interpret** fundamentals of object-oriented programming in Java, including defining

Classes, invoking methods, using class libraries, etc.

CO4. **Construct** programming solutions with exception handling and multi-threading concept

CO5. **Solve** GUI program with proper event handling techniques.

Course Description:

This course investigates object-oriented methods including object-oriented programming methodologies and techniques. Current methodology is emphasized. The use of object-oriented features such as encapsulation, information hiding, inheritance and

polymorphism is reinforced by class assignments and programming exercises. The importance of multi-threading and exception handling is introduced in this course.

Unit-I	09 Lecture Hours

Course Content:

Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

Write a Java program to illustrate the parameterized constructor.

Write a Java program to add two numbers with int and float types using method overloading.

Unit-II	09 Lecture Hours

Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box

Unit-III	09 Lecture Hours

Write a Java program to list all the files in a directory including the files present in all its subdirectories.

Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

Unit-IV	09 Lecture Hours

Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with "Stop" or "Ready" or "Go" should appear above the buttons in selected color. Initially, there is no message shown.

Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.

a) Develop an applet in Java that displays a simple message.

 b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

Unit-V	09 Lecture Hours

Write a Java program that simulates a Banking GUI application with facilities of deposit, withdraw and check balance in an account.

Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

Text Books:

Java Fundamentals - A Comprehensive Introduction, Illustrated Edition ByDaleskrien, Herbert Schildt, Mcgraw-Hill Education.

Reference Books:

Java For Programmers, 2nd Edition By Paul Deitel And Harvey Deitel, Pearson Education.
Thinking In Java, Low Price Edition By Bruce Eckel, Pearson Education

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

Components	Internal	End Term
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 306	Object Oriented Programming Lab	CO306.1	3	2	3	3	3	3	1	-	2	-	-	2	1	1	1
		CO306.2	2	2	2	1	3	2	1	-	3	-	-	1	2	3	2
		CO306.3	3	3	1	2	3	1	2	-	2	-	-	3	1	3	2
		CO306.4	3	3	1	2	1	3	3	-	1	-	-	2	1	2	2
		CO306.5	3	3	2	3	3	1	3	-	3	-	-	1	2	3	2
		CO306	2.8	2.6	1.8	2.2	2.6	2.0	2.0	-	2.2	-	-	1.8	1.4	2.4	1.8

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2 = Moderately Mapped
3 = Strongly Mapped

MODEL QUESTION PAPER

ADAMAS UNIVERSITY
END SEMESTER EXAMINATION
(Academic Session: 2022 – 23)

Name of the Program:	BCA	Semester:	IV
Paper Title:	Object oriented programming lab	**Paper Code:**	CSE12413
Maximum Marks:	50	**Time Duration:**	3 Hrs
Total No. of Questions:	**05**	**Total No of Pages:**	01
(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.		

Ques No.	Question	Knowledge Level	Course Outcome
	Group A : Answer ALL the questions (5 x 10= 50)		
1	Write a Java program to illustrate the parameterized constructor.	**Ap**	**CO1**
2	Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box	**Ap**	**CO2**
3	Write a Java program to list all the files in a directory including the files present in all its subdirectories.	**Ap**	**CO3**
4	Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid	**Ap**	**CO4**

	Layout.		
5	Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order	**Ap**	**CO5**

Note: The Sample prepared by assuming 5 COs in a course, considering one CO for one Module.
233.   If the COs are higher in numbers that can be managed by equating sub-divisional questions
234.   If the COs are lower in numbers, the questions can be increased by equating the number of COs

CSE315	Design and Analysis of Algorithms Lab	L	T	P	C
Version 1.0	**Contact Hours -45**	**0**	**0**	**3**	**2**
Pre-requisites/Exposure	**Programming and Data structures and High Level programming Language like C, Java and Python anyone.**				
Co-requisites	**--**				

Course Objectives:

1. To develop a problem and design the solution for the problem.
2. To design and implement efficient algorithms for a specified application.
3. To provide the ability to identify and apply the suitable algorithm for the given real world problem

Course Outcomes:

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

235. **Analyze** the complexities of various problems in different domains.
236. **Identify** the problem given and design the algorithm using various algorithm design techniques.
237. **Implement** various algorithms in a high level language
238. **Analyze** the performance of various algorithms.
239. **Compare** the performance of different algorithms for same problem.

Catalog Description:

Algorithmic study is a core part of Computer Science. This study caters to all possible applicable areas of Computer Science. This study includes observation, design, analysis and conclusion. Various types of algorithms have different notion of implementation

according to their cost (in terms their time and space complexity). This study also includes refinement of one algorithm as per the applicability to real problems. Categorization of algorithms according to different method of design also includes in this course. It also compares the same algorithm using different algorithm design methods. For example, Knapsack problem can be solved in Greedy approach and Dynamic approach, both are optimization method. This course enables the students to think analytically while applying, designing an algorithm to solve a specific problem.

Course Content:

Experiment 1:
Implementation based on Divide and Conquer: Binary Search using Divide and Conquer approach, Quick sort and Merge Sort

Experiment 2:
Implementation based on Dynamic Programming : Implement all pair of Shortest path for a graph (Floyed-Warshall Algorithm), Dijkstra's , Bellman Ford Algorithm and Implement Traveling Salesman Problem

Experiment 3:
Implementation based on Brunch and Bound :Implement 15 Puzzle Problem

Experiment 4:
Implementation based on Backtracking :Implement 8 Queen problem, Graph Coloring Problem, Hamiltonian Problem

Experiment 5:
Implementation based on Greedy method**:** Knapsack Problem and Job sequencing with deadlines, Minimum Cost Spanning Tree by Prim's Algorithm and Minimum Cost Spanning Tree by Kruskal's Algorithm

Experiment 6:
Implementation based on Graph Traversal Algorithm**:** Implement Breadth First Search (BFS) and Implement Depth First Search (DFS)

Text Books:
240.   Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L RivestAnd Clifford Stein, MIT Press/Mcgraw-Hill.
241.   Fundamentals of Algorithms – E. Horowitz Et Al.

CSE303	Database Management System	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Set Theory, Knowledge of programming language.				
Co-requisite	NIL				

Course Objectives:

242. To understand database concepts, applications, data models, schemas and instances.

243. To implement the relational database design and data modelling using entity-relationship (ER) model.

244. To demonstrate the use of constraints and relational algebra operationsand Normalization process

245. To learn the new emerging Technologies and Applications in database.

Course Outcomes:

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

246. **Describe** the characteristics of database and the architecture of Database system.

247. **Model** the elements used in Entity- Relationship diagram.

248. **Summarize** relational model concept and illustrate the relational constraints.

249. **Build** Structured Query Language (SQL) and apply to query a database and **Define** normalization for relational databases.

Unit-I	9 Lecture Hours

250.   **Develop** some Standalone (Example)/ Mobile/ Web Application DBon real world case studies.

Course Description:

Databases form the backbone of all applications today – tightly or loosely coupled, intranet or internet based, financial, social, administrative, and so on. Database Management Systems (DBMS) based on relational and other models have long formed the basis for such databases. Consequently, Oracle, Microsoft SQL Server, Sybase etc. have emerged as leading commercial systems while MySQL, PostgreSQL etc. lead in open source and free domain. While DBMS's differ in the details, they share a common set of models, design paradigms and a Structured Query Language (SQL). In this background the course examines data structures, file organizations, concepts and principles of DBMS's, data analysis, database design, data modeling, database management, data & query optimization, and database implementation. More specifically, the course introduces relational data models; entity-relationship modeling, SQL, data normalization, and database design. Further it introduces query coding practices using MySQL (or any other open system) through various assignments. Design of simple multi-tier client / server architectures based and Webbased database applications is also introduced.

Course Content:

Overview of database management systems and the relational mode:	
Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations. ER models: Entity Set, Relation Ship Set, Cardinality Properties, Type of Entities, Type of Keys, Aggregation, Specialization and Generalization.	
Unit-II	**9 Lecture Hours**
Database design: E-R diagrams, constraints, normal forms Relational algebra, Fundamental Operations, Additional Operations. Select, Project, Cartesian Product, UNION, Set difference, Rename. Types of joining operations, Division, Intersection, Aggregate. Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.	
Unit-III	**9 Lecture Hours**
SQL: data definition, data manipulation, queries, views, constraints, triggers: Relational database design: Integrity Constraint, Domain Constrain, Referential Integrity, Functional Dependencies, Closure of Set, Cover and Canonical Cover, Types of Anomalies, Armstrong's axioms, Extended Armstrong's axioms, Assertions and Demons. Data Base Decomposition: Domain and data dependency, Normal forms: 1NF, 2 NF, 3 NF, BCNF, Dependency preservation, Lossless design.	
Unit-IV	**9 Lecture Hours**
Storage and indexing: B-trees, hashing: Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms. Storage strategies: Indices, B-trees, B+-trees, hashing, File System, Disk Organization, Physical Storage, Buffer management.	
Unit-V	**9 Lecture Hours**

Case Studies : Standalone (Example)/ Mobile/ Web Application DB:

Transaction processing: Failure, Recovery from Failure, Different States of Transaction, Transaction Isolation, ACID property, Serializability of scheduling, Multi-version and optimistic Concurrency Control schemes. Concurrency control: Locking and timestamp-based schedulers, 2-Phase Locking Protocol, Dead Lock, Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection. Advanced topics: Distributed databases, Data warehousing and data mining.

Text Books:

"Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill 2. "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.

Reference Books:

"Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education

"Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 303	Database Management System	CO303.1	2	2	2	1	3	2	1	-	1	-	-	2	2	3	2
		CO303.2	1	3	3	3	2	3	3	-	2	-	-	3	1	2	3
		CO303.3	3	3	2	2	3	2	2	-	3	-	-	1	1	3	2
		CO303.4	2	3	3	2	3	2	3	-	1	-	-	1	1	2	3
		CO303.5	1	2	3	2	3	3	3	-	3	-	-	3	1	3	2
		CO303	1.8	2.6	2.6	2.0	2.8	2.4	2.4	-	2.0	-	-	2.0	1.2	2.6	2.4

1 = Weakly Mapped

2 = Moderately Mapped

3 = Strongly Mapped

CSE308	Database Management System Lab	L	T	P	C
Version 1.0	**Contact Hours -45**	**0**	**0**	**3**	**2**
Pre-requisites/Exposure	**Set Theory, Knowledge of programming language.**				
Co-requisites	**--**				

Course Objectives:

1. To understand the fundamentals of how data is stored in computer systems.
2. To know the fundamentals of Structured Query Language (SQL) and how it can be used to store and retrieve data from a relational database.
3. To be able to apply the principles used in class to build a web-based database application from the ground up.

Course Outcomes:

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

CO1. **Organize** the basic concepts of Database Systems and Applications.
CO2. **Construct** the basics of SQL query from relational algebra expressions.
CO3. **Define** a commercial relational database system (Oracle, MySQL) by writing SQL using thesystem.
CO4. **Apply**query optimize algorithms to Optimize the Query.

Catalog Description:

The primary goal of this class is to learn principles and practices of database management and database design. Over the course of the semester we will discuss the database relational database design, normalization, SQL queries, reports and other interfaces to database data, and documentation. Lectures will also cover writing ethical and privacy

issues associated with database systems. In- class instruction and exercises will focus on the fundamentals for creating sophisticated, interactive, and secure database applications.

Course Content:

Experiment 1:

Familiarization of ==structured query language.==
Experiment 2:

Table Creation.
Experiment 3:

Insertion, Updation, Deletion of tuples.
Experiment 4:

Executing different queries based on different functions.
Experiment 5:

Performing ==joining operations.==

Experiment 6:

Nested Queries.
Experiment 7:

Use of ==aggregate functions==.
Experiment 8:

Use of group functions.
Experiment 9:

Use of order by functions.
Experiment 10:

Arithmetic operations.
Experiment 11:

Trigger using SQL.
Experiment 12:

==Introduction to PL/SQL.==
Experiment 13:

Report generation of various queries.
Experiment 14:

Merging Data Bases with front end using <mark>ODBC connection</mark>.
Experiment 15:

SQL Injection on a non-harmful test page.

Text Books:
1.   "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill
2.   "Principles of Database and Knowledge – Base Systems", Vol 1 by J. D. Ullman, Computer Science Press.

Reference Books:
1.   "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education
2.   "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.

