

ANNEXURE I

CURRICULUM



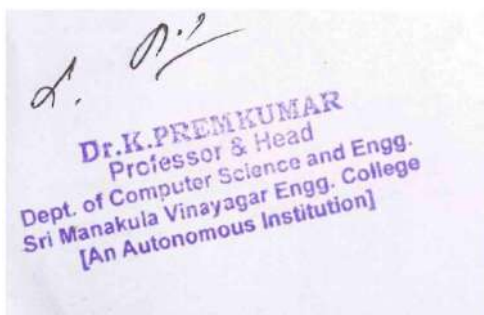
SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

B.TECH. COMPUTER SCIENCE AND ENGINEERING

**ACADEMIC REGULATIONS 2023
(R - 2023)**



CURRICULUM



COLLEGE VISION AND MISSION

VISION

To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

MISSION

M1: Quality Education : To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship : To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values : To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.

DEPARTMENT VISION AND MISSION

VISION

To create a productive learning and research environment for graduates to become highly dynamic, competent, ethically responsible, professionally knowledgeable in the field of computer science and engineering to meet the industrial needs on par with global standards.

MISSION

M1: Quality Education: Empowering the students with the necessary technical skills through quality education to grow professionally.

M2: Innovative Research: Advocating the innovative research ideas by incorporating with industries for developing products and services.

M3: Placement and Entrepreneurship: Advancing the education by strengthening the Industry-academic relationship through hands-on training to seek placement in the top most industries or to develop a start-ups.

M4: Ethics and Social Responsibilities: Stimulating professional behaviour and good ethical values to improve the leadership skills and social responsibilities.



PROGRAMME OUTCOMES (POs)**PO1: Engineering knowledge:**

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

PO2: Problem analysis:

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

PO3: Design/development of solutions:

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

PO4: Conduct investigations of complex problems:

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage:

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

PO6: The engineer and society:

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

PO7: Environment and sustainability:

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

PO8: Ethics:

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

PO9: Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication:

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

PO11: Project management and finance:

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

PO12: Life-long learning:

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



PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Competitive Platform: To create a competitive platform for solving critical problems in a wide variety of fields.

PEO2: Exploration: Enthusiastic participation in learning, understanding, designing and applying new innovative research ideas as the field evolves.

PEO3: Career: Applying cutting-edge technology that improves knowledge and to commit students for life-long learning to reach the leading positions in the career.

PEO4: Professional Values: Simulate the graduates to hold the responsibilities in the context of technology, ethics, society and humanity.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Computational Skills: Graduates with the ability to apply basic knowledge of Computer Science in solving the critical problems.

PSO2: Studios Research: Ability to convert innovative ideas into research or society oriented projects through current trending technologies.

PSO3: Employability: Acquire placement in highly reputed industries or accomplish new technical business skills with the contemporary trends in the industry.



STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAMME

Sl. No.	Course Category	Breakdown of Credits
1	Humanities and Social Sciences including Management courses (HS)	15
2	Basic Science Courses (BS)	20
3	Engineering Science including workshop, drawing, basics of electrical / mechanical / computer etc. (ES)	18
4	Professional Core Courses (PC)	77
5	Professional Electives Courses (PE)	18
6	Open Electives Courses (OE)	9
7	Project Work and Internship (PA)	13
8	Ability Enhancement Courses (AEC*)	
9	Mandatory Courses (MC*)	-
Total		170

SCHEME OF CREDIT DISTRIBUTION - SUMMARY

Sl. No	AICTE Suggested Course Category	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII	VIII	
1	Humanities and Social Sciences (HS)	5	3	1	1	2	-	-	3	15
2	Basic Sciences (BS)	8	3	5	4	-	-	-	-	20
3	Engineering Sciences (ES)	9	5	-	4	-	-	-	-	18
4	Professional Core (PC)	3	8	17	11	12	15	11	-	77
5	Professional Electives (PE)	-	-	-	3	3	3	3	6	18
6	Open Electives (OE)	-	-	-	-	3	3	3	-	9
7	Project Work (PA)	-	-	-	-	1	1	2	8	12
8	Internship (PA)	-	-	-	-	-	-	1	-	1
9	Employability Enhancement Courses (AEC)*	-	-	-	-	-	-	-	-	-
10	Mandatory Courses (MC)*	-	-	-	-	-	-	-	-	-
Total		25	19	23	23	21	22	20	17	170

*** AEC and MC are not included for CGPA calculation**

HONOURS DEGREE PROGRAMME:

The student is permitted to opt for earning an *honours degree* in the same discipline of engineering in addition to the degree in his/her own discipline. To earn an honours degree the student is required to earn an additional 18 - 20 credits (over and above the total 170 credits prescribed in the curriculum) starting from fourth semester onwards by completing 5 additional courses offered in respective semesters. A student is eligible to exercise this option if he/she has passed all the courses offered upto third semester in the first attempt itself and has earned a CGPA / GPA* (*for lateral entry) of not less than 8.0. The prescribed courses offered for Honours degree are given in **Annexure IV**.

SEMESTER – I										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC01	Engineering Mathematics - I	BS	3	1	0	4	25	75	100
2	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	3	0	0	3	25	75	100
3	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
4	U23CSTC02	Problem Solving Approach	PC	3	0	0	3	25	75	100
5	U23HSTC01	Universal Human Values-II	HS	2	0	0	2	25	75	100
Theory Cum Practical										
6	U23ENBC01	Communicative English -I	HS	2	0	2	3	50	50	100
Practical										
7	U23ESPC01	Basics of Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	50	50	100
8	U23CSPC01	Programming in C Laboratory	ES	0	0	2	1	50	50	100
9	U23ESPC03	Engineering Graphics using AutoCAD	ES	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23AEC1XX	Certification Course – I **	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23CSM101	Induction Programme	MC	2 Weeks			-	-	-	-
							21	425	575	1000

SEMESTER – II										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC02	Engineering Mathematics - II	BS	3	1	0	4	25	75	100
2	U23BSTC01	Physical Science for Engineers	BS	3	0	0	3	25	75	100
3	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
4	U23CSTC03	Data Structures	PC	3	0	0	3	25	75	100
5	U23ITTC01	Digital Design and System Architecture	PC	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23ENBC02	Communicative English -II	HS	2	0	2	3	50	50	100
Practical										
7	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
8	U23ADPC01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
9	U23CSPC02	Data Structures Laboratory	PC	0	0	2	1	50	50	100
10	U23ITPC01	Digital Design and System Architecture Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23AEC2XX	Certification Course – II **	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CSM202	Sports Yoga and NSS	MC	0	0	2	-	100	-	100
							23	575	625	1200

**** Certification Courses are to be selected from the list given in Annexure III**

SEMESTER – III										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC03	Probability and Statistics	BS	3	1	0	4	25	75	100
2	U23ITTC02	Microprocessors and Embedded Systems	PC	3	0	0	3	25	75	100
3	U23CST301	Software Engineering and Testing	PC	3	0	0	3	25	75	100
4	U23CSDC01	Automata and Compiler Design	PC	3	0	0	3	25	75	100
5	U23CST302	Computer Networks	PC	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23CSBC01	Design and Analysis of Algorithms	PC	2	0	2	3	50	50	100
Practical										
7	U23ENPC01	General Proficiency -I	HS	0	0	2	1	50	50	100
8	U23MAPC01	Engineering Mathematics Laboratory	BS	0	0	2	1	50	50	100
9	U23ITPC02	Microprocessors and Embedded Systems Laboratory	PC	0	0	2	1	50	50	100
10	U23CSP301	Software Engineering and Testing Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23AEC3XX	Certification Course – III**	AEC	0	0	4	-	100	-	100
12	U23CSS301	Skill Enhancement Course – I*	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23CSM303	Climate Change	MC	2	0	0	-	100	-	100
							23	675	625	1300

SEMESTER – IV										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23MATC05	Discrete Mathematics	BS	3	1	0	4	25	75	100
2	U23ITTC03	Programming in Java	ES	3	0	0	3	25	75	100
3	U23CSTC05	Operating Systems	PC	3	0	0	3	25	75	100
4	U23CSTC06	Database Management Systems	PC	3	0	0	3	25	75	100
5	U23CSE4XX	Professional Electivel #	PE	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23CSB401	Cloud Computing and Big Data	PC	2	0	2	3	50	50	100
Practical										
7	U23ENPC02	General Proficiency -II	HS	0	0	2	1	50	50	100
8	U23ITPC03	Programming in Java Laboratory	ES	0	0	2	1	50	50	100
9	U23CSPC03	Operating Systems Laboratory	PC	0	0	2	1	50	50	100
10	U23CSPC04	Database Management Systems Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23AEC4XX	Certification Course – IV **	AEC	0	0	4	-	100	-	100
12	U23CSS402	Skill Enhancement Course -II *	SEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23CSM404	Right to Information and Good Governance	MC	2	0	0	0	100	-	100
							23	675	625	1300

Professional Electives are to be selected from the list given in Annexure I

* Skill Enhancement Courses (1and 2) are to be selected from the list given in Annexure III

SEMESTER – V										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC02	Research Methodology	HS	2	0	0	2	25	75	100
2	U23CST503	Android Programming	PC	3	0	0	3	25	75	100
3	U23CSTC07	Artificial Intelligence	PC	3	0	0	3	25	75	100
4	U23CST504	Web Designing	PC	3	0	0	3	25	75	100
5	U23CSE5XX	Professional Elective II #	PE	3	0	0	3	25	75	100
6	U23XXO5XX	Open Elective \$	OE	3	0	0	3	25	75	100
Practical										
7	U23CSP502	Android Programming Laboratory	PC	0	0	2	1	50	50	100
8	U23CSPC05	Artificial Intelligence Laboratory	PC	0	0	2	1	50	50	100
9	U23CSP503	Web Designing Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23CSW501	Micro Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23AEC5XX	Certification Course–V **	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CSM505	Essence of Indian Traditional Knowledge	MC	2	0	0	-	100	-	100
							21	600	600	1200

SEMESTER – VI										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23ITTC04	Machine Learning	PC	3	0	0	3	25	75	100
2	U23CST605	Designing and Building of Bots	PC	3	0	0	3	25	75	100
3	U23CST606	Animation and Visual Effects	PC	3	0	0	3	25	75	100
4	U23CSE6XX	Professional Elective III #	PE	3	0	0	3	25	75	100
5	U23XXO6XX	Open Elective II \$	HS	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23CSB602	Blockchain Concepts and Applications	PC	2	0	2	3	50	50	100
Practical										
7	U23ITPC04	Machine Learning Laboratory	PC	0	0	2	1	50	50	100
8	U23CSP604	Designing and Building of Bots Laboratory	PC	0	0	2	1	50	50	100
9	U23CSP605	Animation and Visual Effects Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23CSW602	Mini Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23AEC6XX	Certification Course – VI **	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CSM606	Gender Equality	MC	2	0	0	-	100	-	100
							22	625	575	1200

