ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING ANDTECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UNDER GRADUATE PROGRAM

Course Structure and Syllabus
Of

B.TECH (HONS) COMPUTER SCIENCE AND ENGINEERING (CLOUD COMPUTING)

W.e.f. AY 2023-24

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE UNIVERSITY

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

MISSION STATEMENTS OF THE UNIVERSITY

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

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

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

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

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

CHANCELLOR / VICE CHANCELLOR

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE SCHOOL

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

MISSION STATEMENTS OF THE SCHOOL

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

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

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

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

DEAN / SCHOOL CONCERNED

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION OF THE DEPARTMENT

Graduates of the Department of Computer Science and Engineering will be recognized as innovative leaders in the fields of computer science and software engineering. This recognition will come from their work in software development in a myriad of application areas, as well as through their work in advanced study and research. The faculty is, and will continue to be, known for their passion for teaching and for their knowledge, expertise, and innovation in advancing the frontiers of knowledge in computer science and software engineering.

MISSION STATEMENTS OF THE DEPARTMENT

M.S 01: Our mission is to teach and prepare liberally educated, articulate, and skilled computer scientists and software engineers for leadership and professional careers and for advanced study.

M.S 02: A central objective of our program is to contribute to society by advancing the fields of computer science and software engineering through innovations in teaching and research, thus enhancing student knowledge through interactive instruction, global engagement, and experiential learning.

M.S 03: The program will serve as a resource to inform society about innovations related to the production and uses of computers and software.

M.S 04: To impart moral and ethical values, and interpersonal skills to the students.

HEAD OF THE DEPARTMENT	DEAN / SCHOOL CONCERNED

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Name of the Programme: B.TECH (HONS) COMPUTER SCIENCE AND ENGINEERING (CLOUD COMPUTING)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 01: Graduates would demonstrate analytical and design skills including the ability to generate creative solutions and foster team-oriented, professionalism through effective communication in their careers.

PEO 02: Graduates would expertise in successful careers based on their understanding of formal and practical methods of application development using the concept of computer programming languages and design principles in national and international level.

PEO 03: Graduates would pursue advanced education, research and development moreover other creative and innovative efforts in Computer Application, as well as other professional careers.

PEO 04: Graduates would implement their exhibiting critical thinking and problem solving skills in professional practices or tackle social, technical and business challenges.

PEO 05: Graduates would illustrate effective work conventionalities and be able to adapt as well as accept to the challenges of a dynamic job environment.

HEAD OF THE DEPARTMENT **DEAN / SCHOOL CONCERNED**

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Name of the Programme: B.TECH (HONS) COMPUTER SCIENCE AND ENGINEERING (CLOUD COMPUTING)

GRADUATE ATTRIBUTES/PROGRAMME OUTCOMES

GA 1 / PO 1: Computational knowledge: Acquire Knowledge of mathematical foundations, computer application theory and algorithm principles in the design and modelling of computer based system.
GA 2 / PO 2: Design/development of solutions: Avail appropriately system design notations and apply system design engineering process in order to design, plan, and implement software systems.
GA 3 / PO 3: Conduct investigations of complex problems: Implement document solutions to significant computational problems and apply mathematical and scientific reasoning to a variety of computational problems for the research in the computer application field.
GA 4 / PO 4: Problem analysis: Earn caliber to design, analyze and develop principles in the construction of complex hardware and software design computer systems.
GA 5 / PO 5: The engineer and society: Own Skills of observations and drawing logical inferences from the scientific experiments and develop application programs to meet the desired results including attainable constraints such as social, economic, environmental, functional, and technological.
GA 6 / PO 6: Communication: Assist and manage the execution of a productive project planning through effective communication among range of professional/non-professional audience.
GA 7 / PO 7: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
GA 8 / PO 8: Environment and sustainability: Appraise regarding the social and environmental issues to fulfil the local and global needs and give relevant solutions for them.
GA 9 / PO 9: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
GA 10 / PO 10: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
GA 11 / PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
GA 12 / PO 12: Life-long learning: Understand and adopt emerging technologies, research, strategies for lifelong learning at national and international level.

HEAD OF THE DEPARTMENT | **DEAN / SCHOOL CONCERNED**

ADAMAS UNIVERSITY, KOLKATA
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Name of the Programme: B.TECH (HONS) COMPUTER SCIENCE AND ENGINEERING (CLOUD COMPUTING)

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO-1: To engage in professional development and to pursue post graduate education in the fields of Information Technology and Computer Applications.

PSO-2: To provide the students about computing principles and business practices in software solutions, outsourcing services, public and private sectors.

PSO-3: Analyze and synthesis computing systems through quantitative and qualitative techniques.