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

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 308	Database Management System Lab	CO308.1	3	3	3	2	1	1	3	-	1	-	-	2	1	1	3
		CO308.2	3	2	3	3	1	2	1	-	3	-	-	2	1	2	2
		CO308.3	2	2	3	3	2	1	2	-	3	-	-	2	2	2	2
		CO308.4	2	3	2	3	1	3	3	-	1	-	-	1	3	1	2
		CO308	2.5	2.5	2.7	2.7	1.2	1.7	2.2		2.0	-	-	1.75	1.75	1.5	2.25

					5	5	5	5	5							

1=weakly mapped   2= moderately mapped 3=strongly mapped

CSE305	Industrial Internship	L	T	P	C
Version 1.0		0	0	0	2
Pre-requisites/Exposure	**Basic idea of the required subjects**				
Co-requisites					

Course Objectives

1. To Give and overview of Internship.
2. To enable students building team.
3. To give the students a outline of technical internship.
4. To expound Idea dissemination for internship.

Course Outcomes

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

CO1 **Interpret** importance of Internship.
CO2.**Construct** the real-life scenario with internship.
CO3.**Analyse** and practical implementation with emerging application.
CO4. **Classify** understanding in technology upgradation.

Catalog Description

The course involves presentation and report submission by every student. Reference search and technical internship skills along with effective presentation skills are focused. The course strengthens the research attributes including internship survey.

Course Content

An internship enables you to gain <mark>first-hand exposure</mark> of working in the real world. It also allows students to harness the skill, knowledge, and theoretical practice they learnt in university. You can acquire endless amounts of education in your life, however, that knowledge doesn't always translate to the working life. The great thing about internships is that it teaches young professionals about the specific industries and companies they are interested in.

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

Components	Continuous Assessment	ETE
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Cou rse	Cour se	COs	P O	P O	P O	P O	P O	P O	P O	P O	P O	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3

Code	Name		1	2	3	4	5	6	7	8	9						
CSE 305	Industrial Internship	CO305.1	2	2	2	2	2	1	1	-	2	3	3	2	3	1	1
		CO305.2	3	3	2	2	2	2	2	2	3	2	-	3	1	2	1
		CO305.3	2	2	2	2	3	3	1	-	2	2	-	2	2	1	2
		CO305.4	3	2	2	2	2	3	3	-	3	-	-	3	3	1	3
		CO305	2.5	2.25	2.0	2.0	2.25	2.25	1.75	2.0	2.5	2.33	3.0	2.5	2.25	1.25	1.75

1=weakly mapped
2= moderately mapped
3=strongly mapped

CSE309	Computer Networks	L	T	P	C
Version 1.0	Contact hour-45	3	0	0	3
Pre-requisites/Exposure	Computer Fundamentals				
Co-requisites	--				

Course Objectives:

251. To give a brief overview of fundamentals of computer network
252. To conceptualize understanding in transmission media and data communication.
253. To propagate a functional overview of addressing techniques and protocols
254. To analyse file transfer protocols, and concepts of secured data communication technique

Course Outcomes:

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

255. Explain key networking concepts, principles, design issues and techniques at all protocol layers.
256. Contrast between different types of networks (e.g., wide area networks vs. local area networks, wired vs. wireless) in terms of their characteristics and protocols used.
257. Describe different types of networked applications and what underlying network protocols are needed to meet their diverse requirements.
258. Distinguish between control and data planes in computer networks, and their corresponding architectures in real-world networks (including the Internet).
259. Illustrate reliable transport protocols and networked system architectures via implementation using Socket APIs, measurement and analysis.

Course Description:

In this course, students will study architectures, protocols, and layers in computer networks and develop client-server applications. Topics include the OSI and TCP/IP models, transmission fundamentals, flow and error control, switching and routing, network and transport layer protocols, local and wide-area networks, wireless networks, client-server models, and network security. Students will extend course topics via programming assignments, library assignments and other requirements.

Unit-I	9 Lecture Hours

Course Content:

Unit Heading: Idea Of Networking	
What Is the <mark>Internet</mark>?, Network Edge, Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and Their Service Models, Networks Under Attack. Principles of Network Applications, Web and HTTP, Electronic mail in Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications. LAN Topology, Encoding Technique, Transmission Mode, layers of networking	
Unit-II	**9 Lecture Hours**
Unit Heading: <mark>Datalink</mark> layer Concept	
Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet. THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wireless LAN, Broadband Wireless, Bluetooth	
Unit-III	**9 Lecture Hours**
Unit Heading: <mark>Network</mark> and <mark>Transport</mark> layer	
Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service. Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP. Addressing Mode Class A,B,C,D	
Unit-IV	**9 Lecture Hours**
Unit Heading: <mark>Socket</mark> Over view	
Client server Model.What is socket.TCP socket over view, Socket options – getsocket and setsocket functions – generic socket options – IP socket options – ICMP socket options – TCP socket options – Elementary UDP sockets – UDP echo Server – UDP echo Client – Multiplexing TCP and UDP sockets – Domain name system – gethostbyname function – Ipv6 support in DNS – gethostbyadr function – getservbyname and getservbyport functions	
Unit-V	**9 Lecture Hours**

Unit Heading: Application Layer

Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http. APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.Socket Programming,Network security,Leaky Bucket application,WSN concept and realtime application case study.

Text Books:

. Computer Networking -Top Down Approach- James F. Kurose and Keith W. Ross-- Pearson 2013, sixth Edition
Data Communications and Networking- Behrouz A. Forouzan-McGraw-Hill 2007, fourth Edition.

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE309	Computer Networks	CO309.1	2	2	3	1	3	3	2	-	3	-	-	2	3	2	1
		CO309.2	3	2	3	3	1	3	1	-	1	2	2	2	1	3	3
		CO309.3	2	3	2	2	3	3	3	-	2	-	-	1	2	2	2
		CO309.4	1	1	3	3	2	3	2	-	3	2	3	3	2	2	3
		CO309.5	3	3	3	1	3	3	2	-	2	2	2	3	1	1	1
		CO309	2.2	2.2	2.8	2.0	2.4	3.0	2.0	-	2.2	2.0	2.33	2.2	1.8	2.0	2.0

1 = Weakly Mapped
2 = Moderately Mapped
3 = Strongly Mapped

CSE314	Computer Network Lab	L	T	P	C
Version 1.0	Contact Hours – 15 Hours	0	0	3	2
Pre-requisite/Exposure	Fundamental of Computer and LAN				
Co-requisite	NIL				

Course Objectives:

260.　To introduce the idea of Network components like router, switch ,gateway

261.　To develop a Network topology in packet tracer

262.　To inculcate a concept of addressing mode and subnetting

263.　To analyse socket concept between client and server

Course Outcomes:

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

264.　Design a LAN Topology in Packet tracer with example

265.　Develop a network using distance vector routing protocol

266.　Apply the understanding in LAN Topology in Packet tracer with example
267.　Connectionless Iterative Echo-server, date and time, character generation using user-defined port

268.　Functional Overview of Client server model

Course Description:

Use Networking-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 Networking tools including network design prediction and modelling to complex networking Ing activities with an understanding of the limitations

Course Content:

Suggested assignments to be framed based on the following Programming Language such as Network topology, PacketTracer, Socket programming In C

Experiment 1:
Explain different type of network cables and their Usage with diagram
Experiment 2:
Explain the LAN Topology in Packet tracer with example

Experiment 3:
Study the Basic of Network commands and their Usage Windows/UNIX

Experiment 4:
Configure a network using distance vector routing protocol

Experiment 5:
Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whois

Experiment 6:
Socket Programming: Implementation of Connection-Oriented Service using standard ports.

Experiment 7:
Implementation of Connectionless Iterative Echo-server, date and time, character generation using user-defined port

Experiment 8:
Implementation of Connection-Oriented Concurrent Echo-server, date and time, character generation using user-defined ports

Experiment 9:
Program for connection-oriented Iterative Service in which server reverses the string sent by the client and sends it back

Experiment 10:
Program for connection-oriented Iterative service in which server changes the case of the strings sent by the client and sends back (Case Server).

Experiment 11:
Program for Connection-Oriented Iterative service in which server calculates the Net-salary of an Employee based on the following details sent by the

Experiment 12:
Program for Remote Command Execution using sockets

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CSE 314	Computer Network Lab	CO314.1	3	2	2	2	2	1	1	-	2	-	-	1	2	1	1
		CO314.2	2	2	2	3	2	1	3	-	1	-	-	3	3	3	3
		CO314.3	2	2	2	3	2	3	2	-	1	-	-	3	1	2	1
		CO314.4	3	2	3	3	2	3	2	-	1	-	-	2	3	3	1
		CO314.5	2	2	2	2	1	2	3	-	1	-	-	2	3	3	1
		CO314	2.4	2.0	2.2	2.6	1.8	2.0	2.2	-	1.2	-	-	2.2	2.4	2.4	1.4

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2 = Moderately Mapped
3 = Strongly Mapped

CSE310	Design and Analysis of Algorithms	L	T	P	C
Version 1.0	Contact Hours – 45	3	0	0	3
Pre-requisite/Exposure	Discrete Mathematics				
Co-requisite	Concepts on Programming, Logical Ability, Problem Solving				

Course Objectives:

269.   To introduce problem solving approach through design.
270.   To develop students to analyse the existing algorithms and approach for improvement.
271.   To introduce the students a perspective to different design and analysis approach for algorithm(s) to   solve a problem.
272.   To develop students to select optimal solution to a problem by choosing the most appropriate   algorithmic method.

Course Outcomes:

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

273.   **Understand** the basics about algorithms and learn how to analyse and design algorithms

274.   **Choose** brute force, divide and conquer, dynamic programming and greedy techniques methods to solve computing problems

275.   **Understand** the approach for solving problems using iterative method.

276.   **Describe** the solution of complex problems using backtracking, branch and   bound techniques.

277.   **Classify** the different Computability classes of P, NP, NP-complete and NP-hard.

Course Description:

Algorithmic study is a core part of Computer Science. This study caters to all possible applicable areas of Computer Science. This study includes observation, design, analysis and conclusion. Various types of algorithms have different notion of implementation according to their cost (in terms their time and space complexity). This study also includes refinement of one algorithm as per the applicability to real problems.

Categorization of algorithms according to different method of design also includes in this course. It also compares the same algorithm using different algorithm design methods. For example, Knapsack problem can be solved in Greedy approach and Dynamic approach, both are optimization method. This course enables the students to think analytically while applying, designing an algorithm to solve a specific problem.

Unit-I	09 Lecture Hours

Course Content:

Introduction:

Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behaviour; Performance measurements of Algorithm, Time and space trade-offs, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method and Masters' theorem.

Algorithm Design Paradigms.

Unit-II	09 Lecture Hours

Sorting Algorithms & Data Structures:

Selection sort, bubble sort, insertion sort, Sorting in linear time, count sort, Linear search,

Divide & Conquer:

Quick sort, worst and average case complexity, Merge sort, Matrix multiplication

Binary search, Binary search tree, Strassen's algorithm for matrix multiplication, The substitution method for solving recurrences, The recursion-tree method for solving recurrences, The master method for solving recurrences.

Unit-III	09 Lecture Hours

Greedy algorithms:

General Characteristics of greedy algorithms, Problem solving using Greedy Algorithm-

Activity selection problem, Minimum Spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs: Shortest paths, The Knapsack Problem

Dynamic programming:

Introduction, The Principle of Optimality, Problem Solving using Dynamic Programming-

Making Change Problem, Assembly Line Scheduling, Knapsack problem, Matrix chain multiplication, Longest Common Subsequence Dynamic Programming using Memoization.

Unit-IV	09 Lecture Hours

Graph Algorithms :

Representations of graphs, Breadth-first search, Depth-first search, Topological sort, Strongly connected

components, Minimum Spanning Trees, Growing a minimum-spanning tree, The algorithms of Kruskal and Prim, Single-Source Shortest Paths, Bellman-Ford algorithm, Single-source shortest paths in directed acyclic graphs, Dijkstra's algorithm, Difference constraints and shortest paths, Proofs of shortest-paths properties, All-Pairs Shortest Paths, Shortest paths and matrix multiplication, The Floyd-Warshall algorithm, Johnson's algorithm for sparse graphs, Maximum Flow, Flow-networks, The Ford-Fulkerson method,

Branch & Bound & Backtracking

Unit-V	09 Lecture Hours

String Matching

The naive string-matching algorithm, The Rabin-Karp algorithm, String matching with finite automata, The Knuth-Morris-Pratt algorithm

Approximation Algorithms:

The vertex-cover problem, The traveling-salesman problem, The set-covering problem, Randomization and linear programming

NP-Completeness:

Polynomial time, Polynomial-time verification, NP-completeness and reducibility,

NP-completeness proofs , NP-complete problems.