\$ Open electives are to be selected from the list given in Annexure II

SEMESTER – VII										
Sl. No	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23CST707	IoT and Edge Computing	PC	3	0	0	3	25	75	100
2	U23CST708	Data Science and Digital Marketing Analytics	PC	3	0	0	3	25	75	100
3	U23CST709	Network Security and Cryptography	PC	3	0	0	3	25	75	100
4	U23CSE7XX	Professional Elective IV #	PE	3	0	0	3	25	75	100
5	U23XXO7XX	Open Elective III \$	OE	3	0	0	3	25	75	100
Practical										
6	U23CSP706	IoT and Edge Computing Laboratory	PC	0	0	2	1	50	50	100
7	U23CSP707	Data Science and Digital Marketing Analytics Laboratory	PC	0	0	2	1	50	50	100
Project Work										
8	U23CSW703	Project phase – I	PA	0	0	4	2	50	50	100
9	U23CSW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100
							20	375	525	900

SEMESTER – VIII										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HSTC03	Entrepreneurship and Business Management	HS	3	0	0	3	25	75	100
2	U23CSE8XX	Professional Elective V #	PE	3	0	0	3	25	75	100
3	U23CSE8XX	Professional Elective VI #	PE	3	0	0	3	25	75	100
Project Work										
4	U23CSW805	Project phase – II	PA	0	0	16	8	50	100	150
							17	125	325	450

ANNEXURE - I
PROFESSIONAL ELECTIVE COURSES

Professional Elective –I (Offered in Semester IV)		
Sl. No.	Course Code	Course Title
1.	U23CSE401	Programming in C++
2.	U23CSE402	Cryptography for Cyber Security
3.	U23CSE403	Distributed Systems
4.	U23CSE404	IoT Design Protocols
5.	U23CSE405	Cognitive Neuroscience
Professional Elective –II (Offered in Semester V)		
Sl. No.	Course Code	Course Title
1.	U23CSE506	Programming in C#
2.	U23CSE507	Network Security through Data Analysis
3.	U23CSE508	Azure Cloud
4.	U23CSE509	IOT challenges and Future
5.	U23CSE510	Human Cognitive Process
Professional Elective –III (Offered in Semester VI)		
Sl. No.	Course Code	Course Title
1.	U23CSE611	Haskell Programming
2.	U23CSE612	Information Security
3.	U23CSE613	Cloud Data Management
4.	U23CSE614	Open Source Programming for IOT
5.	U23CSE615	Computational Neuroscience
Professional Elective –IV (Offered in Semester VII)		
Sl. No.	Course Code	Course Title
1.	U23CSEC01	Go Programming
2.	U23CSE716	Cyber Forensics
3.	U23CSE717	Service Oriented Computing
4.	U23CSE718	Internet Cryptography
5.	U23CSE719	Brain Inspired Computing
Professional Elective –V (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1.	U23CSE820	Redux Programming
2.	U23CSE821	Mobile and Wireless Security
3.	U23CSE822	Cloud Security
4.	U23CSE823	Introduction to Industry 4.0
5.	U23CSE824	Cognitive Modelling
Professional Elective –VI (Offered in Semester VIII)		
Sl. No.	Course Code	Course Title
1.	U23CSE825	Kotlin Programming
2.	U23CSE826	Internet Protocols and Networking
3.	U23CSE827	Distributed operating System
4.	U23CSE828	IOT Security
5.	U23CSE829	Computational and Cognitive models of perception: Vision, Sound

ANNEXURE - II
OPEN ELECTIVE COURSES (R-2023)

S. No.	Course Code	Course Title	Offering Department	Permitted Departments
Open Elective – I (Offered in Semester V/VI)				
1	U23CSO501	Structured Query Language	CSE	ECE, EEE, ICE, MECH, CIVIL, BME and MECHTRONICS
2	U23CSO502	Computer Peripherals and Networking	CSE	Offered to all Branches
Open Elective – II (Offered in Semester VII)				
1	U23CSO701	Web Programming	CSE	ECE, EEE, ICE, MECH, CIVIL, BME AND MECHTRONICS
2	U23CSO702	Cloud Technology	CSE	ECE, EEE, ICE, MECH, CIVIL, BME and MECHTRONICS



ANNEXURE – III

ABILITY ENHANCEMENT COURSES-(A) CERTIFICATION COURSES

S. No	Course Code	Course Title	Certified By
1	U23XXCX01	Adobe Photoshop	Adobe
2	U23XXCX02	Adobe Animate	Adobe
3	U23XXCX03	Adobe Dreamweaver	Adobe
4	U23XXCX04	Adobe After Effects	Adobe
5	U23XXCX05	Adobe Illustrator	Adobe
6	U23XXCX06	Adobe InDesign	Adobe
7	U23XXCX07	Autodesk AutoCAD -ACU	Autodesk
8	U23XXCX08	Autodesk Inventor - ACU	Autodesk
9	U23XXCX09	Autodesk Revit - ACU	Autodesk
10	U23XXCX10	Autodesk Fusion 360 - ACU	Autodesk
11	U23XXCX11	Autodesk 3ds Max - ACU	Autodesk
12	U23XXCX12	Autodesk Maya - ACU	Autodesk
13	U23XXCX13	Cloud Security Foundations	AWS
14	U23XXCX14	Cloud Computing Architecture	AWS
15	U23XXCX15	Cloud Foundation	AWS
16	U23XXCX16	Cloud Practitioner	AWS
17	U23XXCX17	Cloud Solution Architect	AWS
18	U23XXCX18	Data Engineering	AWS
19	U23XXCX19	Machine Learning Foundation	AWS
20	U23XXCX20	Robotic Process Automation / Medical Robotics	Blue Prism
21	U23XXCX21	Advance Programming Using C	CISCO
22	U23XXCX22	Advance Programming Using C ++	CISCO
23	U23XXCX23	C Programming	CISCO
24	U23XXCX24	C++ Programming	CISCO
25	U23XXCX25	CCNP Enterprise: Advanced Routing	CISCO
26	U23XXCX26	CCNP Enterprise: Core Networking	CISCO
27	U23XXCX27	Cisco Certified Network Associate - Level 2	CISCO
28	U23XXCX28	Cisco Certified Network Associate- Level 1	CISCO
29	U23XXCX29	Cisco Certified Network Associate- Level 3	CISCO
30	U23XXCX30	Fundamentals Of Internet of Things	CISCO
31	U23XXCX31	Internet Of Things / Solar and Smart Energy System with IoT	CISCO
32	U23XXCX32	Java Script Programming	CISCO
33	U23XXCX33	NGD Linux Essentials	CISCO
34	U23XXCX34	NGD Linux I	CISCO
35	U23XXCX35	NGD Linux II	CISCO
36	U23XXCX36	Advance Java Programming	Ethnotech
37	U23XXCX37	Android Programming / Android Medical App Development	Ethnotech
38	U23XXCX38	Angular JS	Ethnotech
39	U23XXCX39	Catia	Ethnotech
40	U23XXCX40	Communication Skills for Business	Ethnotech
41	U23XXCX41	Coral Draw	Ethnotech
42	U23XXCX42	Data Science Using R	Ethnotech
43	U23XXCX43	Digital Marketing	Ethnotech

44	U23XXCX44	Embedded System Using C	Ethnotech
45	U23XXCX45	Embedded System with IOT / Arduino	Ethnotech
46	U23XXCX46	English For IT	Ethnotech
47	U23XXCX47	Plaxis	Ethnotech
48	U23XXCX48	Sketch Up	Ethnotech
49	U23XXCX49	Financial Planning, Banking and Investment Management	Ethnotech
50	U23XXCX50	Foundation Of Stock Market Investing	Ethnotech
51	U23XXCX51	Machine Learning / Machine Learning for Medical Diagnosis	Ethnotech
52	U23XXCX52	IOT Using Python	Ethnotech
53	U23XXCX53	Creo (Modelling & Simulation)	Ethnotech
54	U23XXCX54	Soft Skills, Verbal, Aptitude	Ethnotech
55	U23XXCX55	Software Testing	Ethnotech
56	U23XXCX56	MX-Road	Ethnotech
57	U23XXCX57	CLO 3D	Ethnotech
58	U23XXCX58	Solid works	Ethnotech
59	U23XXCX59	Staad Pro	Ethnotech
60	U23XXCX60	Total Station	Ethnotech
61	U23XXCX61	Hydraulic Automation	Festo
62	U23XXCX62	Industrial Automation	Festo
63	U23XXCX63	Pneumatics Automation	Festo
64	U23XXCX64	Agile Methodologies	IBM
65	U23XXCX65	Block Chain	IBM
66	U23XXCX66	Devops	IBM
67	U23XXCX67	Artificial Intelligence	ITS
68	U23XXCX68	Cloud Computing	ITS
69	U23XXCX69	Computational Thinking	ITS
70	U23XXCX70	Cyber Security	ITS
71	U23XXCX71	Data Analytics	ITS
72	U23XXCX72	Databases	ITS
73	U23XXCX73	Java Programming	ITS
74	U23XXCX74	Networking	ITS
75	U23XXCX75	Python Programming	ITS
76	U23XXCX76	Web Application Development (HTML, CSS, JS)	ITS
77	U23XXCX77	Network Security	ITS & Palo alto
78	U23XXCX78	MATLAB	MathWorks
79	U23XXCX79	Azure Fundamentals	Microsoft
80	U23XXCX80	Azure AI (AI-900)	Microsoft
81	U23XXCX81	Azure Data (DP -900)	Microsoft
82	U23XXCX82	Microsoft 365 Fundamentals (SS-900)	Microsoft
83	U23XXCX83	Microsoft Security, Compliance and Identity (SC-900)	Microsoft
84	U23XXCX84	Microsoft Power Platform (PI-900)	Microsoft
85	U23XXCX85	Microsoft Dynamics Fundamentals 365 – CRM	Microsoft
86	U23XXCX86	Microsoft Excel	Microsoft
87	U23XXCX87	Microsoft Excel Expert	Microsoft
88	U23XXCX88	Securities Market Foundation	NISM
89	U23XXCX89	Derivatives Equinity	NISM
90	U23XXCX90	Research Analyst	NISM
91	U23XXCX91	Portfolio Management Services	NISM

92	U23XXCX92	Cyber Security	Palo alto
93	U23XXCX93	Cloud Security	Palo alto
94	U23XXCX94	PMI – Ready	PMI
95	U23XXCX95	Tally – GST & TDS	Tally
96	U23XXCX96	Advance Tally	Tally
97	U23XXCX97	Associate Artist	Unity
98	U23XXCX98	Certified Unity Programming	Unity
99	U23XXCX99	VR Development	Unity

ABILITY ENHANCEMENT COURSES - (B) SKILL ENHANCEMENT COURSES

Sl. No.	Course Code	Course Title
1.	U23CSS301	Skill Enhancement Course 1 *
		1) Computer Assembly and Troubleshooting
		2) Aptitude - I
		3) Electronic Devices and Circuits
2.	U23CSS402	Skill Enhancement Course 2 *
		1) Exploring Photoshop
		2) Aptitude - II
		3) Office Automation

*** Any one course to be selected from the list**



ANNEXURE – IV

HONORS DEGREE

B.Tech.(Honors) in Computer Science & Engineering
(with Specialization in Artificial Intelligence and Data science)

SEMESTER – VIII											
Sl. No.	Semester	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
					L	T	P		CAM	ESM	Total
Theory											
1	IV	U23CSH401	AI for Data Science	PC	3	1	0	4	25	75	100
2	V	U23CSH502	Data Visualization Techniques	PC	3	1	0	4	25	75	100
3	VI	U23CSH603	Data Warehousing & Data Mining	PC	3	1	0	4	25	75	100
4	VII	U23CSH704	Deep Learning	PC	3	1	0	4	25	75	100
5	VIII	U23CSH805	Optimization Techniques for Data Science	PC	3	1	0	4	25	75	100
Total								20	125	375	500
Equivalent NPTEL courses##											
1	IV to VIII	U23CSHN01	Introduction to Artificial Intelligence					3	12 Weeks Course		
2			Artificial Intelligence Search Methods for Problem Solving					3			
3			Data Mining-Introduction					4			
4			Deep Learning					3			
			Machine learning and Deep Learning					3			
5			Big Data Computing					3			
			Reinforcement Learning					3			

The student shall be given an option to earn 3 credits through one 12 week NPTEL course (equivalent) instead of any one course listed for honours degree programme and shall be completed before the commencement of eighth semester. The equivalent courses are subject to change based on its availability as per NPTEL course list.