HEAD OF THE DEPARTMENT	DEAN / SCHOOL CONCERNED

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UG Program: B.TECH (HONS) COMPUTER SCIENCE AND ENGINEERING (CLOUD COMPUTING)

COURSE STRUCTURE

FIRST YEAR

(Common for all streams)

SEMESTER I							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	MTH11501	Engineering Mathematics-I	3	1	0	4	4
2	PHY11201	Applied Science	2	0	0	2	2
3	CSE11001	Introduction to Programming#	2	0	0	2	2
4	GEE11001	Electrical and Electronics Technology#	2	0	0	2	
5	ENG11053	English Communication	1	0	2	3	2
6	GEE11012	Disruptive Technology Innovations	1	0	2	3	
7	BIT11003	Life Sciences	2	0	0	2	2
8	DGS11001	Design Thinking	1	0	2	3	2
9	PHY12202	Applied Science Lab	0	0	4	4	2
10	CSE12002	Programming Lab	0	0	4	4	2
11	GEE12002	Electrical and Electronics Technology Lab	0	0	4	4	
12	CEE12001/	Engineering Drawing and CAD	0	0	4	4	2
13	MEE12001	Engineering Workshop	0	0	4	4	
Total			**17**	**1**	**11**	**29**	**20**

SEMESTER II							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	MTH11502	Engineering Mathematics– II	3	1	0	4	4
2	MEE11002	Engineering Mechanics	2	1	0	3	3
3	EVS11112	Environmental Science	2	0	0	2	2
4	GEE11001	Electrical and Electronics Technology	2	0	0	2	2
5	CSE11001	Introduction to Programming	2	0	0	2	

6	GEE11012	Disruptive Technology Innovations	1	0	2	3	2
7	ENG11053	English Communication	1	0	2	3	
8	EIC11001	Venture Ideation	2	0	0	2	2
9	GEE12002	Electrical and Electronics Technology Lab	0	0	4	4	2
10	CSE12002	Programming Lab	0	0	4	4	
11	CEE12001	Engineering Drawing and CAD	0	0	4	4	2
12	MEE12001	Engineering Workshop	0	0	4	4	
Total			**17**	**1**	**9**	**27**	**19**

12

 # Introduction To Programming / Electrical and Electronics Technology are optional papers

1st Year Credits = 39

SECOND YEAR

SEMESTER III							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	SDS11510	Engineering Mathematics – III-C	3	1	0	4	4
2	MTH11534	**Professional Core** Discrete Structures and Logic	3	0	0	3	3
3	CSE11103	**Professional Core – I** Principles of Programming Language	3	0	0	3	3
4	CSE11104	**Professional Core – II** Data Structures and Algorithms	3	0	0	3	3
5	CSE11105	**Professional Core – III** Switching Circuits and Logic Design	3	0	0	3	3
-6	CSE12106	**Professional Core Lab - I** Principles of Programming Language Lab	0	0	2	2	1
7	CSE12107	**Professional Core Lab - II** Data Structures and Algorithms Lab	0	0	2	2	2
8	MTH12531	Numerical Techniques Lab	0	0	2	2	2
9	IDP14001	Interdisciplinary Project	0	0	5	5	3
10	SOC14100	Community Service #	0	0	0	0	1
Total			**15**	**1**	**11**	**27**	**25**

#Community Service will be taken up during the summer break after 2nd semester, and will be evaluated in the 3rd semester.

SEMESTER IV							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	CSE11108	**Professional Core – IV** Database Management Systems	3	0	0	3	3
2	CSE11109	**Professional Core – V** Object Oriented Programming	3	0	0	3	3
3	CSE11110	**Professional Core – VI**	3	0	0	3	3

		Design and Analysis of Algorithms					
4	CSE11111	**Professional Core -VII** Formal Language and Automata Theory	3	0	0	3	3
5	CSE11112	**Professional Core – VIII** Introduction to Artificial Intelligence	3	0	0	3	3
6	PSG11021	Human Values and Professional Ethics	2	0	0	2	2
7	CSE12113	**Professional Core Lab – III** Database Management Systems Lab	0	0	2	2	2
8	CSE12114	**Professional Core Lab – IV** Object Oriented Programming Lab	0	0	2	2	1
9	CSE12166	**Professional Core – VI** Design and Analysis of Algorithms Lab	0	0	2	2	2
10	CSE11175	**Specialization Theory – I** Parallel Processing	3	0	0	3	3
11	CSE12176	**Specialization Lab – I** Parallel Processing Lab	0	0	2	2	1
Total			**20**	**0**	**8**	**28**	**26**

2nd Year Credits: 51

THIRD YEAR

SEMESTER V							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	CSE11115	**Professional Core – IX** Computer Networks	3	0	0	3	3
2	CSE11116	**Professional Core – X** Computer Organization and Architecture	3	0	0	3	3
3	CSE11117	**Professional Core – XI** Software Engineering	3	0	0	3	3
4	CSE11167	Competitive Programming	3	0	0	3	3
5		**Professional Elective - I**	3	0	0	3	3
	CSE11118	Introduction to Python					
	CSE11119	Optimization and Game Theory					
	CSE11120	Introduction to Data Science					
	CSE11121	Distributed Systems and Cloud					
	CSE11122	Introduction to Cyber Security					
6		**Professional Elective - II**	3	0	0	3	3
	CSE11123	Full Stack Software Development					
	CSE11124	Pattern Recognition and Soft Computing					
	CSE11125	Data Mining and Warehousing					
	CSE11126	Cloud Security					
	CSE11127	Cyber Law and Governance					
7	CSE12128	**Professional Core Lab – V** Computer Networks Lab	0	0	2	2	1
8	CSE12129	**Professional Core Lab – VI** Computer Organization and Architecture Lab	0	0	2	2	1
9	CSE12168	**Professional Core Lab – VII** Software Engineering Lab	0	0	2	2	1
10	CSE12169	Competitive Programming Lab	0	0	2	2	1
11	CSE11177	**Specialization Theory – II** Distributed Database Management	3	0	0	3	3
Total			**21**	**0**	**8**	**29**	**25**