Text Books:

Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson, Ronald L Rivest And Clifford Stein, MIT Press/ Mcgraw-Hill.
Fundamentals of Algorithms – E. Horowitz Et Al.
Algorithm Design, 1ST Edition, Jon Kleinberg and Évatardos, Pearson.
Book 3 – Author – Publisher

Reference Books:

Algorithm Design: Foundations, Analysis, And Internet Examples, Second Edition, Michael T Goodrich And Roberto Tamassia, Wiley.
Algorithms -- A Creative Approach, 3RD Edition, Udimanber, Addison-Wesley, Reading, MA.

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 310	Design and Analysis of Algorithms	CO310.1	3	3	3	3	1	3	3	-	1	-	-	1	3	1	1
		CO310.2	3	3	3	3	2	3	3	-	2	-	-	2	2	3	3
		CO310.3	2	1	3	2	3	1	1	-	3	-	-	2	1	3	3
		CO310.4	2	1	3	2	3	2	2	-	3	-	-	1	3	1	1
		CO310.5	3	1	2	3	3	1	3	-	3	-	-	2	2	1	1
		CO310	2.6	1.8	2.8	2.6	2.4	2.0	2.4	-	2.4	-	-	1.6	2.2	1.8	1.8

1 = Weakly Mapped
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3 = Strongly Mapped

CSE311	Operating System	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	3	0	0	3
Pre-requisite/Exposure	Data structures, Programming Languages, and Computer Architecture.				
Co-requisite	NIL				

Course Objectives:

278. To understand the students to study the basic principles and functionality of operating systems

279. To provide the students to identify the concepts of CPU scheduling, concurrent processes, deadlock

280. To allow the students to identify the significance of memory management and virtual memory.

281. To enhance the skill of students to identify the disk scheduling, file systems, and device management.

282. To understand the students to explain the performance trade-offs inherent in advance OS implementation.

Course Outcomes:

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

283. **Understand** functionalities and features of Operating System
284. **Analyzing** various scheduling algorithms and threading concepts to identify a suitable algorithm for a
285. Given criteria.
286. **Assessing** various solutions for critical Section problem. Applying deadlock avoidance principles and
287. Check for the occurrence of deadlock.
288. **Explain** different memory management techniques and its uses. Structuring an overview of file
289. Systems and mass storage

290. **Understand** the functionalities of modern operating system like Android, oxygen, Windows11etc.

Course Description:

The course will begin with an overview of the structure of computer operating systems. The purpose of this course is to provide students basic knowledge of operating systems, difference between the kernel and user modes, concepts of application program interfaces, methods and implementations of interrupts. Students are introduced to the schedulers, policies, processes, threads, memory management, virtual memory, protection, access control, and authentication. Students learn system calls in different popular operating systems used in the industry. Particular emphasis will be given to three major OS subsystems: process management (processes, threads, CPU scheduling, synchronization, and deadlock), memory management (segmentation, paging, swapping), and file systems; and on modern operating system architecture.

Unit-I	09 Lecture Hours

Course Content:

Introduction to operating System:	
Introduction: Concept of Operating Systems, Operating Systems Objectives and Functions, Generations of Operating systems, Types of Operating Systems, OS Services, System Calls, Structure of an OS - Layered, Protection and Security, Case study on UNIX and WINDOWS Operating System.	
Unit-II	**09 Lecture Hours**
Introduction to Process and Process Scheduling :	
Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms (FCFS, SJF, Priority, RR, Multilevel queue Scheduling), and their evaluation.	
Unit-III	**09 Lecture Hours**
Inter-process Communication and Deadlock :	
Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Producer Consumer problem, Readers & Writers Problem, Dining Philosopher Problem .	
Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, and Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.	
Unit-IV	**09 Lecture Hours**
Memory and File Management :	
Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, Virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing.	
File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed),Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.	
Unit-V	**09 Lecture Hours**

Modern OS Architectures :

Case Study on: Android, Windows 11, Mac, oxygen OS and other contemporary Operating system.

Text Books:

Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 9th Edition, John Wiley publishers, 2012

Operating Systems' – Internal and Design Principles, Stallings, Sixth Edition, Pearson education, 2005.

Reference Books:

Operating System a Design Approach-Crowley, 3 rd Edition, Tata Mcgraw Hill, 2009.

Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, Tata Mcgraw Hill, 2012

Modern Operating Systems, Andrew S Tanenbaum 3rd edition Prentice-Hall, Inc, 2008

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 311	Operating System	CO311.1	2	2	1	3	3	1	1	-	2	-	-	3	2	2	3
		CO311.2	3	2	2	3	3	1	3	-	3	-	-	3	2	1	1
		CO311.3	2	3	2	3	2	1	2	-	2	-	-	2	2	2	1
		CO311.4	3	2	3	3	3	1	1	-	2	-	-	1	2	2	3
		CO311.5	2	3	2	3	3	2	1	-	3	-	-	2	3	3	3
		CO311	2.4	2.4	2.0	3.0	2.8	1.2	1.6	-	2.4	-	-	2.2	2.2	2.0	2.2

1 = Weakly Mapped
2 = Moderately Mapped
3 = Strongly Mapped

CSE316	Operating System Lab	L	T	P	C
Version 1.0	Contact Hours – 45 Hours	0	0	3	2
Pre-requisite/Exposure	Data structures, Programming Languages, and Computer Architecture.				
Co-requisite	NIL				

Course Objectives:

291. To introduce basic Unix commands, system call interface for process management, interprocess communication and I/O in Unix.
292. To understand the students to study the basic principles and functionality of operating systems.
293. To provide the students to identify the concepts of CPU scheduling, concurrent processes, deadlock
294. To allow the students to identify the significance of memory management and virtual memory.
295. To enhance the skill of students to identify the disk scheduling, file systems, and device management.

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Course Outcomes:

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

296. **Understand** and implement basic services and functionalities of the operating system using system calls and shell script.
297. **Analyze** and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.

298. **Assessing** various solutions for critical Section problem. Applying deadlock avoidance principles and

299. Check for the occurrence of deadlock.

300. **Implement** memory management schemes and page replacement schemes.

301. **Simulate** file allocation and organization techniques.

Course Description:

The goal of this course is to have students understand and appreciate the principles in the design and implementation of operating systems software.The course will cover the concepts of operating systems, process management, memory management, file systems. Experiments on process scheduling and other operating system duties will be conducted through simulation/implementation in the laboratory.

Unit-I	09 Lecture Hours

Course Content:

Linux Commands/Shell Programming:	
To study about the basics of Linux commands.	
Implementation of shell scripting using conditional/branching statement.	
Implementation of shell scripting using Loop statement.	
Implementation of shell scripting using Array.	
Implementation of shell scripting using String.	
Implementation of shell scripting using Function and recursion.	
Unit-II	**09 Lecture Hours**
Process Scheduling Algorithm: Simulate the following non-preemptive CPUscheduling algorithms to find turnaround time and waiting time. FCFS b) SJF c) Priority Simulate the following non-preemptive CPUscheduling algorithms to find turnaround time and waiting time. Shortest Remaining Time First b) Round Robin c) Priority Simulate multi-level queue scheduling algorithm considering the following scenario. All the processes in the system are divided into two categories – system processes and user processes.System processes are to be given higher priority than user processes. UseFCFS scheduling for the processes in each queue.	
Unit-III	**09 Lecture Hours**
Process Synchronization Problems /Deadlock: Simulate producer-consumer problem using semaphores. Simulate the concept of Dining-Philosophers problem. Simulate Bankers algorithm for the purpose of deadlock avoidance.	
Unit-IV	**09 Lecture Hours**
Memory Management Techniques: Simulate page replacement algorithms FIFO b) LRU c) Optimal Simulate disk scheduling algorithms FCFS b) SCAN c) C-SCAN Simulate selection partition algorithm	

a). Best Fit b). First Fit c). Worst Fit	
Unit-V	**09 Lecture Hours**
File Organization Techniques: simulate the following file organization techniques a) Single level directory b) Two level directory c) Hierarchical	
Text Books: Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 9th Edition, John Wiley publishers, 2012 Operating Systems' – Internal and Design Principles, Stallings, Sixth Edition, Pearson education, 2005. **Reference Books:** Operating System a Design Approach-Crowley, 3 rd Edition, Tata Mcgraw Hill, 2009. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, Tata Mcgraw Hill, 2012 Modern Operating Systems, Andrew S Tanenbaum 3rd edition Prentice-Hall, Inc, 2008	

Modes of Evaluation: Quiz/Assignment/Presentation/Extempore/ Written Examination

Examination Scheme:

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 316	Operating System Lab	CO316.1	3	1	1	2	3	1	3	-	1	-	-	1	3	3	2
		CO316.2	2	2	1	2	3	3	1	-	1	-	-	2	3	2	1
		CO316.3	3	2	1	2	3	1	2	-	2	-	-	1	3	3	2
		CO316.4	3	3	2	3	2	1	3	-	3	-	-	1	1	2	2
		CO316.5	2	3	3	2	2	1	2	-	2	-	-	2	3	1	1
		CO316	2.6	2.2	1.6	2.2	2.6	1.4	2.2	-	1.8	-	-	1.4	2.6	2.2	1.6

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3 = Strongly Mapped

CSE401	Introduction to Cloud Computing	L	T	P	C
Version 1.0	Contact Hours -45	3	0	0	3
Pre-requisites/Exposure	DBMS, Java, Python, Computer Networking				
Co-requisites	--				

Course Objectives:

302. To introduce cloud computing-based programming techniques and cloud services.
303. To introduce concepts and security issues of cloud paradigm.
304. To impart the fundamentals of virtualization techniques.

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

CO1. **How** to provide Flexible and scalable infrastructures.
CO2. **Organize** process to reduce implementation and maintenance costs.
CO3. The case studies will help us to **understand** more of practice of cloud computing in the market.
CO4. **Determine** flexible and scalable infrastructure suitable to the organizational need.
CO5. **Comparison** of cost-wise solution to the problem and selecting the best solution for the problem suggested to the organization.

Catalog Description:

This course focuses on concepts of cloud, fundamental building blocks like Resource Consolidation, Hypervisor, VM etc. and the cloud service models. It gives students the insight into how to build clouds. And provides practices on building the cloud. It also gives exposure to Public and Privacy Clouds. It gives students the future directions in cloud domain.
Course Content:

Unit I: 08 lecture hours

Data communication Components: Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Challenges and Risks.
Unit II: 10 lecture hours

Working with Cloud- Infrastructure as a Service: conceptual model and working Platform as a Service: conceptual model and functionalities Software as a Service: conceptual model and working Technologies and Trends in Service provisioning with clouds.
Service management, Computing on demand, Identity as a Service, Compliance as a Service

Unit III: **6 lecture hours**

Abstraction and Virtualization: Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability, Virtual Machines Manageability, Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context.

Unit IV: **10 lecture hours**

Cloud Infrastructure and Cloud Resource: Management Architectural Design of Compute and Storage Clouds, Layered Cloud Architecture Development, Design Challenges, Inter Cloud Resource Management, Resource Provisioning and Platform Deployment, Global Exchange of Cloud Resources., Administrating the Cloud, Cloud Management Products, Emerging Cloud Management Standards.

Unit V: **11 lecture hours**

Cloud Security: Security Overview, Cloud Security Challenges and Risks, Software-as-a Service Security, Cloud computing security architecture: Architectural Considerations, General Issues Securing the Cloud, Securing Data, Data Security, Application Security, Virtual Machine Security, Identity and Presence, Identity Management and Access Control, Autonomic Security, Storage Area Networks, Disaster Recovery in Clouds.