ANNEXURE II

SYLLABUS

SEMESTER I

Department	Mathematics			Programme: B.Tech.					
Semester	I			Course Category: BS			End Semester Exam Type: TE		
Course Code	U23MATC01			Periods/Week			Credit	Maximum Marks	
				L	T	P	C	CAM	ESE
Course Name	Engineering Mathematics – I			3	1	-	4	25	75 100
(Common to ALL Branches Except CSBS)									
Prerequisite	Basic Mathematics								
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)
	CO1	Understand the concept of Eigen values and Eigen vectors, Diagonalization of a Matrix							K3
	CO2	Solve higher order differential equations							K3
	CO3	Understand the different types of partial differential equations							K3
	CO4	Know about the Applications of double and triple integrals							K3
	CO5	Gain the knowledge about Vector Calculus and its Applications							K3
UNIT – I	Matrices						Periods:12		
Rank of a Matrix – Systems of Linear Equations – Characteristic equation – Cayley Hamilton Theorem – Eigen values and Eigen vectors of a real Matrix–Diagonalization of Matrices.									CO1
UNIT – II	Differential Equations (Higher Order)						Periods:12		
Linear Differential equations of higher order with constant coefficients – Euler’s linear equation of higher order with variable coefficients –Method of Variation of parameters.									CO2
UNIT – III	Functions Of Several Variables						Periods:12		
Partial derivatives – Total derivatives – Maxima and Minima of two variables – Lagrange’s Method of multipliers.									CO3
UNIT – IV	Multiple Integrals						Periods:12		
Multiple Integrals – Change of order of integration (Cartesian form). Applications: Area as a double integral (Cartesian form) – Volume as a triple integral (Cartesian form).									CO4
UNIT – V	Vector Calculus						Periods:12		
Gradient – Divergence and Curl – Directional derivatives – Irrotational and Solenoidal vector fields – Properties (Statement only) – Gauss Divergence Theorem and Stoke’s Theorem (without proofs).									CO5
Lecture Periods:45			Tutorial Periods:15			Practical Periods:-		Total Periods:60	
Text Books									
1. M.K. Venkataraman, “Engineering Mathematics”,The National Publishing Company, 2 nd Edition Chennai, 2016.									
2. N. P Bali and Manish Goyal, “A Text Book of Engineering Mathematics”, Lakshmi Publications, New Delhi, 9 th Edition, 2018.									
3. S. Narayanan and T.K. Manickavasagam Pillay,” Differential Equations and Its Applications”, Viswanathan.S, Printers & Publishers Pvt Ltd, 2009.									
Reference Books									
1. G. Balaji, “Matrices and Calculus (Engineering Mathematics – I)” Balaji Publications, 9 th Edition June 2023									
2. A. Singaravelu, “Engineering Mathematics – I”, Meenakshi publications, 1998.									
3. Erwin Kreyszig, “Advanced Engineering Mathematics “, Wiley, 10 th Edition, 2019.									
4. B.V.Ramana, ” Higher Engineering Mathematics”, Tata McGraw – Hill, New Delhi, 6 th Edition, 2018.									
5. C W. Evans, “Engineering Mathematics”, A Programmed Approach, 3 rd Edition, 2019.									
Web References									
1. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra-slides- systems of equation-handout.pdf									
2. http://www.math.cum.edu/~wn0g/2ch6a.pdf									
3. https://nptel.ac.in/courses/122/104/122104017/									
4. https://nptel.ac.in/courses/111/106/111106051/									
5. https://nptel.ac.in/courses/111/108/111108081/									

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	-	2	1	1	-	-	-	-	1	3	-	-
2	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
3	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
4	3	2	1	1	-	1	1	-	-	-	-	1	3	-	-
5	2	2	1	-	-	-	1	-	-	-	-	1	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	EEE and ECE				Programme: B.Tech.						
Semester	I / II				Course Category: ES		End Semester Exam Type: TE				
Course Code	U23ESTC03				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	Basics of Electrical and Electronics Engineering				3	-	-	3	25	75	100
(Common to CSE, IT, MECH, CIVIL, MCTR, CCE, AI&DS, FT and CSBS Branches)											
Prerequisite	Mathematics and Physics										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Apply the basic concepts and various laws in DC circuits.									K3
	CO2	Analyze the AC circuits and develop resonance conditions for transmitter and receiver circuits.									K3
	CO3	Gain the knowledge of power system components, importance of electrical safety measures and real time applications of transformer and motor.									K2
	CO4	Understand the operation of semiconductor diode and its applications.									K2
	CO5	Explain the characteristics and operation of BJT and FET.									K2
	CO6	Relate and Explain Different Communication Systems.									K2
Section A – Electrical Engineering											
UNIT - I	DC Circuits						Periods: 8				
Concept of Potential Difference, Current, Resistance, Inductance and Capacitance, Work, Power, Energy, Current and Voltage sources - ideal and practical sources - concept of dependent and independent sources, Ohm's law, Kirchhoff's law, Series parallel combination of R, L, C components, Voltage Divider and Current Divider Rules, Mesh and Nodal analysis, Star/Delta transformation, Network Theorems - Superposition, Thevenin, Norton and Maximum Power Transfer.										CO1	
UNIT - II	AC Circuits						Periods: 8				
AC waveform definitions - form factor, peak factor, R-L, R-C, RLC series circuit, R-L-C parallel circuit, phasor representation in polar and rectangular form, concept of impedance, admittance, active, reactive, apparent and complex power, power factor, Resonance in series and parallel circuits, band-width and quality factor, Three Phase balanced AC Circuits (Y-Δ and Y-Y) - Power Measurement – Two Wattmeter method.										CO2	
UNIT - III	Electrical Safety and Electrical Machines						Periods: 7				
Layout of electrical power system and its functions, Wiring Accessories, Types of domestic wiring, Necessity of earthing, insulators and cables, Safety devices - fuse, relay and circuit breaker - Sensors and its types. Faraday's Law of electromagnetic induction, Fleming's Right and Left hand rule - DC Generator and DC Motor - construction, principle, load test and performance characteristics - Auto transformer, Single phase transformer- construction, principle, load test - Single phase capacitor start and run induction motor – Load test.										CO3	
Section B – Electronics Engineering											
UNIT - IV	Semiconductor Diodes And Applications						Periods: 7				
Introduction semiconductor materials – Doping - Intrinsic and Extrinsic Semiconductor – PN junction diode, structure, characteristics - diffusion and depletion capacitance - Rectifier, Half wave and Full wave rectifier - zener diode characteristics - zener diode as regulator – Light Emitting Diode (LED) - Solar Cell.										CO4	
UNIT - V	Transistors						Periods: 7				
Bipolar Junction Transistor - construction – operation - Common Base, Common Emitter, Common collector Configuration – characteristics – Biasing - numerical application. Junction Field Effect Transistor (JFET), Metal oxide semiconductor Field Effect Transistor, EMOSFET-DMOSFET operation characteristics - Numerical application.										CO5	
UNIT - VI	Communication Systems						Periods: 8				
Need for Modulation – Block diagram of analog communication System - AM, FM, PM Definitions and Waveforms – Comparison of digital and analog communication system- Block diagram of digital communication system – Electromagnetic Spectrum. Wired and wireless Channel – Block diagram of communication systems – satellite communication – Cellular Mobile Communication – Fibre Optical Communication System.										CO6	
Lecture Periods: 45			Tutorial Periods:-			Practical Periods:-			Total Periods: 45		
Text Books											
1. R. K. Rajput, “Basic Electrical and Electronics Engineering”, University Science Press, 2 nd Edition, 2017. 2. Dr. R. Saravanakumar, Dr.V. Jegathesan, Dr. K. Vinoth Kumar, Dr. K. Kowsalya, “Basic Electrical and Electronics Engineering”, Wiley Publisher, 2 nd Edition, 2022. 3. R. Muthusubramaniam, S. Salivahanan and K. A. Mureleedharan, “Basic Electrical Electronics and Computer Engineering”, Tata McGraw Hill, 2018.											

Reference Books

1. A. Sudhakar and S. P. Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 4th Edition, 2017.
2. D. P. Kothari and I. J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.
3. B. L. Theraja, A. K. Theraja, "A Textbook of Electrical Technology – Volume - II", S Chand & Co. Ltd., New Delhi, 23rd Edition, 2009.
4. David. A. Bell, "Electronic Devices and Circuits", PHI Learning Private Ltd, India, 4th Edition, 2020
5. Wayne Tomasi, "Electronic Communication Systems- Fundamentals Theory Advanced", Pearson Education, 6th Edition, 2018.

Web References

1. <https://nptel.ac.in/courses/108/108/108108076/>
2. <https://www.electrical4u.com/>
3. <https://nptel.ac.in/courses/108/102/108102146/>
4. https://onlinecourses.nptel.ac.in/noc21_ee55/
5. <https://nptel.ac.in/courses/117/102/117102059>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
2	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
3	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
4	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
5	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-
6	3	3	3	-	2	-	-	-	-	-	-	1	3	2	-