SEMESTER VI							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	CSE11131	**Professional Core – XII** Web Technology	3	0	0	3	3
2	CSE11132	**Professional Core – XIII** Compiler Design	3	0	0	3	3
3		**Professional Elective - III**	3	0	0	3	3
	CSE11133	Mobile Computing and Android					
	CSE11134	Machine Learning					
	CSE11135	Real-time Analytics					
	CSE11136	Virtualization and Applied Cloud Computing					

	CSE11137	Network Security					
4		**Professional Elective - IV**	3	0	0	3	3
	CSE11138	Application Development with Python					
	CSE11139	Neural Networks and Deep Learning Application					
	CSE11140	Statistical Modelling for Data Analytics					
	CSE11141	Cloud Management					
	CSE11142	Malware Analysis					
5		**Open Elective - I**	3	0	0	3	3
	CEE11029	Disaster Management					
	ECE11046	Digital Signal Processing					
	ECE11048	VLSI System Design					
6	ECO11505	Economics for Engineers	3	0	0	3	3
7	CSE12143	**Professional Core Lab – VIII** Web Technology Lab	0	0	2	2	1
8	CSE15144	**Project Work** Seminar	0	0	2	2	1
9		**Professional Elective Lab - I**	0	0	2	2	1
	CSE12145	Android Application Development Lab					
	CSE12146	Machine Learning Lab					
	CSE12147	Statistical Modelling for Data Analytics Lab					
	CSE12148	Virtualization and Applied Cloud Computing Lab					
	CSE12149	Network Security Lab					
10	CSE11178	**Specialization Theory – III** Big Data on Cloud	3	0	0	3	3
11	CSE12179	**Specialization Lab – II** Big Data on Cloud Lab	0	0	2	2	1
Total			**18**	**0**	**8**	**29**	**25**

3rd Year Credits : 50

FOURTH YEAR

SEMESTER VII							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	MGT11402	Industrial Management	3	0	0	3	3
2	CSE11150	**Professional Core – XIV** Operating Systems	3	0	0	3	3
3		**Professional Elective - V**	3	0	0	3	3
	CSE11151	Advanced Web Technologies					
	CSE11152	Applied Machine Intelligence					
	CSE11153	Data Analysis					
	CSE11154	Cloud Architecture and Deployment					
	CSE11155	Application Security					
4		**Open Elective - II**	3	0	0	3	3
	PHY11203	Medical Image Processing and Analysis					

	ECE11047	Sensors and Actuators for IOT					
	MEE11071	Robotics and Automation					
5		**Open Elective - III**	3	0	0	3	3
	MEE11060	Computer-Aided Simulation & Analysis					
	ECE11049	Microcontrollers and Interfacing					
	BIT11074	Bioinformatics					
6	CSE12156	**Professional Core Lab – X** Operating Systems Lab	0	0	2	2	2
7		**Professional Elective Lab - II**	0	0	2	2	1
	CSE12157	Advanced Web Technologies Lab					
	CSE12158	Applied Machine Intelligence Lab					
	CSE12159	Data Analysis Lab					
	CSE12160	Cloud Architecture and Deployment Lab					
	CSE12161	Application Security Lab					
8	CSE14162	Summer Internship #	0	0	0	0	2
9	CSE14163	Minor Project	0	0	6	6	3
10	CSE11180	**Specialization Theory – IV** IoT Application Development on Cloud	3	0	0	3	3
11	CSE12181	**Specialization Lab- III** IoT Application Development on Cloud Lab	0	0	2	2	1
Semester VII Total			**18**	**0**	**12**	**30**	**27**

#Summer Internship will be taken up during the summer break after 6th semester, and will be evaluated in the 7th semester.

SEMESTER VIII							
S.No.	**Course Code**	**Course Title**	**L**	**T**	**P**	**H**	**C**
1	CSE11182	**Specialization Theory – V** Cloud Computing Platforms	3	0	0	3	3
2	CSE14164	Industry Work experience/SIRE*/Major Project	0	0	12	12	6
3	CSE15165	Comprehensive Viva Voce	0	0	0	0	2
Semester VIII Total			**3**	**0**	**12**	**15**	**11**

***SIRE: Scientific Investigation and Research Experience**

4th Year Credits: 38

CREDIT DISTRIBUTION (SEMESTER-WISE)

SEM I	SEM II	SEM III	SEM IV	SEM V	SEM VI	SEM VII	SEM VIII	TOTAL
20	19	25	26	25	25	27	11	178

CREDIT DISTRIBUTION(YEAR-WISE)

YEAR I	YEAR II	YEAR III	YEAR IV	TOTAL
39	51	50	38	178