Text Books:
1. Rajkumar Buyya et. el., Cloud Computing: Principles and Paradigms, Wiley India Edition
2. Sosinsky B., "Cloud Computing Bible", Wiley India

Reference Books:
1. Mastering Cloud Computing by Rajkumar Buyya, C. Vecchiola & S. Thamarai SelviMcGRAW Hill Publication

2. Miller Michael, "Cloud Computing: Web Based Applications that Change the Way You Work and Collaborate Online", Pearson Education India
3. Velte T., Velte A., Elsenpeter R., "Cloud Computing – A practical Approach", Tata McGrawHill

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

Components	Attendance	Internal Assessment	MTE	ETE
Weightage (%)	**10**	**30**	**20**	**40**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 401	Introduction to Cloud Computing	CO401.1	2	3	2	1	1	1	1	-	2	-	-	3	3	3	1
		CO401.2	2	3	2	1	1	2	3	-	1	-	-	2	1	2	3
		CO401.3	1	2	2	3	2	1	2	-	2	-	-	3	2	2	2
		CO401.4	3	2	3	3	3	2	3	-	2	-	-	2	1	2	3
		CO401.5	2	1	3	3	2	2	2	-	1	-	-	2	3	3	1
		CO401	2.0	2.2	2.4	2.2	1.8	1.6	2.2		1.6	-	-	2.4	2.0	2.4	2.0

1=weakly mapped   2= moderately mapped   3=strongly mapped

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

Name of the Program: BCA   Semester: III   Stream: CSE

PAPER TITLE: Introduction to Cloud Computing
PAPER CODE: CSE11457
Maximum Marks: 40   Time duration: 3 hours
Total No of questions: 12   Total No of Pages: 02

Instruction for the Candidate:

305. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
306. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
307. 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.	**What** is meant Scale-Up scale-Down?	U	CO2
2.	**Express** data center with example.	U	CO3
3.	**What is** Hardware Virtualization?	R	CO1
4.	**Define** is cloud computing with example?	R	CO3
5.	**List** the main characteristics of cloud computing?	R	CO5
	SECTION B (Attempt any **Three Questions**) (3 x 5 = 15)		
6.	**Describe** in detail about Deployment Models in cloud computing.	U	CO4

7.	**Distinguish** three major differencesthat separate cloud architecture from the tradition one?	An	CO5
8.	**Describe** Distributed computing?	R	CO2
9.	**List** the pros and cons of cloud computing.	U	CO2
	SECTION C(Answer Any Two Questions) (2 x 10 = 20)		
10.	**Illustrate** the following in detail i. Demand-Driven Resource Provisioning ii. Event-Driven Resource Provisioning iii. Popularity-Driven Resource Provisioning	U	CO3
11.	What is the difference between recovery time objective and recovery point objective? How do they depend on each other? **Justify** your answer with appropriate examples.	E	CO4
12.	**Demonstrate** thee architectural design of compute and storage clouds.	AP	CO2

CSE406	Cloud Computing Lab	L	T	P	C
Version 1.0	Contact Hours -45	0	0	3	2
Pre-requisites/Exposure	DBMS, Java, Python				
Co-requisites	--				

Course Objectives:

1. To understand the installation of hypervisors.
2. To understand the installation of different cloud simulation tools and cloud setup tools.
3. To deploy cloud services.

Course Outcomes:

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

CO1. **Describe** the key concepts and technologies in cloud computing.
CO2. **Evaluate** cloud computing technologies and platforms in the context of the needs of a specific application
CO3. **Design** data storage components for cloud-based software systems.
CO4**. Assess** and monitor resource use of applications in virtualized environments
CO5. **Design, implement, and deploy** cloud applications for current cloud platforms
CO6. **Evaluate** privacy and security issues for cloud infrastructure and cloud applications

Catalog Description:
This course introduces students to fundamentals of cloud computing and software development for cloud platforms. It covers topics such as virtualization, architecture of cloud systems, programming for the cloud, resource management, as well as privacy and security issues. Students gain practical experience developing applications for cloud platforms through a series of hands-on assignments.

Course Content:

Experiment 1:

Introduction to cloud computing
Experiment 2:

Hands on creation of virtual machine using computer server.
Experiment 3:

Design virtual machine
Experiment 4:

Key based authentication and login virtual machine from the host machine
Experiment 5:

Create Backend logic to communication with frontend app using Ajax
Experiment 6:

Using Backend logic setup communication with frontend app using Ajax
Experiment 7:

308.   Create SQL DB and design schema for user session
309.   Login using username and password and validate in SQL
Experiment 8:

310.   Procedure to setup one Hadoop Cluster
311.   Access the Hadoop using API's from the application and show the data
Experiment 9:

312.   Demonstrate the use of map/reduce using simple program
313.   AWS Free Tier Account Creation
Experiment 10:

314.   In AWS account enabling Multi-Factor Authentication to Secure Your Access and
       create your First Linux Instance
315.   In AWS create your First EC2 windows instance In AWS assign Elastic IP
       Addresses to Instance (Static IP Address)

Text Books:

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley India Edition.

2. Anthony Velte, tobyVelte, Robert Elsenpeter, "Cloud Computing – A Practical
Approach", Tata McGraw-Hill Edition.

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

Components	Attendance	Internal Assessment	MTE	ETE
Weightage (%)	**10**	**30**	**20**	**40**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CSE 406	Cloud Computing Lab	CO406.1	3	2	3	1	1	2	1	-	2	-	-	3	2	3	2
		CO406.2	3	3	3	1	2	3	3	-	1	-	-	2	1	2	2
		CO406.3	2	2	1	3	2	2	2	-	1	-	-	2	2	1	3
		CO406.4	3	3	3	2	3	3	3	-	1	-	-	2	3	3	3
		CO406.5	2	2	3	2	1	2	3	-	3	-	-	1	3	1	2
		CO406.6	2	1	2	1	3	2	2	-	1	-	-	2	2	2	3
		CO406	2.5	2.17	2.5	1.67	2.0	2.33	2.33	-	1.5	-	-	2.0	2.17	2.0	2.5

1=weakly mapped   2= moderately mapped   3=strongly mapped

CSE402	Web Designing	L	T	P	C
Version 1.0	**Contact hour -45**	**3**	**0**	**0**	**3**
Pre-requisites/Exposure	**Browser compatibility knowledge /HTML**				
Co-requisites	**--**				

Course Objectives:

1. To help the pupils to develop an understanding of client /server model.
2. To enable students a precise understanding of web protocol.
316. To give the students a perspective of web design language for designing a web site.
317. To enable students design a structure of web page model for any organization.

Course Outcomes:

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

CO1. **Understanding** of E- Mail, Telnet, FTP, E-Commerce, Video Conferencing, E-Business.
CO2. **Formalize**HTML Tag Reference, Global Attributes, Event Handlers, Document Structure.
CO3. **Classify** a detailed analysis of form, frame and CSS in HTML.
    CO4. **Demonstrate** effectively a web page with HTML/JavaScript/XML style.
    CO5. **Create** rich internet application using XML

Course Description:

The methods by which computers communicate with each other through the use of markup languages and multimedia packages is known as web technology. In the past few decades, web technology has undergone a dramatic transition, from a few marked-up web pages to the ability to do very specific work on a network without interruption. Let's look at some examples of web technology. Being a web developer gives you the power to create new cool things. If you can imagine it you can build it (or kind of). You don't need any kind of material - just your knowledge about web development.

Course Content:

Unit-I	08 Lecture Hours

Unit Heading: Internet And WWW: Introduction, E- Mail, Telnet, FTP, E-Commerce, Video Conferencing, E-Business. Internet Service Providers, Domain Name Server, Internet Address, World Wide Web (WWW): World Wide Web And Its Evolution, Uniform Resource Locator (URL), Browsers - Internet Explorer, Netscape Navigator, Opera, Firefox, Chrome, Mozilla. Search Engine, Web Server - Apache, IIS, Proxy Server, HTTP Protocol. Case Study of E-Business website like (Myntra,Jabong,Amazon)

Unit-II	12 Lecture Hours

Unit Heading: HTML And Graphics: HTML Tag Reference, Global Attributes, Event Handlers, Document Structure Tags, Formatting Tags, Text Level Formatting, Block Level Formatting, List Tags, Hyperlink Tags, Image And Image Maps, Table Tags, Form Tags, Frame Tags, Executable Content Tags.

Imagemaps: Introduction, Client-Side Imagemaps, Server-Side Imagemaps, Using Server-Side And Client-Side Imagempas Together, Alternative Text For Imagemaps, Tables : Introduction To HTML Tables And Their Structure, The Table Tags, Alignment, Aligning Entire Table, Alignment Within A Row, Alignment Within A Cell, Attributes, Content Summary, Background Colour, Adding A Caption, Setting The Width, Adding A Border, Spacing Within A Cell, Spacing Between The Cells, Spanning Multiple Rows Or Columns, Elements That Can Be Placed In A Table, Table Sections And Column Properties, Tables As A Design Tool.

Frames: Introduction To Frames, Applications, Frames Document, The Tag, Nesting Tag, Placing Content In Frames With The Tag, Targeting Named Frames, Creating Floating Frames, Using Hidden Frames,Frame analysis in Online Job portal.

Forms: Creating Forms, The<FORM>

Tag, Named Input Fields, The <INPUT> Tag, Multiple Lines Text Windows, Drop Down And List Boxes, Hidden Text, Text Area, Password, File Upload, Button, Submit, Reset, Radio, Checkbox, Select, Option, Forms And Scripting, Action Buttons, Labelling Input Files, Grouping Related Fields, Disabled And Read-Only Fields, Form Field Event Handlers Passing **Form Data Style Sheets:**Introduction, Different Approaches To Style Sheets, Using Multiple Approaches, Linking To Style Information In Separate File, Setting Up Style Information,

Using The <LINK>Tag, Embedded Style Information, Using <STYLE> Tag, Inline Style Information. Real life case study analysis of E-Ticket booking, with suitable linking of travel destination.	
Unit-III	**08 Lecture Hours**

Unit Heading: <mark>Java Script</mark>: Introduction, Client-Side Javascript, Server-Side Javascript, Javascript Objects, Javascript Security.

Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++ (Increment), -- (Decrement), -(Unary Negation), Logical Operators, Short.

Java Script: Introduction, Client-Side Javascript, Server-Side Javascript, Javascript Objects, Javascript Security.

Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++ (Increment), -- (Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ? (Conditional Operator), ,(Comma Operator), Delete, New, This, Void

Statements: Break, Comment, Continue, Delete, Do ... While, Export, For, For...In, Function, If...Else, Import, Labelled, Return, Switch, Var, While, With,

Core Javascript: Array, Boolean, Date, Function, Math, Number, Object, String, Regexp

Document And Its Associated Objects: Document, Link, Area, Anchor, Image, Applet, Layer

Events And Event Handlers: General Information About Events, Defining Event Handlers: Onabort, Onblur, Onchange, Onclick, Ondblclick, Ondragdrop, Onerror, Onfocus, Onkeydown, Onkeypress, Onkeyup, Onload, Onmousedown, Onmousemove, Onmouseout, Onmouseover, Onmouseup, Onmove, Onreset, Onresize, Onselect, Onsubmit, Onunload,Case study analysis of E-commerce website in transaction processing of client order

Unit-IV	**10 Lecture Hours**

Unit Heading: Introduction Client-Side JavaScript, Server-Side Javascript, Javascript Objects, Javascript Security.

<mark>**Operators**</mark>: Assignment Operators, Comparison Operators, Arithmetic Operators, %

(Modulus), ++ (Increment), -- (Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ? (Conditional Operator), ,(Comma Operator), Delete, New, This, Void

Statements: Break, Comment, Continue, Delete, Do ... While, Export, For, For...In, Function, If...Else, Import, Labelled, Return, Switch, Var, While, With,

Core Javascript: Array, Boolean, Date, Function, Math, Number, Object, String, Regexp

Document And Its Associated Objects: Document, Link, Area, Anchor, Image, Applet, Layer

Unit-V	07 Lecture Hours

Unit Heading: <mark>XML:</mark> Introduction, Anatomy, Document, Creating XML Documents, Creating XML Dtds, XML Schemas, XSL, Mapping of XML ontology for a web site.

PHP: Introduction, Server-Side Web Scripting, Installing PHP, Adding PHP To HTML, Syntax And Variables, Passing Information Between Pages, Strings, Arrays And Array Functions, Numbers, Basic PHP Errors / Problems

Text Books:

"Web Design The Complete Reference", Thomas Powell, Tata Mcgrawhill
Book 2 – Author – Publisher
Book 3 – Author – Publisher

Reference Books:

HTML And XHTML The Complete Reference", Thomas Powell,Pearson education.
Book 2 – Author – Publisher
Book 3 – Author – Publisher

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

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 402	Web Designing	CO402.1	2	2	3	1	3	3	3	2	3	-	-	3	1	1	1
		CO402.2	2	2	1	3	2	2	1	3	3	-	-	3	3	1	3
		CO402.3	2	3	3	3	1	1	3	-	3	-	-	2	3	2	1
		CO402.4	3	1	3	3	2	3	1	2	3	-	-	2	2	3	1

CO4 02.5	2	3	3	1	2	1	1	2	2	-	-	2	2	3	3
CO4 02	2.2	2.2	2.6	2.2	2.0	2.0	1.8	2.25	2.8	-	-	2.4	2.2	2.0	1.8

Model Question Paper

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

Name of the Program: BCA   Semester: III   Stream: CSE
PAPER TITLE: Web Designing   PAPER CODE:
Maximum Marks: 50   Time duration: 3 hours
Total No of questions: 12   Total No of Pages: 01

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

Section A (Answer All the Questions) (5 x 2 = 10)		
1. **List** the steps involved in Architecture of of server with suitable example	U	CO1
2. **Enumerate** the basic elements of application layer protocol and their use in message communication.	U	CO2
3. **Define** brief history of internet)?	R	CO3
4. **What** is multicast DNS (mDNS),?	R	CO4
5. **Give** the the essential components of URL.	U	CO3
SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
6. **Describe** the characteristics of Java script arithmetic operator)? .	U	CO1
7. **Examine** the frame with HTML tag	U, Ap	CO1, CO2
8. **Elucidate** the factors influencing Javascript security.	Ap	CO3
9. **Explain** with Example: i) FTP ii) DNS.	U	CO4 /CO5
SECTION C (Answer Any Two Questions) (2 x 12.5 = 25)		

10.	**Explain** in detail about Table in HTML.	U	CO4
11.	**Write** a list in HTML?with suitable example .	R	CO4
12.	**Distinguish** XML DTD by taking suitable example?	An	CO5

CSE12408	Web Designing Lab	L	T	P	C
Version 1.0	**Contact Hours -15**	**0**	**0**	**3**	**2**
Pre-requisites/Exposure	**Basic Knowledge of Coding**				
Co-requisites	**---**				

Course Objectives:

321.   To introduce students how to design static webpage using HTML and CSS
322.   To provide knowledge on web architecture, web services, client side and server side
        scripting technologies to focus on the development of web-based information systems
        and web services
323.   To provide skills to design interactive and dynamic web sites
324.   To develop students knowledge for implementing web applications using PhP

Course Outcomes:

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

CO1:   **Design** a static webpage by applying HTML elements
CO2:   **Apply** CSS concepts for designing HTML web pages.
CO3:   **Develop** DHTML pages by using JavaScript with DOM events
CO4**:**   **Implement** a webpage with database connectivity using PhP
CO5:   **Create** rich internet application using XML.