Correlation Level: 1 – Low, 2 – Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Computer Science and Engineering				Programme:B.Tech.							
Semester	I / II				Course Category: ES			End Semester Exam Type: TE				
Course Code	U23CSTC01				Periods/Week			Credit	MaximumMarks			
					L	T	P	C	CAM	ESE	TM	
Course Name	Programming in C				3	-	-	3	25	75	100	
(Common to All Branches Except CSBS and FT)												
Prerequisite	NIL											
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)		
	CO1	Comprehend the basics of Computers.									K2	
	CO2	Illustrate the concepts of control structures and looping.									K2	
	CO3	Implement programs using arrays and functions.									K3	
	CO4	Demonstrate programs using Structure and Pointers.									K3	
	CO5	Build the programs using Union and File management Operations.									K3	
UNIT - I	Introduction						Periods:09					
Generation and Classification of Computers - Block Diagram of a Computer –Categories of Software – Network Structure - Number System – Binary – Decimal – Conversion – Algorithm – Pseudo code – Flow Chart.											CO1	
UNIT - II	C Programming Basics						Periods:09					
Introduction to 'C' Programming – Basic structure of a 'C' program – compilation and linking processes – Constants, Variables – Data Types – Expressions using operators in 'C' – Managing Input and Output operations – Decision Making and Branching – Looping statements.											CO2	
UNIT - III	Arrays and Functions						Periods:09					
Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations- Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion											CO3	
UNIT - IV	Structure and Pointers						Periods:09					
Structure Introduction – Structure definition – Structure declaration – Structure within a structure –Self Referential Structure. Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays -Pointer to Function –Pointer and Structure- Simple programs.											CO4	
UNIT - V	Unions and Files						Periods:09					
Union Introduction - Programs Using Structures and Unions – Introduction to File - File Operations - File Input and Output Functions - Random Access to Files - File System Functions - Command Line Arguments- Storage Classes - Pre-Processor Directives- Dynamic Memory Functions.											CO5	
Lecture Periods:45			Tutorial Periods: -			Practical Periods: -			Total Periods:45			
Text Books												
1. Balagurusamy. E, “Programming in ANSI C”, Tata McGraw Hill, 8thEdition,2019. 2. Yashvant Kanetkar, “Let us C”, BPB Publications, 16th Edition, 2017. 3. Herbert Schildt, “C: The Complete Reference”, McGraw Hill, FourthEdition,2014.												
Reference Books												
1. Vikas B. Agarwal Jyoti P. Mirani, “Computer Fundamentals, Nirali Prakashan Aug-2019. 2. Ashok N Kamthane, “Computer Programming”, Pearson education, Second Impression,2012. 3. Vikas Verma, “A Workbook on C “, Cengage Learning, Second Edition,2012. 4. P. Visu, R.Srinivasan and S. Koteeswaran, “Fundamentals of Computing and Programming”, Fourth Edition, Sri Krishna Publications 2012. 5. PradipDev, ManasGhoush, “Programming in C”, Second Edition, Oxford University Press, 2011.												
Web References												
1. https://www.programiz.com/c-programming 2. https://www.geeksforgeeks.org/c-language-set-1-introduction/ 3. https://www.tutorialspoint.com/cprogramming 4. https://www.assignment2do.wordpress.com/.../solution-programming-in-ansi-c 5. https://nptel.ac.in/courses/106/104/106104128/												

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
2	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
3	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
4	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
5	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus



Department	Computer Science and Engineering			Programme:B.Tech						
Semester	I			Course Category: PC			*End Semester Exam Type: TE			
Course Code	U23CSTC02			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	Problem Solving Approach			3	-	-	3	25	75	100
(Common to CSE, ICE and CCE)										
Prerequisite	NIL									
Course Outcomes	After completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Explain the basic concepts of computational thinking and problem solving.							K2	
	CO2	Explain basic concepts of algorithm and data organization.							K2	
	CO3	Illustrate algorithmic solution to problem solving.							K3	
	CO4	Explain the concepts of array, merging, sorting & searching.							K2	
	CO5	Implement recursive algorithm to solve problems.							K3	
UNIT-I	Computational Thinking and Logic-Solving Problems						Periods:9			
Computational Thinking – Information and Data – Converting Information into Data – Data Capacity – Data Types and Encoding – Logic-Solving Problems – Limits of Computation – Pseudocode and Flow Chart.										CO1
UNIT-II	Algorithmic Thinking and Data Organization						Periods:9			
Algorithmic Thinking: Algorithms – Software and Programming Languages – Actions. Data Organization: Name list, Graph Hierarchies – Spread Sheets – Text processing – Patterns – Pseudocode and Flow Chart.										CO2
UNIT-III	Fundamental Algorithms and Factoring Methods						Periods:9			
Fundamental Algorithms: Exchanging – Counting – Summing – Factorial Computation – Fibonacci Sequence – Reversing the Digit-Base Conversion – Character to number conversion. Factorial Methods: Finding Square Root – Greatest Common Divisor – Prime Number – Prime Factor – Pseudocode and Flow Chart.										CO3
UNIT-IV	Array, Merging, Sorting and Searching						Periods:9			
Array Techniques: Introduction – Array order reversal – Array Counting or Histogramming – Maximum and Minimum of a Set – Removal of Duplicate – Partitioning – Longest monotone. Sorting and searching: Sorting by Bubble, Selection, Insertion. Searching: Linear, Binary – Pseudocode and Flow Chart.										CO4
UNIT-V	Text Processing, Pattern Searching and Recursive Algorithms						Periods:9			
Key word Searching – Text Line Adjustment – Linear Pattern Search – Sub Linear Pattern Search. Recursion:Towers of Hanoi– Sample Generation – Combination Generation – Permutation Generation – Pseudocode and Flow Chart.										CO5
Lecture Periods:45			Tutorial Periods: -		Practical Periods:-			Total Periods:45		
Text Books										
1. David Riley and Kenny Hunt, “Computational Thinking for Modern Problem Solver”, Chapman & Hall/CRC Text Books in Computing, 2014.										
2. R.G. Dromey, “How to solve it by Computer”,PHI,2008.										
3. Vickers Paul, “How to Think like a Programmer: Problem Solving for the Bewildered”, Cengage Learning EMEA,2008.										
Reference Books										
1. Kathryn Rentz, Paula Lentz, “A Problem-solving Approach”, McGraw-Hill Education,2018.										
2. Don McAdam, Roger Winn, “A Problem-solving Approach”, Prentive Hall Canada; 2 nd Edition, 2017.										
3. V Anton Spraul, “Think Like a Programmer: An Introduction to Creative Problem Solving”, Cengage Learning EMEA, 2012.										
4. Sham Tickoo “A Problem-solving Approach”, Delmar/Cengage Learning, 2009.										
5. Harold Abelson & Gerald Jay Sussman, “Structure and Interpretation of Computer Programs”, McGraw-Hill Book Company, 1997.										
Web References										
1. https://www.edx.org/g/learn/problem-solving										
2. https://www.lynda.com/Business-Skills-tutorials/Problem-Solving-Techniques/553700-2.html										
3. https://www.classcentral.com/course/problem-solving-skills-6687										

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	1	-	-	-	1	-	-	1	3	2	3
2	2	1	-	-	1	-	-	-	-	-	-	1	3	2	3
3	2	1	-	-	1	-	-	-	-	-	-	1	3	2	3
4	2	1	-	-	1		-	-	-	-	-	1	3	2	3
5	3	2	1	1	1	-	-	-	-	-	-	1	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

*Application oriented / Problem solving / Design / Analytical in content beyond the syllabus



Department	Computer Science and Engineering			Programme:B. Tech.						
Semester	I / II			Course Category: HS			End Semester Exam Type: TE			
Course Code	U23HSTC01			Periods/Week			Credit	MaximumMarks		
				L	T	P	C	CAM	ESE	TM
Course Name	Universal Human Values – II			2	-	-	2	25	75	100
(Common to all Branch)										
Prerequisite	UHV – I									
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Evaluate the significance of value inputs in formal education and start applying them in their life and profession							K2	
	CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.							K2	
	CO3	Analyze the value of harmonious relationship based on trust and respect in their life and profession							K2	
	CO4	Examine the role of a human being in ensuring harmony in society and nature.							K2	
	CO5	Apply the understanding of ethical conduct to formulate the strategy for ethical life and profession.							K2	
UNIT - I	Introduction to Value Education						Periods: 06			
Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) - Understanding Value Education - Self-exploration as the Process for Value Education - Basic Human Aspirations - Happiness and Prosperity - Current Scenario- Method to Fulfil the Basic Human Aspirations									CO1	
UNIT - II	Harmony inthe Human Being						Periods: 06			
Understanding Human being as the Co-existence of the Self and the Body-Distinguishing between the Needs of the Self and the Body-The Body as an Instrument of the Self-Understanding Harmony in the Self-Harmony of the Self with the Body-Programme to ensure self-regulation and Health									CO2	
UNIT - III	Harmony in the Family and Society						Periods: 06			
Harmony in the Family - Basic Unit of Human Interaction- 'trust' - Foundational Value in Relationship - 'Respect' - as the Right Evaluation - Other Feelings, Justice in Human-to-Human Relationship - Understanding Harmony in the Society-Vision for the Universal Human Order.									CO3	
UNIT - IV	Harmony in the Nature / Existence						Periods: 06			
Understanding Harmony in the Nature-Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature - Realizing Existence as Co-existence at All Levels - Holistic Perception of Harmony in Existence									CO4	
UNIT - V	Implications of the Holistic Understanding - A Look at Professional Ethics						Periods: 06			
Natural Acceptance of Human Values - Definitiveness of (Ethical) Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Universal Human Order-Competence in Professional Ethics-Holistic Technologies, Production Systems and Management Models-Typical Case Studies-Strategies for Transition towards Value - based Life and Profession									CO5	
Lecture Periods:30			Tutorial Periods:-			Practical Periods:-			Total Periods: 30	
Text Book										
1. R. R. Gaur, R. Asthana, G. P. Bagaria, “A Foundation Course in Human Values and Professional Ethics”, Excel Books, 2 nd Revised Edition, New Delhi, 2019.										
Reference Books										
1. A Nagraj, Jeevan Vidya Prakashan, Amarkantak, “Jeevan Vidya: EkParichaya”, 2013.										
2. A.N. Tripathi, “Human Values”, New Age International Publishers, New Delhi, 3 rd Edition, 2019.										
3. Annie Leonard, “The Story of Stuff”, Free Press, Reprint Edition, 2011.										
4. Mohandas Karam chand Gandhi, “The Story of My Experiments with Truth – Mahatma Gandhi Autobiography”, Finger print Publisher, 2009.										
5. E. F Schumacher, “Small is Beautiful”, Vintage Publisher, 1993.										
6. Cecile Andrews, “Slow is Beautiful”, New Society Publishers, 2006.										
7. J C Kumarappa, “Economy of Permanence”, Sarva Seva Sangh Prakashan, 2017.										
8. Pandit Sunderlal, “Bharat Mein Angreji Raj”, Prabhat Prakashan Publisher, 2021.										
9. Dharampal, “Rediscovering India”, Stosius Inc/Advent Books Division Publisher, 1983.										

10. Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule", Gyan Publishing House, 2023.
11. Maulana Abdul Kalam Azad, "India Wins Freedom", Orient BlackSwan Publisher, 1st Edition, 1988.
12. Life of Vivekananda, "Romain Rolland (English)", Advaita Ashrama Publisher, India, 4th Edition, 2010.
13. Mahatma Gandhi, "Romain Rolland (English)", Srishti Publishers & Distributors, 2020.

