ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UNDERGRADUATE PROGRAM

Course Structure and Syllabus

B. Tech (Computer Science and Engineering)

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 (Computer Science and Engineering)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 01: To prepare students to excel in Computer Science and Engineering post graduate programs, to succeed in computing industry profession or successful entrepreneurs through quality education.

PEO 02: To provide students an ability to analyse and solve computer science and engineering problems through application of fundamental knowledge of math's, science and engineering.

PEO 03: To train students with good Computer Science and Engineering breadth, so as to comprehend, analyse, design and create innovative computing products and solutions for real life problems.

PEO 04: To inculcate in students professional and ethical attitude, communication skills, teamwork skills, lifelong learning, multidisciplinary approach and an ability to relate computer engineering issues with social awareness.

PEO 05: To equip students with excellent academic environment for a successful carrier as engineers, scientist, technocrats, administrators and entrepreneurs.

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 (Computer Science and Engineering)

GRADUATE ATTRIBUTES/PROGRAMME OUTCOMES

GA 01 / PO 01: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
GA 02 / PO 02: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
GA 03 / PO 03: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
GA 04 / PO 04: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
GA 05 / PO 05: 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 06 / PO 06: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
GA 07 / PO 07: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
GA 08 / PO 08: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
GA 09 / PO 09: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
GA 10 / PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
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 / PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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 (Computer Science and Engineering)

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO 01: Adequate strong skills in learning new programming environments, analyse and design algorithms for efficient computer-based systems of varying complexity.

PSO 02: The ability to understand the evolutionary changes in computing, apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success, real world problems and meet the challenges of the future.

PSO 03: Ability to analyse the impact of computer science and engineering solutions in the societal and human context, design, model, develop, test and manage complex software and information management systems.

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

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

UG Program: B.Tech (Computer Science and Engineering)

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#	3	1	0	4	4
5	ENG11053	English Communication	1	0	2	3	2
6		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	2	2	1
12	CEE12001/	Engineering Drawing and CAD	0	0	4	4	2
13	MEE12001	Engineering Workshop	0	0	4	4	
Total			**17**	**1**	**11**	**29**	**21**

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	EVS11107	Environmental Studies	2	0	2	4	3
4	GEE11001	Electrical and Electronics Technology	3	1	0	4	4
5	CSE11001	Introduction to Programming	2	0	0	2	2
6		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	2	2	1
10	CSE12002	Programming Lab	0	0	4	4	2
11	CEE12001/	Engineering Drawing and CAD	0	0	4	4	2
12	MEE12001	Engineering Workshop	0	0	4	4	
Total			**17**	**1**	**9**	**27**	**20**

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

1st Year Credits = 43

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** Design and Analysis of Algorithms	3	0	0	3	3
4	CSE11111	**Professional Core -VII** Formal Language and Automata	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
	TBD	**Professional Core – VI** Design and Analysis of Algorithms Lab	0	0	2	2	2
Total			**17**	**0**	**4**	**21**	**22**

2nd Year Credits : 47

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	TBD	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 Da3ta 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	TBD	**Professional Core Lab – VII** Software Engineering Lab	0	0	2	2	1
10	TBD	Competitive Programming Lab	0	0	2	2	1
Total			**15**	**0**	**6**	**21**	**22**

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					
Total			**18**	**0**	**6**	**24**	**21**

3rd Year Credits : 43

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
Semester VII Total			**15**	**0**	**10**	**25**	**23**

#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	CSE14164	Industry Work experience/SIRE*/Major Project	0	0	12	12	6
2	CSE15165	Comprehensive Viva Voce	0	0	0	0	2
Semester VIII Total			**0**	**0**	**12**	**12**	**8**

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

4th Year Credits: 31

CREDIT DISTRIBUTION (SEMESTER-WISE)

SEM I	SEM II	SEM III	SEM IV	SEM V	SEM VI	SEM VII	SEM VIII	TOTAL
20	**21**	**25**	**22**	**22**	**21**	**23**	**8**	**162**

CREDIT DISTRIBUTION(YEAR-WISE)

YEAR I	YEAR II	YEAR III	YEAR IV	TOTAL
41	**47**	**43**	**31**	**162**