Course Description:

The main objective of this course is on the World Wide Web as a platform for interactive
applications, content publishing and social services. The development of web-based
applications requires knowledge about the underlying technology and the formats and
standards the web is based upon. In this course you will learn about the HTTP
communication protocol, the markup languages HTML, XHTML and XML, the CSS and XSLT
standards for formatting and transforming web content, interactive graphics and
multimedia content on the web, client-side programming using JavaScript.

Course Content:

Suggested assignments to be framed based on the following Programming Language such as HTML, CSS, Java script, XML and PH

Experiment 1:

Introduction to ==web page design==, attributes and concept by taking an example of online job-portal

Experiment 2:

Explain the logic of HTML and its feature, heading, color, background color, (h1 to h6).

Experiment 3:

Design a preliminary web page by using ==HTML table==, create, row, header, data insertion.

Experiment 4:

Design a web page by using ==HTML form tag== and explore its features by taking reference of some

E-commerce web site (Mantra, Zabong etc)

Experiment 5:

Design a web page by using ==HTML form attributes== (Radio button, submit button, drop down menu, check box etc) in Online Ticket booking

Experiment 6:

Design a List in HTML (Ordered list and Un-ordered list).

Experiment 7:

Design an event page by using JavaScript in E-commerce website.

Experiment 8:

Design a web page by using JavaScript for arithmetic and logical operation.

Experiment 9:

Design a page enabling idea of ==Java string==, Java switch, DOM model. By taking an online movie ticket booking

Experiment 10:

Design a web repository knowledge base by using XML-ontology.

Experiment 11:

Write a PHP class that sorts an ordered integer array with the help of sort () function.

Experiment 12:

Write a PHP Calculator class which will accept two values as arguments, then add them, subtract them, multiply them together, or divide them on request

Text Books:

1. "Web Design The Complete Reference", Thomas Powell, Tata McGraw-Hill

2. "Web Design The Complete Reference", Thomas Powell, Tata McGraw-Hill.

Reference Books:

1. "PHP : The Complete Reference", Steven Holzner, Tata McGraw-Hill The Easy Guide to Operating Systems, Larry Miller, 2012.

2. "Javascript 2.0 : The Complete Reference", Second Edition By Thomas Powell And Fritz Schneider

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

Components	Internal Assessment	ETE
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE12408	Web Designing Lab	CO12408.1	2	3	3	2	1	3	3	-	3	-	-	3	3	3	3
		CO12408.2	2	2	3	3	1	3	2	-	2	-	-	3	1	1	1
		CO12408.3	2	2	3	2	1	3	3	-	1	-	-	3	3	2	2
		CO12408.4	3	2	2	2	2	1	3	-	1	-	-	2	2	1	2
		CO12408.5	3	2	2	3	3	2	3	-	3	-	-	3	1	2	3
		CO12408	2.4	2.2	2.6	2.4	1.6	2.4	2.8	-	2.0	-	-	2.8	2.0	1.8	2.2

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

Name:	
Enrolment No:	
ADAMAS UNIVERSITY	

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION

Name of the Program: Semester: III

Code- CSEStream- CSE

Time: 03 Hrs.

Paper title– Web Technology Lab   Total pages- 1

Max. Marks: 50   Total no. of questions- 5

Instructions:

Attempt All Questions from Section A (Each Carrying 10 Marks);

	SECTION A (Answer All questions)(5 x 10=50)		
1.	**Develop** the web page for Student database.	**Ap**	**CO4**
2.	**Define** Imagemap? Design a webpage to display the cricket player's information using Imagemap.	**R**	**CO1**
3.	**Construct** a webpage for creating a registration form using HTML &CSS.	**Ap**	**CO4**
4.	**Build** a webpage in such a way that display MCA course Details with Routine	**Ap**	**CO5**
5.	**Illustrate** the use of <form> tag and action Attribute with an example.	**U**	**CO1**

CSE313	PROJECT	L	T	P	C
Version 1.0	**Contact Hours -60**	**0**	**0**	**6**	**4**
Pre-requisites/Exposure	**Basic idea of the required subjects**				
Co-requisites					

Course Objectives:

1. To be able to design, develop, document, and test software using current techniques.

2. To understand the fundamentals of computer architecture and computing theory.

3. To be able to solve problems working in group settings.

4. To demonstrate the ability to give presentations and write technical reports.

5. To demonstrate understanding of the importance of social and ethical issues related to the profession.

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

CO1. **Identify** a real world problem
CO2. **Utilize** the modern tools to solve the problems
CO3. **Discuss** in a group to promote team spirit and leadership quality among the students
CO4. **Plan** a projects involving both technological aspects and finance
CO5. **Identify** newer areas of in-depth study and research and lifelong learning

Catalog Description:

The course encourages students to take project works that are based on current trends and technologies in various subjects, which will augment the theory subjects. The students will form a group to do their project work. This teaming is to encourage team spirit and to insist the importance of team work. The students typically undergo group formation, finalization of area of work, testing, generation and verification of results, and possible research publication procedure.

Course Content:

The Evaluation of the project work are to be carried out in the following way:
1. In-depth study of a topic proposed by the supervisor
2. Continuous Evaluation through guide.
3. An open pre-submission seminar by the student.
4. End-semester University Examination (An open seminar followed by a Vivavoce)

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

Components	Continuous Evaluation	End Semester Examination
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
CSE 313	PROJECT	CO313.1	2	2	3	2	1	1	3	-	3	-	-	2	1	3	1
		CO313.2	2	3	3	1	3	2	3	-	2	-	-	2	2	2	3
		CO313.3	3	2	2	1	3	1	2	-	2	-	-	1	3	2	3
		CO313.4	2	3	3	1	1	2	1	-	2	-	3	2	1	1	3
		CO3	3	2	2	3	2	1	1	-	1	-	-	3	2	1	1

		13.5														
		CO3 13	2.4	2.4	2.6	1.6	2.0	1.4	2.0	-	2.0	-	3.0	2.0	1.8	1.8	2.2

CSE403	Software Engineering	L	T	P	C
Version 1.0	**Contact hour-45**	3	0	0	3
Pre-requisites/Exposure	**Software/Hardware evolution at basic level**				
Co-requisites	--				

Course Objectives:

325. To help the student to acquire knowledge of software evolution process.
326. To enable students modelling software project with appropriate metric and precision at workplace.
327. To give the students a perspective to software design process variables by exposing them to software specification document; and also, to enrich their software testing ability.
328. To enable students, acquire testing and quality assessment of model required for their profession.

Course Outcomes:

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

CO1. **Understand** the impact of software engineering.
CO2**. Communicate** with proper software model paradigm to pupils.
CO3**. Enhancement** of software metric engineering application in industry.
CO4. **Compare** Effectively testing and maintenance of software project.
CO5. **Classify** software metric analysis for an effective model.

Catalog Description:

There is a growing need for talented software developers across every industry. As technology advances, the ability to build quality 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.

Software Engineering applies the knowledge and theoretical understanding gained through computer science to building high-quality software products. As a maturing discipline, software is becoming more and more important in our everyday lives. Our software development and engineering professional program is Pace University's response to the tremendous growth of the software development industry.

Course Content:

Unit I: **8 lecture hours**

Software - Evolving role of it, a crisis on the Horizon and its Myths, Software process models: linear sequential model, prototyping model, RAD model, Evolutionary model, Formal methods model, Component based development, fourth generation techniques, Software development and requirement analysis using Agile, Scrum framework.

Unit II: **10 lecture hours**

Management spectrum, people, problem, process, project and few Critical approach,

Software Process and project metrics: Measure, Metrics and Indicators, Process and Project Domain related metrics, Software Measurement, Reconciling of Different, Metrics Approaches, Software quality metrics, Validation management, **Software project planning:** Observations on estimation, Objectives of Project planning.

Unit III: **8 lecture hours**

Resources: Software project estimation, Empirical models for estimation, Automated estimation tools, Risk management and Software risks: Identification, Risk projection, safety risks and hazards; RMMM plans, Risk management

Unit IV: **9 lecture hours**

Project scheduling and tracking: Definition of task set and task network, Scheduling, earned value analysis, Tracking of Errors, Project planning, **Software quality assurance:** Concepts of Software Quality, Quality movement, Review of software quality assurance, Software reliability, Software quality metrics (MTTF, MTTR, MTBF ETC.)

Unit V: **10 lecture hours**

Software configuration management: Object identification in software configuration, Configuring audit-SCM standards, **Analysis concepts and principles:** Requirement analysis, Software prototyping, Specification Review Analysis modeling, Data modeling, Functional modeling, Behavioral modeling, **Software design, Software testing techniques:** White box and black box testing, Software testing strategies - Unit testing, Integrating testing, System testing.

Text Books:
329. Software Engineering: A practitioner's approach, 8th Edition, Roger S. Pressman, McGraw Hill
330. An integrated approach to Software Engineering, Springer/Narosa Edition, PankajJalote.

Reference Books:
331. Fundamentals of Software Engineering, 4th Edition, Rajib Mall, Prentice Hall, India.

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 403	Software Engineering	CO403.1	2	3	2	2	2	1	3	-	2	-	-	1	1	2	3
		CO403.2	2	2	3	2	3	1	2	-	3	-	3	2	2	1	1
		CO403.3	2	3	1	1	1	3	1	-	1	-	-	2	2	1	3
		CO403.4	2	1	1	3	2	1	2	3	2	-	-	2	3	2	3
		CO403.5	2	3	2	3	3	1	3	-	2	-	-	3	1	2	2
		CO403	2.0	2.4	1.8	2.2	2.2	1.4	2.2	3.0	2.0	-	3.0	2.0	1.8	1.6	2.4

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

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

Name of the Program:BCA   Semester: V   Stream: CSE
PAPER TITLE:Software Engineering   PAPER CODE:
CSE11424
Maximum Marks: 50   Time duration: 3 hours
Total No of questions: 12   Total No of Pages: 01

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

Section A (Answer All the Questions) (5 x 2 = 10)		
1. **List** the steps involved in Software development life cycle? Write a note on it.	U	CO1
2. **Enumerate** the basic elements of Software requirement specification.	U	CO2
3. **Define**Data coupling.	R	CO3
4. **What** is Software configuration management?	R	CO4
5. **Give** the principles of functional cohesion.	U	CO4
SECTION B (Attempt any **Three Questions) (3 x 5 = 15)**		
6. **Describe**the stages of evolutionary model?	U	CO1

7.	**Examine**the essential phases of iterative water fall model then what is the expected performance over traditional water fall model?	**Ap**	**CO2**
8.	**Elucidate** the Black box testing and White box testing with suitable example.	**Ap**	**CO3**
9.	**Explain**Scrum and agile application briefly explain it with proper example?	**U**	**CO4 /CO2**
	SECTION C (Answer Any Two Questions) (2 x 12.5 = 25)		
10.	**Explain** in detail about V-model from end user point of view how it is useful in project design.	**U**	**CO4**
11.	**Write** a Project estimation technique and estimation issues in project progress line.?Explain with a Case Study	**U**	**CO4**
12.	**Distinguish**features of the factors i) Product metric, ii) Function point metric?	**U**	**CO5**

CSE404	E-commerce & its applications	L	T	P	C
Version 1.0	**Contact Hours -45**	**3**	**0**	**0**	**3**
Pre-requisites/Exposure	**Web-Technology**				
Co-requisites	**--**				

Course Objectives:

1. To understand terms related to database design and management.
2. To understand the objectives of data and information management.
3. To assess data and information requirements.
4. To understand the economic structure for selling items.