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2. <http://www.storyofstuff.com>
3. https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw
4. https://fdp-si.aicte-india.org/8dayUHV_download.php
5. <https://www.youtube.com/watch?v=8ovkLRYXlJE>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	2	3	2	2	-	-	3	-	-	-
2	-	-	-	-	-	2	3	2	2	-	-	3	-	-	-
3	-	-	-	-	-	3	3	2	2	-	-	3	-	-	-
4	-	-	-	-	-	2	3	2	2	-	-	3	-	-	-
5	-	-	-	-	-	2	3	2	2	-	-	3	-	-	-

Correlation Level: 1 – Low, 2 – Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	English			Programme: B.Tech.							
Semester	I			Course Category: HS			*End Semester Exam Type: TE				
Course Code	U23ENBC01			Periods/Week		Credit	Maximum Marks				
				L	T	P	C	CAM	ESE	TM	
Course Name	Communicative English - I			2	-	2	3	50	50	100	
(Common to ALL Branches except CSBS)											
Prerequisite	Basics of English Language										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Understand the communication flow in organization and its objectives								K2	
	CO2	Write the technical contents with grammatically precise sentences								K2	
	CO3	Articulate with correct pronunciation and overcome vernacular impact in speaking								K3	
	CO4	Express opinions confidently in formal and informal communicative contexts								K2	
	CO5	Attend interview with assertiveness								K3	
UNIT - I	Workstead Communication						Periods:10				
Communication, Definition, Process, Channels, Barriers, Strategies for Effective Communication, Verbal and Nonverbal Communication - Listening, Types, Barriers, Enhancing Listening Skills - Bibliography: Book, Journal and Internet References											CO1
UNIT - II	Common Errors In Writing And Comprehension Strategies						Periods:10				
Subject Verb Agreement, Misplaced Modifiers, Squinting Modifiers, Dangling Modifier, Fused Sentence, Comma Splice, Sentence Fragment - Reading Comprehension: Technical passage, Strategies: Skimming, Scanning, Intensive and Extensive Reading, Prediction, and Contextual Meaning											CO2
UNIT - III	Phonetics						Periods:10				
Pronunciation Guidelines to consonants and vowels, Sounds Mispronounced, Silent and Non-silent Letters, Intonation, Spelling Rules and Words often misspelled, Mother Tongue Influence (MTI), Various Techniques for Neutralization of Mother Tongue											CO3
UNIT - IV	Communication Practice - I						Periods:15				
List of Exercises Listening: Self Introduction videos Speaking: Self-Introduction, Extempore, and Role Play Reading: Non-Technical Comprehension Passage Writing: Common Errors in Writing										CO4	
UNIT - V	Interpersonal Communication - I						Periods:15				
List of Exercises Listening: Speech Sounds, Interview Videos Speaking: Debate, Structured Group Discussion, and Conversation Reading: Commonly Confused Words Writing: Transcription										CO5	
Lecture Periods: 30			Tutorial Periods: -			Practical Periods: 30		Total Periods: 60			
Text Books											
1. Richa Mishra , RatnaRao, "A textbook of English Language Communication Skills", Macmillan Publishers India Private Ltd., Revised Edition 2021. 2. Rizvi M. Ashraf, "Effective Technical Communication", New Delhi: Tata-McGraw-Hill Publishing Company Limited, 4th Edition, 2010. 3. Balasubramanian T, "English Phonetics for Indian students workbook", 2nd Edition, Trinity Press, 2016.											
Reference Books											
1. N.P.Sudharshana, C. Savitha," English for Engineers", Cambridge University Press, 2018. 2. Raman, Meenakshi, and Sharma, Sangeetha, "Technical Communication - Principles and Practice", 3rd Edition, Oxford University Press, 2017. 3. Comfort, Jeremy, etal., "Speaking Effectively: Developing Speaking Skills for Business English", Cambridge University Press, Cambridge, Reprint 2011. 4. Wren & Martin, "High School English Grammar and Composition", S Chandh & Co.Ltd, 2015. 5. Boove, Courtland L, "Business Communication Today", Pearson Education, New Delhi, 2002.											
Web References											
1. https://lemongrad.com/subject-verb-agreement-rules/ 2. https://opentextbc.ca/advancedenglish/chapter/misplaced-and-dangling-modifiers/ 3. https://www.hitbullseye.com/Reading-Comprehension-Tricks.php 4. https://www.softwaretestinghelp.com/how-to-crack-the-gd/ 5. https://worldscholarshipvault.com/neutralize-mother-tongue-interference/											

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
5	1	-	-	-	-	-	-	-	1	3	-	1	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method**Theory**

Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	10		5	5	75	60
	20(to be weighted for 10 marks)				(to be weighted for 50 marks)	

Practical

Continuous Assessment Internal Evaluation		End Semester Internal Evaluation		Total Marks
30(to be weighted for 10 marks)		30 marks		
Listening (L)*	10	Listening (L)*	10	40
Speaking(S)	5	Speaking(S)	5	
Reading(R)*	10	Reading(R)*	10	
Writing(W)*	5	Writing(W)*	5	

- LRW components of Practical can be evaluated through Language Lab Software

Department	EEE and ECE			Programme: B.Tech.							
Semester	I / II			Course Category: ES			End Semester Exam Type: LE				
Course Code	U23ESPC01			Periods/Week			Credit	MaximumMarks			
				L	T	P	C	CAM	ESE	TM	
Course Name	Basics of Electrical and Electronics Engineering Laboratory			0	0	2	1	50	50	100	
(Common to CSE, IT, MECH, CIVIL, MCTR, CCE, AI&DS, FT, CSBS Branches)											
Prerequisite	Mathematics and Physics										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Build the different wiring for domestic and commercial applications.								K3	
	CO2	Design and analyze the domestic power distribution.								K3	
	CO3	Estimate the performance of transformer and motors by conducting load test.								K3	
	CO4	Describe characteristics of semiconductor diode and utilize it for different applications								K5	
	CO5	Relate the characteristics of various transistor								K2	
	CO6	Understand Rectifiers and Regulators								K2	
List of Experiments											
Section– A Electrical Experiments											
Demonstration on Power Sources, Ammeter, Voltmeter, Wattmeter and Energy meter are Pre-requisite for conducting this Electrical Engineering Lab.											
<div>1. Electrical safety precautions and study of tools, accessories, electrical joints and electrical symbols.</div> <div>2. Domestic Wiring Practice<ul style="list-style-type: none">Staircase wiringDoctor's room wiringGodown wiringWiring of Ceiling fan, LED lamps and Iron Box.</div> <div>3. Design of Domestic power distribution.</div> <div>4. Measurement of 3-phase power using two wattmeter method</div> <div>5. Load test on DC shunt motor.</div> <div>6. Load test on single phase transformer.</div> <div>7. Load test on single phase Induction Motor.</div>											
Section – B Electronics Experiments											
<div>1. Study of Electronic components and equipment: Resistor, Capacitor</div> <div>2. Measurement of AC signal parameter (Peak-Peak, rms period, frequency) using CRO.</div> <div>3. VI Characteristics of PN junction diode, Zener diode</div> <div>4. Input and output characteristics of Common Emitter configuration of BJT</div> <div>5. Characteristics of JFET</div> <div>6. Measurement of Ripple factor of HWR, FWR</div> <div>7. Voltage Regulator using Zener Diode</div>											
Lecture Periods: -			Tutorial Periods: -			Practical Periods:30			Total Periods:30		
Reference Books											
<div>1. S. Gowri, T. Jeyapoovan Nadar, "Engineering Practices Lab Manual", Vikas Publishing House Private Limited, New Delhi, 5th Edition, 2014.</div> <div>2. A. Sudhakar and S. P. Shyam Mohan, "Circuits and Networks: Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 5th Edition, 2017.</div> <div>3. D. P. Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.</div> <div>4. Edward Hughes, John Hiley, Keith Brown, Ian McKenzie Smith, "Electrical and Electronics Technology", Pearson Education Limited, New Delhi, 12th Edition, 2016.</div> <div>5. S.K. Sahdev, "Fundamentals of Electrical Engineering and Electronics", Dhanpat Rai and Co, 2017.</div>											
Web References											
<div>1. http://eie.sliet.ac.in/laboratories/basic-electrical-engineering-lab/</div> <div>2. https://www.electronics-tutorials.ws/accircuits/series-circuit.html</div> <div>3. https://www.allaboutcircuits.com/textbook/experiments/</div> <div>4. https://www.electronicshub.org/measurements-of-ac-current/</div> <div>5. http://www.electronics-tutorials.ws</div>											

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

Cos	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
2	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
3	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
4	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
5	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-
6	3	2	3	-	-	1	-	-	3	-	-	1	3	2	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in Practical classes			Model Practical Examination	Attendance		
	Conduction of Practical	Record work	viva				
Marks	15	5	5	15	10	50	100

Department	Computer Science and Engineering			Programme:B.Tech.							
Semester	I / II			Course Category: ES			End Semester Exam Type: LE				
Course Code	U23CSPC01			Periods/Week			Credit	MaximumMarks			
Course Name	Programming in C Laboratory			L	T	P	C	CAM	ESE	TM	
				0	0	2	1	50	50	100	
(Common to All Branches Except CSBS and FT)											
Prerequisite	NIL										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Implement logical formulations to solve simple problems leading to specific applications.								K3	
	CO2	Execute C programs for simple applications making use of basic constructs, arrays and strings.								K3	
	CO3	Experiment C programs involving functions, recursion, pointers, and structures.								K3	
	CO4	Demonstrate applications using sequential and random access file processing.								K3	
	CO5	Build solutions for online coding challenges.								K3	
List of Exercises											
<div>1. Write a C program to find the Area of the triangle.</div> <div>2. Develop a C program to read a three digit number and produce output like 1 hundreds 7 tens 2 units For an input of 172.</div> <div>3. Write a C program to check whether a given character is vowel or not using Switch – Case statement.</div> <div>4. Write a C program to Print the numbers from 1 to 10 along with their squares.</div> <div>5. Demonstrate do—While loop in C to find the sum of 'n' numbers.</div> <div>6. Find the factorial of a given number using Functions in C.</div> <div>7. Write a C program to check whether a given string is palindrome or not?</div> <div>8. Write a C program to check whether a value is prime or not?</div> <div>9. Develop a C program to swap two numbers using call by value and call by reference.</div> <div>10. Construct a C program to find the smallest and largest element in an array.</div> <div>11. Implement matrix multiplication using C program.</div> <div>12. Write a C program to perform various string handling functions like strlen, strcpy, strcat, strcmp.</div> <div>13. Develop a C program to remove all characters in a string except alphabets.</div> <div>14. Write a C program to find the sum of an integer array using pointers.</div> <div>15. Write a C program to find the Maximum element in an integer array using pointers.</div> <div>16. Construct a C program to display Employee details using Structures</div> <div>17. Write a C program to display the contents of a file on the monitor screen.</div> <div>18. Write a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands.</div> <div>19. Write a C program to create two files with a set of values. Merge the two file contents to form a single file</div> <div>20. Write a C program to pass the parameter using command line arguments.</div>											
Lecture Periods:		-	Tutorial Periods:		-	Practical Periods:30		Total Periods:30			
Reference Books											
<div>1. Zed A Shaw," Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)", Addison Wesley,2016.</div> <div>2. Anita Goel and Ajay Mittal," Computer Fundamentals and programming in C", Pearson Education, First edition, 2011.</div> <div>3. Maureen Sprankle, Jim Hubbard," Problem Solving and Programming Concepts," Pearson, 9th Edition, 2011.</div> <div>4. Yashwanth Kanethkar, "Let us C", BPB Publications, 13th Edition, 2008.</div> <div>5. B.W. Kernighan and D.M. Ritchie, "The C Programming Language", Pearson Education, 2nd Edition, 2006.</div>											
Web References											
<div>1. https://alison.com/course/introduction-to-c-programming</div> <div>2. https://www.geeksforgeeks.org/c-programming-language/</div> <div>3. http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf</div> <div>4. https://www.tenouk.com/clabworksheet/clabworksheet.html</div> <div>5. https://fresh2refresh.com/c-programming/</div>											

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
2	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
3	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
4	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3
5	3	2	1	1	3	-	-	-	-	-	-	-	3	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Evaluation Methods							
Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100



Department	Mechanical Engineering				Programme: B.Tech.							
Semester	I / II				Course Category: ES			End Semester Exam Type: LE				
Course Code	U23ESPC03				Periods/Week			Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM	
Course Name	Engineering Graphics Using AutoCAD				-	-	2	1	50	50	100	
(Common to all Branches)												
Prerequisite	Nil											
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)		
	CO1	Familiarize with the fundamentals and standards of engineering graphics.									K3	
	CO2	Perform drawing of basic geometrical constructions and multiple views of objects.									K2	
	CO3	Visualize the isometric and perspective sections of simple solids.									K3	
	CO4	Connect side view associate on front view.									K4	
	CO5	Correlate sectional views and lateral surface developments of various solids.									K4	
List of Experiments												
1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.												
2. Drawing a Title Block with necessary text and projection symbol.												
3. Drawing 2D sketch by applying modify tools like fillet, mirror, array, etc.,												
4. Drawing front view and top view of simple solids like prism, pyramid, cylinder, cone, etc., and Dimensioning.												
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. Simple stool, V-block, Mixie Base).												
6. Drawing a plan of residential building (Two bed rooms, kitchen, hall, etc.)												
7. Drawing sectional views of prism, pyramid, cylinder, cone, etc,												
8. Drawing lateral surface development of prism, pyramid, cylinder, cone, etc,												
9. Drawing isometric projection of simple objects.												
10. Creating 3D model of simple object and obtaining 2D multi-view drawings.												
11. Note: Plotting of drawings must be made for each exercise and attached to the records written by Students.												
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30			Total Periods: 30			
Reference Books												
1. James D. Bethune, “Engineering Graphics with AutoCAD”, A Spectrum book 1st Edition, Macromedia Press, Pearson, 2020.												
2. NS Parthasarathy and Vela Murali, “Engineering Drawing”, Oxford university press, 2015.												
3. M.B Shah, “Engineering Graphics”, ITL Education Solutions Limited, Pearson EducationPublication, 2011.												
4. Bhatt N.D and Panchal V.M, “Engineering Drawing: Plane and Solid Geometry”, Charotar Publishing House, 2017.												
5. Jeyapoovan T, “Engineering Drawing and Graphics Using AutoCAD”, Vikas Publishing House Pvt Ltd., 7th Edition, New Delhi, 2016.												
6. C M Agrawal, Basant Agrawal, “Engineering Graphics”, McGraw Hill, 2012.												
7. Dhananjay A. Jolhe, “Engineering Drawing: With An Introduction To CAD”, McGraw Hill, 2016.												
8. James Leach, “AutoCAD 2017 Instructor”, SDC Publications, 2016.												
Web References												
1. http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/egraphics_lab/labs/index.php												
2. http://www.nptelvideos.in/2012/12/computer-aided-design.html												
3. https://mech.iitm.ac.in/meiitm/course/cad-in-manufacturing/												
4. https://autocadtutorials.com												
5. https://dwgmodels.com												

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	-	-	3	-	-	-	3	-	-	2	3	3	3
2	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3
3	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3
4	3	1	-	-	3	-	-	-	3	-	-	2	3	3	3
5	3	1	-	-	3	-	-	-	3	-	-	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100



Department	Computer Science and Engineering	Programme: B.Tech.						
Semester	I	Course Category: AEC			End Semester Exam Type:-			
Course Code	U23CSC1XX	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	Certification Course – I	-	-	4	-	100	-	100
<p>Students shall choose an international certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence. Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.</p>								
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 50			Total Periods: 50	



Department	Computer Science and Engineering				Programme: B.Tech.				
Semester	I				Course Category: MC		End Semester Exam Type: -		
CourseCode	U23CSM101				Periods/Week		Credit	MaximumMarks	
					L	T	P	C	
Course Name	Induction Programme				2 Weeks		Non-Credit	CAM	
Prerequisite	NIL							ESE	
								TM	
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)	
	CO1	Develop holistic attitude and harmony in the individual, family, and Society							K2
	CO2	Acquire grammar skills and capable to write and speak English confidently							K2
	CO3	Understand the basic concepts in Mathematics and Programming							K2
	CO4	Know about the art and culture, language and literature of this vast secular nation							K2
	CO5	Identify the inherent talent and develop it professionally							K3
UNIT - I	Universal Human Values					Periods:12			
Welcome and Introductions - Getting to know each other, Aspirations and Concerns - Individual Academic and Career, Expectations of Family, Peers, Society, Nation, Fixing one's Goals, Self-Management - Self-confidence, Peer Pressure, Time Management, Anger, Stress, Personality Development, Self-improvement, Health - Health issues, Healthy diet, Healthy lifestyle, Hostel life, Relationships - Home sickness, Gratitude towards Parents, Teachers and others Ragging and interaction, Competition and Cooperation, Peer Pressure, Society - Participation in Society, Natural Environment - Participation in Nature, Sum Up - Role of Education, Need for a Holistic Perspective, Self-evaluation and Closure - Sharing and feedback.									CO1
UNIT - II	Proficiency in English					Periods:12			
Communication skills – Prognostic test on Grammar - Synonyms, Antonyms, Tenses, Sentence Completion, Idioms and Phrases, One-word Substitution, Homophones, Homonyms, Use of Prepositions, Subject – verb - Agreement - Writing – Paragraph writing, Letter writing, Essay writing, Story Development.									CO2
UNIT - III	Bridge Course in Mathematics and C Programming					Periods:12			
Mathematics: Fundamentals of differential and integral calculus: Theory and Practice, Limit of function - Fundamental results on limits - Continuity of a function - Concept of differentiation - Concept of derivative - Slope of a curve - Differentiation Techniques - Derivatives of elementary functions from first principle – Derivatives of inverse functions – Logarithmic differentiation – Method of substitution – Differentiation of parametric functions – Differentiation of implicit functions – Higher order derivatives. Integrals of functions containing linear functions - Method of integration (Decomposition method, method of substitution, integration by parts) - Definite integrals. Simple definite integrals – Properties of Definite integrals – Reduction formulae - Area and volume - Length of curve - surface area of a solid.									CO3
C Programming: Features of C and its basic Structure - Keywords - constants - variables - operators - Data types - Formatted input and output statements - Control and Looping statement - Arrays - Functions - Strings - writing simple C programs.									
UNIT - IV	Literary Activities					Periods:12			
Team building activities - Quiz - Oral Exercises - Group discussion, Debate, Extempore, Role play, சிறப்பு சொற்பொழிவு – தமிழ் மரபு மற்றும் தமிழர் தொழில் நுட்பம்.									CO4
UNIT - V	Creative Arts					Periods:12			
Introduction to painting and renowned artworks - Documentary and Short films - Music - Vocal, Instrumental - Dance - Classical, Cinematic - Mimicry - Mime.									CO5
Lecture Periods:60			Tutorial Periods:-			Practical Periods:-		Total Periods:60	
Reference Books									
1. R.R Gaur, R. Asthana, G.P. Bagaria, "A Foundation Course in Human Values and Professional Ethics", Excel Books, New Delhi, 2 nd Revised Edition, 2019.									
2. Kumar Mohan R, "English Grammar for all (Functional and Applied Grammar)", Unicare Academy, 2022.									
3. Seely, John, "Oxford A-Z of Grammar and Punctuation, Oxford Publication, 2013.									
4. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw – Hill, New Delhi, 6 th Edition, 2018.									
5. Dr. A. Singaravelu, "Engineering Mathematics - I", Meenakshi publications, Tamil Nadu, 2019.									
6. E. Balagurusamy, "PROGRAMMING IN ANSI C", Mc Graw Hill, 8 th Edition, 2019.									
7. Dr. K.K. Pillay, "Social Life of Tamils", A joint publication of TNTB & ESC and RMRL									
8. R. Balakrishnan, "Journey of Civilization", Rojamuthiah research publishers, 1 st Edition 2019.									
9. தமிழகவரலாறு - மக்களும் பண்பாடும், பிள்ளை, கே. கே. , சென்னை : உலகத்தமிழாராய்ச்சி நிறுவனம் , 2002.									
10. கணினித்தமிழ் - முனைவர் இல.சுந்தரம், விகடன் பிரசுரம்.									
11. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம், தமிழக தொல்லியல் துறை.									
Web References									
1. http://www.newsociety.com/Books/S/Slow-isBeautiful									
2. https://www.aplustopper.com/formal-letter/									
3. https://www.javatpoint.com/c-programming-language-tutorial									
4. http://www.math.cum.edu/~wn0g/2ch6a.pdf									
5. https://education.nsw.gov.au/teaching-and-learning/curriculum/creative-arts									

SEMESTER II

Department	Mathematics			Programme: B.Tech.						
Semester	II			Course Category: BS			End Semester Exam Type: TE			
Course Code	U23MATC02			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	Engineering Mathematics – II			3	1	-	4	25	75	100
(Common to ALL Branches Except CSBS, FT)										
Prerequisite	Basic Mathematics									
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Convert a periodic function into series form.							K2	
	CO2	Compute Fourier transforms of various functions.							K3	
	CO3	Solve Differential Equations using Laplace transforms.							K3	
	CO4	Apply inverse Laplace transform of simple functions.							K3	
	CO5	Solve difference equations using Z – transforms.							K3	
UNIT – I	Fourier Series					Periods:12				
Dirichlet’s conditions – General Fourier series – Odd and Even functions – Half-Range sine series and cosine series – Change of intervals – Parseval’s Identity.										CO1
UNIT – II	Fourier Transforms					Periods:12				
Fourier Transforms and its inverse – Properties of Fourier Transform (without proof) – Fourier sine and cosine Transforms and their properties (excluding proof).										CO2
UNIT – III	Laplace Transforms					Periods:12				
Laplace transforms of elementary functions and Periodic functions – Basic properties (excluding proof) – Laplace transforms of derivatives and integrals – Initial and final value theorems.										CO3
UNIT – IV	Inverse Laplace Transforms					Periods:12				
Definition of inverse Laplace Transforms – Convolution theorem (excluding proof) – Solutions of Linear Ordinary Differential Equations of second order with constant coefficients.										CO4
UNIT – V	Z – Transforms					Periods:12				
Z-transforms – Elementary Properties – Inverse Z-transforms (using partial fraction and Residues) – Solution of difference equations using Z - transform.										CO5
Lecture Periods:45			Tutorial Periods:15			Practical Periods:-			Total Periods:60	
Text Books										
1. T. Veerarajan, “Engineering Mathematics”, Tata McGraw Hill, New Delhi, 3 rd Edition, 2011.										
2. C. P. Gupta, Shree Ram Singh. M. Kumar, “Engineering Mathematics for semester I & II”, Tata McGraw Hill, New Delhi, 2 nd Edition 2016.										
3. H.K. Dass, “Advanced Engineering Mathematics”, S. Chand, New Delhi, 22 nd Edition 2019.										
Reference Books										
1. N.P. Bali and Dr. Manish Goyal, “A TEXTBOOK OF ENGINEERING MATHEMATICS”, UNIVERSITY SCIENCE PRESS, India, 8 th Edition, 2016.										
2. P. Sivaramakrishna Das and C. Vijayakumari, “Engineering Mathematics”, Pearson India Education services Pvt. Ltd, India 1 st 2017.										
3. Erwin Kreyszig, “Advanced Engineering Mathematics”, John Wiley & Sons, New Delhi, 10 th Edition, 2019.										
4. G. Balaji, “Engineering Mathematics - Transforms and Partial Differential Equations”, G. Balaji Publishers, 18 th Edition, 2022.										
5. B.V. Ramana, “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2017.										
Web References										
1. https://nptel.ac.in/courses/111105121/										
2. https://nptel.ac.in/courses/111105035/										
3. https://nptel.ac.in/courses/11110711										
4. https://swayam.gov.in/nd1_noc20_ma17/preview										
5. https://nptel.ac.in/courses/111/103/111103021/										