Course Outcomes:

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

CO1. **Describe** the characteristics of database and the architecture of Database system.
CO2. **Design** Entity-Relationship Model for enterprise level databases
CO3**. Develop** the database and provide restricted access to different users of database
CO4**. Analyze** various patterns of user procurement patterns

Catalog Description:

E-Commerce (electronic commerce) is an area which is used in various fields of business like wholesale, retail as well as manufacturing unit. eCommerce is a subset of the e-business that concerns commerce. The activity of the exchange of goods and services with some of the other kind of payment methods can be intended as commerce. eCommerce world is an application of

information sharing among business trading basically online commercial transaction with clients. Now eCommerce modules or plugins are included in all types wordpress development company.

Course Content:

Unit I: **07 lecture hours**

E-commerce: The revolution is just beginning, Ecommerce : A Brief History, Understanding E-commerce: organizing Themes

Unit II: **16 lecture hours**
E-commerce Business Models, Major Business to Consumer (B2C) business models, Major Business to Business (B2B) business models, Business models in emerging E-commerce areas, How the Internet and the web change business: strategy, structure and process, The Internet: Technology Background, The Internet Today, Internet II- The Future Infrastructure, The World Wide Web, The Internet and the Web : Features

Unit III: **10 lecture hours**

Building an E-commerce Web Site: A systematic Approach, The e-commerce security environment, Security threats in the e-commerce environment, Technology solution, Management policies, Business procedures, and public laws, Payment system, E-commerce payment system, Electronic billing presentment and payment.

Unit IV: **12 lecture hours**

Consumer online: The Internet Audience and Consumer Behaviour, Basic Marketing Concepts, Internet Marketing Technologies, B2C and B2B E-commerce marketing and business strategies, The Retail sector, Analyzing the viability of online firms, E-commerce in action: E-tailing Business Models, Common Themes in online retailing, The service sector: offline and online, Online financial services, Online Travel Services, Online career services.

Text Books:
1.   " S. J. Joseph, E-Commerce: an Indian perspective" PHI
2.   " . Kenneth C. Laudon, E-Commerce : Business, Technology, Society" 4th Edition, Pearson

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE404	E-commerce & its applications	CO404.1	3	1	3	1	1	3	3	2	2	-	-	1	2	1	1
		CO404.2	2	3	3	3	3	3	1	-	2	-	-	2	3	2	1
		CO404.3	3	2	2	3	3	1	3	-	2	-	-	3	2	1	3
		CO404.4	3	1	3	3	2	3	2	-	2	-	-	1	2	1	1
		CO404	2.75	1.75	2.75	2.5	2.25	2.5	2.25	2.0	2.0	-	-	1.75	2.25	1.25	1.5

1=weakly mapped   2= moderately mapped   3=strongly mapped

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

Name of the Program:BCA

PAPER TITLE:E-commerce &Applications
PAPER CODE: MKT12403
Maximum Marks: 40
Total No of questions: 12

Semester: VI
Stream: CSE

Time duration: 3 hours
Total No of Pages: 02

Instruction for the Candidate:

    1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and 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.	**What** are the various components of electronic commerce applications?	**R**	**CO1**
2.	**What** are the various components of electronic commerce applications?	**R**	**CO2**
3.	**What** are the characteristics of internet-based EDI?	**R**	**CO4**
4.	**What** are the classifications of E-commerce field by the nature of the transactions?	**R**	**CO3**
5.	**Why** do the companies usually choose to implement SAP?	**R**	**CO3**
	SECTION B (Attempt any **Three Questions**) (3 x 5 = 15)		
6.	**What** are the key technologies for B2B E-commerce? Explain architectural models of B2B E-commerce.	**R**	**CO2**
7.	**Describe** the functional requirements for online selling and what specialized services and servers perform these functions.	**U**	**CO3**
8.	**Who** are the stakeholders in E-Commerce information system? Explain the benefits and limitations of E-commerce.	**R**	**CO4**
9	**Explain** the concept of "Business Content" in SAP Business Information Warehouse.	**U**	**CO1**
	SECTION C (Answer Any Two Questions) (2 x 10 = 20)		
10.	a. Once a company has acquired customer, the key to maximizing revenue is keeping them. **Explain** how e-commerce is helpful in customer retention? b. **What** are the security issues of E-commerce? 5+5=10	**Ap & U**	**CO2**

11.	a. **Explain** the concept of business process reengineering and its relationship with the productivity paradox and ERP. b. **What** is E-shopping? What are the advantages and disadvantages of e-shopping?5+5=10	U & R	CO3
12.	a. **What** is EDI? Discuss its layered structure? b. **What** is e-payment? Why is orientation and standardization required for e-payment businesses? 5+5=10	R	CO4

CSE410	Mobile Application Development	L	T	P	C
Version 1.0	Contact Hours -45	3	0	0	3
Pre-requisites/Exposure	Basic concept of programming				
Co-requisites	--				

Course Objectives:

335. To introduce students familiar with client server architecture.
336. To develop a web application using java technologies
337. To develop skills and project-based experience needed for entry into web application and development's careers.

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

CO1. **Produce** apps for iOS platform devices (iPhone/iPad/iPod Touch)

CO2. **Develop** a working knowledge of Apple's Xcode app development tool

CO3. **Identify** need and opportunity in app markets

CO4. **Analyze** android application

CO5. **Apply** API in application

Catalog Description:
Although they have only become widely used in the past few years, mobile devices have already had a tremendous impact on our culture and its social dynamics. Recent rapid growth in the mobile device market has not been primarily driven by voice communications, but rather by the limitless ways in which these devices may be used to explore our local environments. These new communicative modes are expressed through small and self-contained "apps" that are focused around a central concept, and that leverage many of the advanced features of these devices to augment a user's understanding of her environment. This course operates in two distinct but related modes: development, wherein an app is made functional; and design, through which an app is made usable. Students will be expected to consider both modes when producing their apps. Students will work throughout the semester to produce a compelling app of interest to the UNC community

Course Content:

Unit I   *9 Lecture hours*

Introduction to the Android Platform: Introduction to Android Operating System: Android OS and Features – Android development framework; Installing and running applications on Android Studio, Creating AVDs, Types of Android application; Creating Activities, Activity Life Cycle, Activity states, monitoring state changes.

Unit II   *9 Lecture hours*

Android Application Design Fundamentals: Android application components –
Android Manifest file, Externalizing recourses like Simple Values, Drawables, Layouts,
Menus, etc, Building User Interfaces: Fundamental Android UI design, Layouts – Linear,
Relative, Grid and Table Layouts. User Interface (UI) Components.

Unit III   9 Lecture hours

Android User Interface (UI) Design Fundamentals: Fragments – Creating fragments,
Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and
replacing fragments with fragment transactions, interfacing between fragments and
Activities.

Unit IV   9 Lecture hours

Testing Android applications, Testing tools in Android, Intents and Broadcasts: Using
intents to launch Activities, Types of Intents, Passing data to Intents, Getting results from
Activities, Broadcast Receivers – Using Intent filters to service implicit Intents, Resolving
Intent filters.

Unit V   9 Lecture hours

Using Common Android APIs: Database: Introduction to SQLite database, creating

and opening a database, creating tables, inserting retrieving and deleting data.

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, "Android Wireless Application
Development", Pearson Education

REFERENCE BOOKS:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd

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

Components	Internal Assessment	MTE	ETE

Weightage (%)		30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 410	Mobile Application Development	CO410.1	2	3	1	3	2	1	1	3	2	-	-	1	1	2	1
		CO410.2	3	3	2	3	2	3	3	-	3	-	-	1	2	1	2
		CO410.3	2	2	3	3	2	2	2	-	2	-	-	2	3	2	2
		CO410.4	2	2	3	3	1	1	2	-	2	-	-	2	1	1	3
		CO410.5	3	3	3	1	2	3	3	-	2	-	-	1	2	3	2
		CO410	2.4	2.6	2.4	2.6	1.8	2.0	2.2	3.0	2.2	-	-	1.4	1.8	1.8	2.0

1=weakly mapped   2= moderately mapped 3=strongly mapped

CSE415	Mobile Application Development Lab	L	T	P	C
Version 1.0	**Contact Hours -15**	0	0	3	2
Pre-requisites/Exposure	**Basic Knowledge of Coding**				
Co-requisites	**---**				

Course Objectives:

338. Know the components and structure of mobile application development frameworks for
Android and windows OS based mobiles.
339. Understand how to work with various mobile application development frameworks.
340. Learn the basic and important design concepts and issues of development of mobile applications.
341. Understand the capabilities and limitations of mobile devices.

Course Outcomes:

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

CO1. **Produce** apps for iOS platform devices (iPhone/iPad/iPod Touch)

CO2. **Develop** a working knowledge of Apple's Xcode app development tool

CO3. **Identify** need and opportunity in app markets

CO4. **Analyze** android application

CO5. **Apply** API in application

Course Description:

Catalog Description:
Although they have only become widely used in the past few years, mobile devices have already had a tremendous impact on our culture and its social dynamics. Recent rapid growth in the mobile device market has not been primarily driven by voice communications, but rather by the

limitless ways in which these devices may be used to explore our local environments. These new communicative modes are expressed through small and self-contained "apps" that are focused around a central concept, and that leverage many of the advanced features of these devices to augment a user's understanding of her environment. This course operates in two distinct but related modes: development, wherein an app is made functional; and design, through which an app is made usable. Students will be expected to consider both modes when producing their apps. Students will work throughout the semester to produce a compelling app of interest to the UNC community

Course Content:

List of experiments:

342. Installation of Android studio
343. Development Of Hello World Application
344. Create an application that takes the name from a text box and shows hello message along with the name entered in text box, when the user clicks the OK button
345. Create a screen that has input boxes for User Name, Password, Address, Gender(radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button (use any layout).
346. Design an android application to create page using Intent and one Button and pass the Values from one Activity to second Activity
347. Design an android application Send SMS using Intent
348. Create an android application using Fragments
349. Design an android application Using Radiobuttons
350. Design an android application for menu
351. Create a user registration application that stores the user details in a database table.

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education

REFERENCE BOOKS:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd.
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd

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

Examination Scheme:

Components	Internal Assessment	ETE
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 415	Mobile Application Development Lab	CO415.1	3	2	2	2	3	2	2	3	1	-	-	1	1	3	2
		CO415.2	2	3	2	2	2	3	3	-	3	-	-	3	2	2	2
		CO415.3	3	2	2	3	3	3	2	-	1	-	-	3	2	1	3
		CO415.4	1	3	3	2	2	3	2	-	3	-	-	2	1	2	3
		CO415.5	3	2	3	3	1	2	1	-	1	-	-	2	3	2	3
		CO415	2.4	2.4	2.4	2.4	2.2	2.6	2.0	3.0	1.8	-	-	2.2	1.8	2.0	2.6

1=weakly mapped   2= moderately mapped   3=strongly mapped

CSE411	Artificial Intelligence and Machine Learning	L	T	P	C
Version 1.0	Contact Hour -45	3	0	0	3
Pre-requisites/Exposure	H. Sc. level Mathematics knowledge or Basic of python programming				
Co-requisites	--				

Course Objectives:

1. To help the student to acquire knowledge of basics of artificial intelligent computing.
2. To enable students to gain basic knowledge of machine learning.
3. To incorporate the evolutionary computational knowledge.
4. To enable students to acquire various problem solving, learning, and planning ability.
5. To enable students to apply machine learning models to solve real-life problems.

Course Outcomes

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

CO1. Define solution according to real problem, apply search proper strategies for a particular problem, and construct logical propositions to conclude a proof statement.
CO2. Construct and differentiate plan for specific problem solution using various planning strategies.
CO3. Implement predictive model for both classification and regression
CO4. Design and deploy complex ensemble technique model to get insights from complex data, probabilistic model using conditional probability (Baye's Theorem).
CO5. Construct Clustering model to get insights from unlabelled data. Generate Ability to select best features from the dataset using PCA.

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: **5 lecture hours**

Introduction to Artificial Intelligence and Machine Learning:
Introduction to AI and Machine learning, Difference between AI and Machine learning. Types of Machine learning: Supervised Machine learning, Unsupervised Machine learning, Semi Supervised Machine learning, Reinforcement learning, Hypothesis testing.