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	-	1	-	-	-	-	-	1	1	-	-
2	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
3	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
4	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-
5	3	2	1	1	-	1	-	-	-	-	-	1	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus



Department	Physics / Chemistry				Programme: B.Tech.						
Semester	I/II				Course Category: BS			End Semester Exam Type: TE			
Course Code	U23BSTC01				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	Physical Science for Engineers				3	-	-	3	25	75	100
(Common to all Branches)											
Prerequisite	Physics of 12 th standard or equivalent / Chemistry of 12 th standard or equivalent.										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Understand the basic of properties of magnetic, dielectric and superconductors.									K2
	CO2	Identify the wave nature of the particles, physical significance of wave functions									K3
	CO3	Understand the basic principles of laser and fiber optics communication									K2
	CO4	Understand and familiar with the water treatment.									K2
	CO5	Understand the electrode potential for its feasibility in electrochemical reaction and uses of various batteries.									K2
	CO6	Understand the specific operating condition under which corrosion occurs and suggest a method to control corrosion.									K2
SECTION A - PHYSICS											
UNIT - I	Magnetic, Dielectric and Superconducting Materials						Periods: 8				
Introduction to magnetic materials, Ferromagnetism- Domain theory-Types of energy-Hysteresis-Hard and Soft magnetic materials-ferrites-Dielectric materials-Types of polarization – Langevin-Debye equation-Frequency effects on polarization-Dielectric breakdown- Ferroelectric materials-Superconducting materials and their properties.										CO1	
UNIT - II	Quantum Mechanics						Periods: 7				
Matter Waves - de Broglie Wavelength - Uncertainty Principle –Physical Significance of wave functions - Schrodinger wave Equation - Time Dependent - Time Independent - Application to Particle in a One Dimensional Box - Tunnel Diode.										CO2	
UNIT-III	Laser and Fiber Optics						Periods: 7				
Lasers - Principles of Laser - Spontaneous and Stimulated Emissions - Einstein's Coefficients - Population Inversion and Laser Action –components of laser - Types of Lasers - NdYAG, CO ₂ laser, GaAs Laser Fiber Optics - Principle and Propagation of light in optical fiber - Numerical aperture and acceptance angle - Types of optical fibers (material, refractive index, mode)										CO3	
SECTION B – CHEMISTRY											
UNIT-IV	Water and its Treatment						Periods: 8				
Water: Sources and impurities, Water quality parameters: Definition and significance of-color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD. Desalination of brackish water: Reverse osmosis-disadvantages of using hard water in boiler - Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and Calgon conditioning) and External treatment–Ion exchange demineralization and zeolite process.										CO4	
UNIT-V	Electrochemical Cells and Storage Devices						Periods: 8				
Galvanic cells, single electrode potential, standard electrode potential, electrochemical series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes-hydrogen, calomel and Ag/AgCl. Batteries and fuel cells: Types of batteries- alkaline battery-lead storage battery- nickel-cadmium battery- fuel cell H ₂ -O ₂ fuel cell-applications.										CO5	
UNIT-VI	Corrosion						Periods: 7				
Corrosion –Introduction - factors – types – chemical, electrochemical corrosion (galvanic, differential aeration), corrosion control – material selection and design aspects – electrochemical protection – sacrificial anode method and impressed current cathodic method. Uses of inhibitors, metallic coating – anodic coating, cathodic coating. Metal cladding, Electroplating of Copper and electroless plating of nickel.										CO6	
Lecture Periods: 45			Tutorial Periods:-			Practical Periods:-			Total Periods:45		

Text Books

1. V Rajendran, "Engineering Physics", 2nd Edition, TMH, New Delhi 2011.
2. S.S Dara – "A text book of Engineering Chemistry" - 15th Edition, 2021. S.Chand Publications.
3. C. Jain, Monica Jain, – "Engineering Chemistry" 17th Ed. Dhanpat Rai Pub. Co., New Delhi, (2015).

Reference Books

1. R. Murugesan, "Modern Physics", S. Chand & Co, New Delhi 2006.
2. William D Callister Jr., "Material Science and Engineering", 6th Edition, John Wiley and sons, 2009.
3. Jain & Jain "Engineering chemistry", 23rd Edition, Dhanpat Rai Publishing Company. 2022
4. Mars Fontana "Corrosion Engineering", July 2017
5. Jina Redlin, "Handbook of Electrochemistry", March 28, 2005

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1. https://www.sciencedaily.com/terms/materials_science.htm.
2. https://www.acs.org/content/acs/en/careers/college-to-career/chemistry-careers/materials_science.html.
3. <https://study.com/academy/lesson/semiconductors-superconductors-definition-properties.html>
4. <https://mechanicalc.com/reference/engineering-materials>
5. http://ndl.ethernet.edu.et/bitstream/123456789/89589/1/%5BPerez_N.%5D_Electrochemistry_and_corrosion%28BookZZ.org%29.pdf

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	-	-	-	-	-	-	-	-	-	-	-
2	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
3	3	2	3	2	-	-	-	-	-	-	-	-	-	-	-
4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
6	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	Artificial Intelligence and Data Science			Programme: B.Tech						
Semester	II/III			CourseCategory:ES			End Semester Exam Type: TE			
Course Code	U23ADTC01			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	Programming in Python			3	0	0	3	25	75	100
(Common to All Branches)										
Prerequisite	NIL									
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Interpret the basic concepts of Python programs.							K2	
	CO2	Articulate the concepts of Sets, Dictionaries and Object-Oriented concepts.							K2	
	CO3	Experiment with Numpy package.							K3	
	CO4	Apply and analyze Data Manipulation with Pandas.							K3	
	CO5	Illustrate programming concept for Visualization with Matplotlib.							K3	
UNIT - I	Introduction To Python					Periods:09				
Structure of Python Program – Underlying mechanism of Module Execution – Branching and Looping – Problem Solving Using Branches and Loops – Functions – Lambda Functions – Lists and Mutability – Problem Solving Using Lists and Functions.										CO1
UNIT - II	Sequence Datatypes and Object-Oriented Programming					Periods:09				
Sequences – Mapping and Sets – Dictionaries. Classes: Classes and Instances – Inheritance – Exception Handling – Introduction to Regular Expressions using “re” module.										CO2
UNIT - III	Using Numpy					Periods:09				
Basics of NumPy – Computation on NumPy – Aggregations – Computation on Arrays – Comparisons – Masks and Boolean Arrays – Fancy Indexing – Sorting Arrays – Structured Data: NumPy's Structured Array.										CO3
UNIT - IV	Data Manipulation with Pandas					Periods:09				
Introduction to Pandas Objects – Data indexing and Selection – Operating on Data in Pandas – Handling Missing Data – Hierarchical Indexing – Combining Data Sets. Aggregation and Grouping – Pivot Tables –Vectorized String Operations – Working with Time Series – High Performance Pandas – eval() and query().										CO4
UNIT - V	Visualization With Matplotlib					Periods:09				
Basic functions of Matplotlib – Simple Line Plot – Scatter Plot – Density and Contour Plots – Histograms – Binnings and Density – Customizing Plot Legends – Colour Bars – Three-Dimensional Plotting in Matplotlib.										CO5
Lecture Periods:45			Tutorial Periods:			Practical Periods:-			Total Periods:45	
Text Books										
1. Jake VanderPlas, “Python Data Science Handbook - Essential Tools for Working with Data”, O'Reily Media Inc, 2016. 2. Zhang.Y, “An Introduction to Python and Computer Programming”, Springer Publications, 2016. 3. Wesley J Chun, “Core Python Programming”, Pearson Education, 2 nd Edition, 2006.										
Reference Books										
1. John Paul Mueller, Luca Massaron, “Python for Data Science for Dummies”, 2 nd Edition, John Wiley& Sons, 2019. 2. Jesus Rogel-Salazar, “Data Science and Analytics with Python”, CRC Press Taylor and Francis Group, 2017. 3. Brian Draper, “Python Programming A Complete Guide for Beginners to Master and Become an Expert in Python Programming Language”, CreateSpace Independent Publishing Platform, 2016. 4. Mark Lutz, Laura Lewin, Frank Willison, “Programming Python”, O'Reilly Media, 3 rd Edition, 2006. 5. Gowrishankar S, Veena A, “Introduction to Python Programming”, CRC Press, 2018.										
Web References										
1. https://nptel.ac.in/courses/106/106/106106212/ 2. https://www.geeksforgeeks.org/data-analysis-visualization-python/ 3. https://www.coursera.org/learn/python-data-analysis 4. https://www.python.org/ 5. https://www.programiz.com/python-programming										

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	-	-	3	-	-	-	-	-	-	-	3	-	3
2	2	2	1	3	-	-	-	-	-	-	-	2	2	2	3
2	3	2	2	3	-	-	-	-	-	-	-	2	3	2	3
3	3	3	2	3	-	-	-	-	-	-	-	3	3	3	3
2	3	3	2	3	-	-	-	-	-	-	-	2	3	3	3
3	3	3	2	3	-	-	-	-	-	-	-	3	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	5	5	5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus



Department	Computer Science and Engineering			Programme: B.Tech							
Semester	II/III			Course Category:ES			End Semester Exam Type: TE				
Course Code	U23CSTC03			Periods/Week			Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM	
Course Name	Data Structures			3	0	0	3	25	75	100	
(Common to All Branches)											
Prerequisite	Any Programming Knowledge										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Compute time and space complexity for given problems								K2	
	CO2	Demonstrate stack, queue and its operation.								K2	
	CO3	Illustrate the various operations of linked list.								K3	
	CO4	Use the concepts of tree for various applications.								K3	
	CO5	Outline the various Tables, Graphs and Sets techniques.								K3	
UNIT - I	Basic Terminologies of Data Structures						Periods:09				
Introduction: Basic Terminologies – Asymptotic Notations: Complexity analysis. Array and its operations - Searching: Linear Search and Binary Search Techniques. Sorting: Bubble Sort – Selection Sort – Insertion Sort – Heap Sort – Shell Sort. Performance and Comparison among the sorting methods.										CO1	
UNIT - II	Stack and Queue Operations						Periods:09				
Stacks and Queues: ADT Stack and its operations. Applications of Stacks: Expression Conversion and evaluation. ADT Queue and its operations. Types of Queue: Simple Queue – Circular Queue – Priority Queue – Deque.										CO2	
UNIT - III	Linked List Operations						Periods:09				
Linked Lists: Singly linked list: Representation in memory. Algorithms of several operations: Traversing – Searching – Insertion – Deletion. Linked representation of Stack and Queue. Doubly linked list: operations. Circular Linked Lists: operations.										CO3	
UNIT - IV	Trees						Periods:09				
Trees: Basic Tree Terminologies. Different types of Trees: Binary Tree – Threaded Binary Tree – Binary Search Tree – Binary Tree Traversals – AVL Tree- Red Black Tree.										CO4	
UNIT - V	Graphs, Tables and Sets						Periods:09				
Graph: Basic Terminologies and Representations – Graph traversal algorithms. Tables: Different types of tables – Hash Table and its operations - Applications. Sets: Representation of Sets- Operations and its applications.										CO5	
Lecture Periods:45			Tutorial Periods:			Practical Periods:-		Total Periods:45			
TextBooks											
1. Ellis Horowitz, Sartaj Sahni, "Fundamentals of Data Structures", Illustrated Edition, Computer Science Press, 2018.											
2. Thomas H. Coreman, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", PHI, Third Edition, 2010.											
3. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, "Data Structures and Algorithms", 4 th Edition, 2009.											
ReferenceBooks											
1. D. Samanta, "Classic Data Structures", Prentice-Hall of India, Second Edition, 2012.											
2. Robert Kruse, C.L. Tondo and Bruce Leung, "Data Structures and Program Design in c". Prentice-Hall of India, Second Edition, 2007.											
3. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Pearson Education, Second. Edition,2006.											
4. Mark Allen Weiss," Algorithms, Data Structures and Problem Solving with C++", Illustrated Edition, Addison-Wesley Publishing Company, 1995.											
5. Mark Allen Weiss," Algorithms, Data Structures and Problem Solving with C++", Addison- Wesley Publishing Company, Illustrated Edition, 1995.											
Web References											
1. https://www.geeksforgeeks.org/data-structures/											
2. https://www.javatpoint.com/data-structure-tutorial/											
3. https://www.studytonight.com/data-structures/											
4. https://www.tutorialspoint.com/data_structures_algorithms/											
5. https://www.w3schools.in/data-structures-tutorial/intro/											