Unit II: **15 lecture hours**
Supervised Learning:

Regression and Classification, Linear Regression, Multiple Linear Regression, Regularization Techniques: Lasso and Ridge Regression, Bias-Variance Trade off, over fitting, under fitting. Regression Evaluation metric: MAE, MSE, RMSE, R2 score, Adjusted R2 score. Logistic Regression. Decision Tree: ID3, CART. Support vector Machine, Kernel Function. K-Nearest-Neighbours. Classification Evaluation metric: Accuracy, Confusion Matrix, Precision, Recall, F-Beta Score, ROC-AUC curve.

Unit III: **8 lecture hours**

Ensemble Learning:

Basic of ensemble learning. Bagging: Voting based classifier, Random Forest. Boosting: Adaboost, Gradient boost, Cat boost, Extreme gradient boosting.

Unit IV   **9 lecture hours**

Probabilistic Learning:

Introduction to Probability, Conditional Probability, Bayesian Learning, Bayes Optimal classifier, Naïve Bayes Classifier.

Learning Association Rule:

Mining Frequent Patterns, Basic Concept of Apriori algorithm, FP- Growth algorithm, Association-based Decision Trees

Unit V   **8 lecture hours**

Unsupervised Learning:

Introduction to Clustering, K-Means Clustering, Elbow method, Hierarchical Clustering, Density Based Spatial Clustering (DBScan), Principle component analysis.

Text Books:
  1. Artificial Intelligence – A Modern Approach, Second Edition, S. Russel and P. Norvig Pearson Education, 2003.

  2. Artificial Intelligence, Ritch& Knight, TMH

  3. Machine Learning, 1st Edition, Tom M. Mitchell, McGraw-Hill Series In Computer Science

  4. Neural Networks and Learning Machines, 3rd Edition, Simon O. Haykin, Prentice Hall

  5. Introduction to Machine Learning, 2nd Edition, Ethem Alpaydın, The MIT Press

Reference Books:
  1. Artificial Intelligence; Structures for Complex Problem Solving, Fourth edition, G. Lugar, Pearson Education, 2002

  2. Artificial Intelligence: A New Synthesis, Nils J. Nilsson, Morgan Kaufmann Publishing, Inc., Year 1998

  3. "INTRODUCTIONTOMACHINE LEARNING", 2005 Edition, Nils J Nillsson, Morgan Kaufmann

  4. "Foundations of Machine Learning", 2012 Edition, Mehryar Mohri, Afshin Rostamezadeh, Ameet Talwalkar, The MIT Press

  5. "Python Data Science Handbook Essential Tools for Working with Data", 1st Edition, Jake Vander Plas, O'Reilly

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 411	Artificial Intelligence and Machine Learning	CO411.1	3	2	3	2	2	1	1	-	3	-	3	3	3	1	2
		CO411.2	2	3	2	1	2	3	2	-	2	3	-	2	2	2	1
		CO411.3	2	3	3	2	3	2	3	-	1	-	-	2	3	2	1
		CO411.4	3	2	2	1	1	1	3	-	3	-	-	3	3	3	2
		CO411.5	2	3	2	2	1	2	3	-	2	-	-	2	1	3	2
		CO411	2.4	2.6	2.4	1.6	1.8	1.8	2.4	-	2.2	3.0	3.0	2.4	2.4	2.2	1.6

1=weakly mapped
2= moderately mapped
3=strongly mapped

CSE416	Artificial Intelligence and Machine Learning Lab	L	T	P	C
Version 1.0	Contact Hour -45	0	0	2	1
Pre-requisites/Exposure	Basic of python programming				
Co-requisites	--				

Course Objectives:

1. To help students gain practical insights of AI Algorithm through functional programming.
2. To enable students, communicate with clarity and precision of ML Algorithm.
3. To give the students a perspective enhancement of present system.
4. To enable students to make a comparative study and further improvement.

Course Outcomes

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

CO1**. Interpret** and Evaluate different search strategies using Python.
CO2. **Execute** and Memorize and different various libraries and the most frequently used functions, methods, constants required for the implementation of any machine learning.
CO3. **Apply** and Appraise Linear regression, Multiple Linear regression, Logistic Regression, Support vector machine, K nearest neighbour, Decision Tree, Naive Bayes, Apriori algorithm for different datasets.
CO4. **Implement** clustering algorithm and judge the appropriate clustering method for a particular dataset.
CO5. **Implement** advance machine learning algorithms like Random forest, Ada boost, Cat boost, Gradient boost, Extreme gradient boost.

Course Description:

Every laboratory course brings an open world to a student. It helps the most in exploring and innovating. In Artificial Intelligence and Machine Learning Lab all experiments are given based on real-life problems. Through this kind of practice students become more analytic more inclined to practical thinking. Also, this course brings inquisitiveness to the students. This course is a rationale to the advance courses such as Artificial Neural Network and Deep Learning", "Soft Computing", etc. First Part of this course is the implementation of some important Artificial intelligence aspects such as Agents,

Knowledge Representation and Planning. The later part implements all major Machine Learning algorithms with the online datasets.

Course Content:

Experiments:

352. Introduction to various libraries and the most frequently used functions, methods, constants required for the implementation of any machine learning algorithm.
353. Implement basic statistical analysis using python.
354. Implement different mathematical operation using numpy.
355. Implement different data preprocessing technique using pandas python.
356. Implementation of linear regression, Multiple linear regression, lasso regression, ridge regression and analyze different model evaluation technique in regression.
357. Implementation of logistic regression and analyze the ROC AUC curve.
358. Implementation of KNN and decision tree and analyze different model evaluation technique in classification.
359. Implementation of support vector classifier and support vector regression.
360. Implementation of Naïve Bayes classifier.
361. Implementation of bagging and boosting technique. (Random forest, Ada boost, Cat boost, Gradient boost, Extreme gradient boost).
362. Implementation of different clustering technique. (Kmeans, Hierarchical clustering, DBscan)

Text Books:
1. "Python Data Science Handbook Essential Tools for Working with Data", 1st Edition,

Jake Vander Plas, O'Reilly

2. Prolog Programming for Artificial Intelligence (4th Edition) (International Computer

 Science Series): Bratko, Ivan

Reference Books
1. "Foundations of Machine Learning", 2012 Edition, Mehryar Mohri, Afshin Rostamezadeh, Ameet Talwalkar, The MIT Press

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

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 416	Artificial Intelligence and Machine Learning Lab	CO416.1	3	3	3	3	3	2	3	-	2	-	2	3	3	2	3
		CO416.2	3	2	3	3	1	1	1	-	2	3	-	3	1	2	3
		CO416.3	2	3	3	3	3	3	2	-	1	-	-	2	3	3	3
		CO416.4	2	2	3	3	2	1	3	-	3	-	-	3	1	1	1
		CO416.5	3	3	2	3	3	3	3	-	1	-	-	2	1	3	3
		CO416	2.6	2.6	2.8	3.0	2.4	2.0	2.4	-	1.8	3.0	2.0	2.6	1.8	2.2	2.6

1=weakly mapped
2= moderately mapped
3=strongly mapped

CSE203	Business Intelligence	L	T	P	C
Version 1.0	Contact Hour -45	3	0	0	3
Pre-requisites/Exposure	H. Sc. level Mathematics knowledge.				
Co-requisites	-				

Course Objectives:

1. To help the student to acquire knowledge of Data Science.
2. To enable students to gain basic knowledge of Data Pre-processing technique and Exploratory Data Analysis.
3. To enable students to gain knowledge about statistics and ability to apply statistics in real world data science problem.
4. To enable students to apply machine learning models to solve real-life problems.
5. To enable students to plot different charts to analyse the data.

Course Outcomes

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

CO1. Students will gain proficiency in working with data, including data collection, integration, cleaning, and transformation. They will learn various data management techniques and technologies, enabling them to handle large volumes of data efficiently and maintain data quality for business intelligence purposes.

CO2. Students will develop the ability to apply business analytics techniques to derive valuable insights from data. They will learn to use statistical methods and machine learning algorithms to analyse data, identify patterns, trends, and correlations, and make data-driven predictions to support business decision-making.

CO3. Students will master the art of data visualization and reporting using business intelligence tools. They will be able to create interactive dashboards, reports, and visual representations of data, making complex information easily understandable to different stakeholders within an organization.

CO4. Students will understand the strategic role of business intelligence in organizations and learn how to develop and implement BI strategies effectively. They will explore different BI architectures, data warehouses, and data modeling techniques. Additionally, students will be exposed to best practices for integrating business intelligence solutions into existing business processes.

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 data 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.

Data Science 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: **5 lecture hours**

Introduction to Business Intelligence
Understanding the concept and significance of Business Intelligence. Overview of BI architecture and components. Different types of BI tools and their functionalities. Data warehousing and data integration. Key performance indicators (KPIs) and metrics in BI.

Unit II: **10 lecture hours**
Data Modeling and ETL (Extract, Transform, Load)

Introduction to data modeling techniques for BI Understanding data modeling schemas (e.g., star schema, snowflake schema) Data extraction techniques and data sources Data transformation and cleaning processes Data loading and integration into BI systems. Basic concept of Exploratory Data Analysis. Basic Statistical analysis.

Unit III: **15 lecture hours**

BI reporting and visualization

Introduction to BI reporting tools (e.g., Tableau, Power BI, QlikView). Creating interactive reports and dashboards Design principles for effective data visualization. Applying data visualization best practices Using storytelling with data to communicate insights effectively.

Unit IV   **15 lecture hours**

Advance Business Intelligence Concepts:

Introduction to advanced BI techniques (e.g., predictive analytics, data mining). Implementing business analytics for decision-making. Understanding the role of AI and machine learning in BI. Performance management and monitoring in BI systems. Data security and governance in BI implementations.

Text Books:
  1. Data Strategy: How To Profit From A World Of Big Data, Analytics And The Internet Of Things" by Bernard Marr.

  2. The Data Detective: Ten Easy Rules to Make Sense of Statistics" by Tim Harford

Reference Books:
  1. Effective Data Storytelling: How to Drive Change with Data, Narrative and Visuals" by Brent Dykes

  5."Python Data Science Handbook Essential Tools for Working with Data", 1st Edition, Jake Vander Plas, O'Reilly

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

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	**30**	**20**	**50**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Cou rse Cod	Cours e Name	COs	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3

e																		
CSE 203	Business Intelligence	CO203.1	2	3	2	3	2	1	3	-	2	-	-	3	2	2	2
		CO203.2	2	3	2	3	3	2	2	-	3	-	-	3	1	3	2
		CO203.3	2	3	2	2	3	1	2	-	3	-	-	2	2	3	3
		CO203.4	3	1	2	2	2	2	3	-	1	-	-	2	2	1	1
		CO203	2.25	2.5	2.0	2.5	2.5	1.5	2.5	-	2.25	-	-	2.5	1.75	2.25	2.0

1=weakly mapped

2= moderately mapped

3=strongly mapped

CSE206	Business Intelligence Lab	L	T	P	C
Version 1.0	Contact Hour -45	0	0	2	1
Pre-requisites/Exposure	H. Sc. level Mathematics knowledge.				
Co-requisites	-				

Course Objectives:

1. To help the student to acquire knowledge of Data Science.
2. To enable students to gain basic knowledge of Data Pre-processing technique and Exploratory Data Analysis.
3. To enable students to gain knowledge about statistics and ability to apply statistics in real world data science problem.
4. To enable students to apply machine learning models to solve real-life problems.
5. To enable students to plot different charts to analyse the data.

Course Outcomes

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

   CO1. Students will gain proficiency in working with data, including data collection, integration, cleaning, and transformation. They will learn various data management techniques and technologies, enabling them to handle large volumes of data efficiently and maintain data quality for business intelligence purposes.
   CO2. Students will develop the ability to apply business analytics techniques to derive valuable insights from data. They will learn to use statistical methods and machine learning algorithms to analyse data, identify patterns, trends, and correlations, and make data-driven predictions to support business decision-making.
   CO3. Students will master the art of data visualization and reporting using business intelligence tools. They will be able to create interactive dashboards, reports, and visual representations of data, making complex information easily understandable to different stakeholders within an organization.
   CO4. Students will understand the strategic role of business intelligence in organizations and learn how to develop and implement BI strategies effectively. They will explore different BI architectures, data warehouses, and data modeling techniques. Additionally, students will be exposed to best practices for integrating business intelligence solutions into existing business processes.

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 data 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.

Data Science 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:

Experiments:

363. Introduction to business Intelligence tool:
364. Overview of BI tools and their role in data analysis and decision-making.
365. Understanding the advantages and limitations of using BI tools.
366. Exploring popular BI tool options in the market.
367. Basics of Microsoft excel.
368. Create pivot table, pivot chart, macros and visualization using Microsoft excel.
369. Data Exploration and Visualization:
370. Getting started with the BI tool's user interface.
371. Connecting to data sources and importing data into the tool.
372. Creating basic visualizations (e.g., bar charts, line charts, pie charts).
373. Advanced Data Visualization:
374. Building interactive dashboards with multiple visualizations.
375. Applying filters, sorting, and grouping to enhance data insights.
376. Utilizing advanced visualization options (e.g., heatmaps, treemaps, geographic maps).
377. Data Preparation and Cleaning:
378. Understanding data preparation techniques in the BI tool.
379. Dealing with missing data and data quality issues.
380. Performing data transformations and data cleansing.
381. Data Analysis and Exploration:
382. Applying various analytical functions and calculations.
383. Creating calculated fields and measures for analysis.
384. Conducting ad-hoc data exploration to discover patterns and trends.
385. Report Creation and Publishing:

386. Designing and formatting reports for different user audiences.
387. Scheduling and automating report generation and distribution.
388. Publishing reports to various formats (e.g., PDF, Excel, web).
389. Data Modeling and Relationships:
390. Setting up data models and defining relationships between tables.
391. Working with dimensions, hierarchies, and measures.
392. Building data models to support complex analysis.
393. Advanced Analytics:
394. Introduction to advanced analytics features in the BI tool (e.g., forecasting, clustering).
395. Applying machine learning algorithms for predictive analytics.
396. Incorporating statistical functions into data analysis.
397. Implementation of web scrapping techniques using python.

Text Books:
1. Mastering Power BI by Brett Powell

2. "Information Dashboard Design: Displaying Data for At-a-glance Monitoring" by Stephen Few

Reference Books:
1. Applied Microsoft Power BI (3rd Edition) by Teo Lachev

2." "Beautiful Visualization, Looking at Data Through the Eyes of Experts by Julie Steele, Noah Iliinsky"

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

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

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 206	Business Intelligence Lab	CO206.1	3	3	3	3	2	1	1	-	3	-	-	2	3	2	1
		CO206.2	2	3	2	2	1	1	3	-	2	-	-	3	1	3	3
		CO206.3	3	2	2	2	2	3	2	-	2	-	-	3	1	3	3
		CO206.4	2	2	3	2	3	2	2	-	2	-	-	3	1	3	3
		CO206	2.5	2.5	2.5	2.25	2.0	1.75	2.0	-	2.25	-		2.75	1.5	2.75	2.5

1=weakly mapped
2= moderately mapped
3=strongly mapped

CSE409	Cryptography and Cyber Security	L	T	P	C
Version 1.0	**Contact Hours -45**	**3**	**0**	**0**	**3**
Pre-requisites/Exposure	**Cryptography**				
Co-requisites	**--**				

Course Objectives:

398.   To understand of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.

399.   To demonstrate the familiarity with prevalent network and distributed system attacks, defences against them, and forensics to investigate the aftermath.

400.   Appraise a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.

401.   Examine security policies (such as authentication, integrity and confidentiality),

as well as protocols to

402.   Evaluate such policies in the form of message exchanges.

Course Outcomes:

CO1	**Understand** the basics of System and Network Vulnerability Scanning.
CO2	**Demonstrate** and practice the application of Network Protection tools.
CO3	**Appraise** the application of different types of tools against web vulnerabilities.
CO4	**Examine**Cyber Crime and Law.
CO5	**Evaluate**Cyber Crime Investigation**.**

Course Description:

Information Technology systems need to ensure the confidentiality, integrity, and availability of information. This course introduces students the principles of network and operating system security through hands-on exploration. Students learn how to harden an operating system as well as secure the network by implementing technologies such as firewalls, Virtual Private Networks (VPN), and Intrusion Detection Systems (IDS).

Course Content:

Unit I: **9 lecture hours**

Module 1:
Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4. Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

Unit II: **9 lecture hours**
Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks, Firewall, VPN.

Unit III: **9 lecture hours**

Public-Key Cryptography and RSA:
Principles of public-key cryptosystems. Public-key cryptosystems. Applications for public-key cryptosystems, requirements for public-key cryptosystems. public-key cryptanalysis. The RSA algorithm, desription of the algorithm, computational aspects, the security of RSA.
Other Public-Key Cryptosystems:
Diffie-hellman key exchange, The algorithm, key exchange protocols, man in the middle attack,Elgamal Cryptographic systems

Unit IV: **9 lecture hours**

Cyber Crime and law: Cyber Crimes, Types of Cybercrime, Hacking, Attack vectors, Cyberspace and Criminal Behavior, Clarification of Terms, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Computer Language, Network Language, Realms of the Cyber world, A Brief History of the Internet, Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000. 10

Unit V: **9 lecture hours**

Cyber Crime Investigation : Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks

	Text Books:
1	"Anti-Hacker Tool Kit (Indian Edition)", Mike Shema, Publication McGraw Hill
2	" Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Nina Godbole and SunitBelpure, Publication Wiley

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

Examination Scheme:

Components	Internal Assessment	Mid Semester Examination	End Semester Examination
Weightage (%)	30	20	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Course Code	Course Name	COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CSE 409	Cryptography and Cyber Security	CO409.1	3	2	1	3	1	3	2	-	1	-	-	1	2	3	1
		CO409.2	3	2	2	2	2	2	3	-	1	-	-	1	3	3	2
		CO409.3	1	2	3	1	3	3	3	-	1	-	-	2	3	1	1
		CO409.4	3	3	2	2	3	2	1	-	3	-	-	3	1	3	3
		CO4	3	2	3	2	3	3	2	-	2	-	-	3	3	3	2

		09.5														
		CO4 09	2.6	2.2	2.2	2.0	2.4	2.6	2.2	-	1.6	-	-	2.0	2.4	2.6	1.8

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3=strongly mapped

Model Question Paper

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

Name of the Program: BCA   Semester: VI   Stream: CSE
PAPER TITLE: Cryptography and Cyber Security
      PAPER CODE: CSE409
Maximum Marks: 50   Time duration: 3 hours
Total No of questions: 12   Total No of Pages: 01

Instruction for the Candidate:
403. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, and Date of Exam.
404. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page.
405. 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. **Describe** the OpenSSL and Stunnel.	U	CO1
2. **Explain** the HTC-Hydra .	Evaluate	CO1
3. **Describe** Cyber Crimes	U	CO1
4. **Explain** Digital Forensics.	Evaluate	CO2
5. **Describe** Contaminants and Destruction of Data	U	CO2
SECTION B (Attempt any **Three Questions**) (3 x 5 = 15)		

6.	**Write**Firewalls and Packet Filters	**Ap**	**CO1**
7.	**Examine**Steganography	**Ap**	**CO2**
8.	**Describe** DOS and DDOS attack.	**U**	**CO6**
9.	**Describe** with Example: i) XSS attack ii) Sql injection	**U**	**CO3, CO5**
	SECTION C (Answer Any Two Questions) (2 x 10 = 20)		
10.	**Write** the steps of IT assessments or audits	**Ap**	**CO2**
11	**Write** the steps of Cross-site scripting (XSS).	**Ap**	**CO4**
12.	**Describe** SQL injection and Cross-Site Request Forgery (CSRF) in details.	**U**	**CO3**

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO – PO & PSO MAPPING

Name of the Programme: BCA

Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
MTH11221	Mathematics-I	3	3	-	2	2	-	-	-	3	-	-	-	2	-	-
CSE11401	Introduction to Programming	3	3	2	2	-	-	-	-	-	-	-	-	3	-	-
ENG11055	English Communication	-	-	-	-	3	3	-	2	-	-	3	-	-	-	2
CSE11402	Computer Fundamentals	3	2	-	2	-	-	-	-	-	-	-	2	2	-	-
EVS11103	Environmental Science	-	2	-	-	2	2	-	-	2	-	1	1	-	-	1
CSE12	Programmi	3	3	2	3	-	-	2	-	-	-	-	-	3	-	-

Code	Name															
403	ng Lab															
DGS11001	Design Thinking	3	-	1	2	-	-	1	-	-	-	1	-	-	-	-
MTH11507	Mathematics-II	3	3	-	-	-	-	-	-	3	-	-	2	-	3	-
CSE11404	Programming &Data Structures	2	3	-	3	-	-	-	-	-	-	-	2	3	2	3
ECE11501	Digital Electronics	3	3	-	2	3	-	-	-	-	-	-	3	-	2	3
CSE11405	Design of Logic Circuits	-	3	3	3	-	-	-	-	-	-	-	-	3	-	3
CSE11453	Principles of Programming	3	3	3	-	-	-	-	-	-	-	-	3	3	-	3
CSE12407	Data Structures Lab	3	3	2	3	-	-	-	-	-	-	-	-	3	3	3
ECE12502	Digital Electronics Lab	3	2	3	-	-	3	-	-	-	2	-	-	2	2	3
CSE12454	Principles of Programming	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3

	Lab															
EIC 11001	Venture Ideation	-	-	-	-	3	-	-	2	3	-	3	-	-	-	2
CSE11409	Object Oriented Programming with JAVA	3	3	-	3	-	-	-	-	-	-	-	-	3	3	3
CSE11455	Data Science with Python	3	2	2	3	-	-	-	-	-	-	-	-	3	-	-
CSE11411	Computer Organization & Architecture	3	2	3	-	2	3	-	-	-	-	-	3	3	2	3
CSE11412	Database Management System	3	3	2	2	-	-	2	-	-	-	-	2	3	2	3
CSE12413	Object Oriented Programming Lab	3	3	3	-	2	-	-	-	-	-	-	3	3	3	3
CSE12	Data Scien	3	3	3	3	-	-	-	-	-	-	-	-	3	-	-

Code	Course	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
456	ce with Python Lab															
CSE12415	Computer Organization Lab	3	-	3	-	3	-	-	-	-	-	-	3	3	3	-
CSE12416	Database Management System Lab	3	3	2	3	-	-	2	-	-	-	-	2	2	2	3
SOC14100	Community Service#	-	-	-	2	2	2	-	2	2	2	-	-	-	-	-
IDP14001	Interdisciplinary Project	3	3	3	3	-	-	3	-	-	-	-	-	3	3	-
ECE11503	Data Communication & Computer Network	3	3	2	3	2	-	3	-	-	-	-	-	3	-	-
CSE11417	Algorithm Design	2	2	3	2	3	-	-	-	-	-	-	3	3	3	3
CSE11418	Operating System	3	3	-	3	-	-	-	-	-	-	-	-	3	3	-
CSE11	Introduction	3	3	-	3	-	-	-	-	-	-	-	-			

Code	Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
457	to Cloud Computing													3	3	3
ECE12504	Computer Network Lab	3	3	3	-	2	-	3	-	-	-	-	-	3	-	-
CSE12420	Algorithm Design Lab	2	2	3	2	3	-	-	-	-	-	-	-	3	3	-
CSE12421	Operating System Lab	3	2	3	2	2	-	-	-	-	-	-	3	2	3	3
CSE12458	Cloud Computing Lab	3	3	-	3	-	-	3	-	-	-	-	-	3	-	3
CSE12459	Applied Computing Lab	3	3	-	3	-	-	3	-	-	-	-	3	3	-	1
PSG11021	Human Values and Professional Ethics	-	-		2	-	-	-	3	2	-	2	3	2	2	2
CSE11406	Web Designing	-	3	3	-	3	2	-	-	-	2	-	2	3	3	-
CSE11460	AI and Machine Learning	3	3	-	3	-	-	-	-	-	-	-	-	3	3	3
CSE11	Software	3	2	2	2	-	-	2	-	-	-	-	2	3	3	2

Code	Course															
424	Engineering															
TBD	Business Communication	-	2	-	-	-	3	-	-	-	3	-	3	-	-	-
CSE12461	AI and Machine Learning Lab	3	3	-	3	-	-	-	-	-	-	-	-	3	3	3
CSE12408	Web Designing Lab	3	2	3	2	-	-	2	-	-	-	-	2	2	3	2
CSE14428	Project-I	3	3	3	-	-	-	-	-	2	-	2	2	3	2	-
MKT12403	E-commerce & Applications	3	2	3	3	-	-	-	2	-	-	-	-	3	2	-
CSE11429	Cyber Security	3	-	2	-	2	3	-	2	-	-	-	-	-	-	-
CSE15430	Comprehensive Viva Voce	3	3	3	2	3	-	-	-	-	2	-	-	3	3	2
CSE14431	Project-II	3	3	3	2	-	-	2	-	-	-	-	3	3	2	-
Average of CO-PO Mapping		2.9230777	2.717949	2.633333	2.545455	2.555556	2.714286	2.384615	2.142857	2.571429	2.2	2.2	2.55	2.815789	2.607143	2.692308