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
3	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
4	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
5	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

* Application oriented / Problem solving / Design / Analytical in content beyond the syllabus



Department	Information Technology				Programme: B.Tech.							
Semester	II				Course Category: PC		*End Semester Exam Type: TE					
CourseCode	U23ITTC01				Periods/Week		Credit	Maximum Marks				
					L	T	P	C	CAM	ESE	TM	
Course Name	Digital Design and System Architecture				3	0	0	3	25	75	100	
(Common to CSE and IT)												
Prerequisite	Basic mathematics, Basics of Electrical and Electronics Engineering											
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)	
	CO1	Demonstrate simplifications of Boolean functions.										K2
	CO2	Describe various combinational logic circuits.										K2
	CO3	Illustrate various sequential circuits.										K2
	CO4	Narrate the basic components and computer organization										K2
	CO5	Explain memory types and I/O organization										K2
UNIT - I	Review of Number Systems							Periods:09				
Review of Number systems – Conversion of Number systems – Binary addition and subtractions – Binary representation: Signed magnitude representation and Compliment representations - Binary codes – Boolean Algebra – Boolean functions – canonical forms - Simplifications of Boolean function: Theorems and laws, K-Map and Quine McCluskey method.											CO1	
UNIT - II	Logic Gates and its Types							Periods:09				
Introduction to combinational circuits – Design procedures of Combinational circuits – Adders - Subtractors – Binary parallel Adder – BCD Adder – Carry look ahead adder – Decoder – Encoder – Priority Encoder – Multiplexer.											CO2	
UNIT - III	Sequential Logic Design							Periods:09				
Introduction to Sequential Circuits – Latches - Types of Latches: SR Latch and D Latch – Flip-Flop- Types of Flip-Flops: RS, JK, D,T Flip-Flops – Excitation table of Flip-Flops – Counters : Asynchronous Counters – Synchronous counters – Mod counters - Shift registers – Types of Shift registers : SISO,SIPO,PISO,PIPO and Universal Shift registers – Ripple counter and Johnson counter.											CO3	
UNIT - IV	Fundamentals Of Computer Organization							Periods:09				
Block diagram of Digital Computer, Organization and Design: Instruction codes, Registers, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt, ALU design, Execution of a complete instruction-Multiple bus organization, Hardwired control Microprogrammed control, Pipelining: Basic concepts, Data hazards, Instruction hazards, Parallel and Vector Processors.											CO4	
UNIT - V	Memory And I/O Organization							Periods:09				
Memory hierarchy - Main memory, Memory chip Organization, Auxiliary memory, Associate memory, Virtual memory, Cache memory, input-output interface, asynchronous data transfer, Modes of transfer, Priority interrupt, DMA - Buses Interface circuits, Standard I/O Interfaces (PCI, SCSI, USB), Case study – Advanced Processors.											CO5	
Lecture Periods:45			Tutorial Periods: -			Practical Periods:-			Total Periods:45			
Text Books												
1. M. Morris Mano and Michael Ciletti, Digital Design, Sixth Edition, Pearson India Education Services, Pvt. Ltd., 2018												
2. Stephen Brown and ZvonkoVranesic, "Fundamentals of Digital Logic with VHDL Design", Tata McGraw Hill Education Pvt. Ltd., 3rd Edition, 2012.												
3. M.Moris Mano, Computer System Architecture, Third Edition, Pearson Education,2017: The Complete Reference”, McGraw Hill, FourthEdition,2014												

Reference Books

1. Tocci R J and Widmer N S, "Digital Systems - Principles and Applications", Prentice Hall of India, New Delhi, 11th Edition, 2010.
2. John.F.Wakerly, "Digital Design Principles and Practices", Pearson Education, 4th Edition, 2006.
3. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", 5th edition, Tata McGraw Hill Education, 2011.
4. David A. Patterson and John L. Hennessey, "Computer Organization and Design", 5th edition, Morgan Kaufman /Elsevier, 2014
5. Roger Tokhien, "Schaum's Outline of Digital Principles", McGraw Hill publication, 3rd Edition, 1994.

Web References

1. <https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/>
2. <https://nptel.ac.in/courses/117/105/117105080/>
3. <https://nptel.ac.in/courses/106/105/106105163/>
4. <https://www.javatpoint.com/computer-organization-and-architecture-tutorial>
5. <http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	2	-	1	-	-	-	-	1	-	-	3	-	-
2	2	1	2	-	1	-	-	-	-	1	-	-	3	-	-
3	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-
4	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-
5	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Assignment*	Attendance		
Marks	10		5	5	5	75	100

*Application oriented / Problem solving / Design / Analytical in content beyond the syllabus

Department	English			Programme: B.Tech.						
Semester	II			Course Category: HS			*End Semester Exam Type: TE			
Course Code	U23ENBC02			Periods/Week		Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM
Course Name	Communicative English - II			2	-	2	3	50	50	100
(Common to ALL Branches except CSBS)										
Prerequisite	Basics of English Language									
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)
	CO1	Draft effective written communication in professional environment								K2
	CO2	Apply the mechanics of creative writing with precision and clarity								K3
	CO3	Acquire language skills professionally to groom the overall personality through sensitizing various etiquettes in real time situation								K2
	CO4	Develop language fluency and gain self-confidence								K3
	CO5	Express thoughts and ideas with clarity and focus								K2
UNIT - I	Business Correspondence						Periods:10			
Business Writing: Circular, Agenda, Memoranda, Notice, Instruction, Minutes, Email Writing, Report Writing- Official and Demi Official Letters : Applying for Educational / Car / Home Loans / Joining Report, Leave Letter, Industrial Visit, Inplant Training, Letter to the Editor, Calling for a quotation, Placing Order, Letter of Complaints, Letter seeking Clarification, Resume', Job Application Letter, Bio-data, CV										CO1
UNIT - II	Functional Writing Skills						Periods:10			
Four Modes of Writing, Sentence Structure , Art of condensation: Summary Writing and Note Making, Use of phrase and clause in sentence, Principles of paragraph writing, Techniques of Essay Writing, Jumbled Sentence, Paraphrasing										CO2
UNIT - III	Etiquettes						Periods:10			
Etiquette: Meaning, Kinds: Corporate Etiquette, Meeting Etiquette, Telephone Etiquette, Email Etiquette, Social Media Etiquette, Dining Etiquette, Communication Etiquette										CO3
UNIT - IV	Communication Practice-II						Periods:15			
List of Exercises										CO4
Listening: Letter writing tips										
Speaking: Just a Minute, Impromptu Speech, Contemporary Issues										
Reading: Variety of examples for Modes of Writing										
Writing: Different types of letters										
UNIT - V	Interpersonal Communication-II						Periods:15			
List of Exercises										CO5
Listening: Videos on different types of Etiquettes										
Speaking: Team Presentation, Negotiation Skills										
Reading: Phrases and Clauses										
Writing: Free writing on any given topic, Paraphrasing Practice										
Lecture Periods:30			Tutorial Periods: -			Practical Periods:30		Total Periods:60		
Text Books										
1. PC Das, "Letter Writing including Official and Business Letters", New Central Book Agency, 2020.										
2. Kumar, Sanjay, Pushpalatha," Communication Skills". Oxford University Press, 2018.										
3. Raman, Meenakshi & Sangeetha Sharma," Communication Skills", New Delhi: OUP,2018.										
Reference Books										
1. Sahukar, Nimeran , Bhalla, Prem,, "The book of Etiquettes and Manners".PustakMahal Publisher, New Delhi; 1st Edition 2009.										
2. Gerson Sharon J, Steven M. Gerson, "Technical Writing Process and Product", Pearson Education Pvt. Ltd. 3 rd Edition, 2009.										
3. Grussendorf, Marion, "English for Presentations". Oxford University Press, Oxford, 2007.										
4. Seely John, "The Oxford Guide to Writing and Speaking", Oxford University Press, 2006.										
5. R.C. Sharma, Krishna Mohan, "Business Correspondence and Report Writing", Tata McGraw Hill &Co.Ltd., New Delhi, 2001.										

Web References

1. <https://www.indeed.com/career-advice/finding-a-job/how-to-write-an-application-letter>
2. <https://owlcation.com/humanities/Four-Types-of-Writing>
3. <https://targetstudy.com/languages/english/paragraph-writing.html>
4. <https://www.businessnewsdaily.com/8262-email-etiquette-tips.html>
5. <https://www.youtube.com/watch?v=UOceysteljo>

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
2	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
3	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
4	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-
5	1	-	-	-	-	-	-	-	-	3	-	1	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method**Theory**

Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	10		5	5	75	60
	20(to be weighted for 10 marks)				(to be weighted for 50 marks)	

Practical

Continuous Assessment Internal Evaluation		End Semester Internal Evaluation		Total Marks
30(to be weighted for 10 marks)		30 marks		
Listening (L)*	10	Listening (L)*	10	40
Speaking(S)	5	Speaking(S)	5	
Reading(R)*	10	Reading(R)*	10	
Writing(W)*	5	Writing(W)*	5	

- LRW components of Practical can be evaluated through Language Lab Software

Department	Mechanical Engineering		Programme: B.Tech.							
Semester	I/II		Course Category: ES				*End Semester Exam Type: LE			
CourseCode	U23ESPC02		Periods/Week			Credit	Maximum Marks			
			L	T	P	C	CAM	ESE	TM	
Course Name	Design Thinking and IDEA Lab		-	-	2	1	50	50	100	
(Common to ALL Branches)										
Prerequisite	Basic Knowledge of Science									
Course Outcomes	On completion of the course, the students will be able to							BT Mapping (Highest Level)		
	CO1	Demonstrate a comprehensive understanding of the tools and inventory associated with the IDEA Lab.							K2	
	CO2	Develop proficiency in ideation techniques to generate creative and innovative solutions for various design challenges and problems							K3	
	CO3	Acquire practical knowledge of mechanical and electronic fabrication processes, including hands-on experience with machinery, tools, and techniques used in the manufacturing and assembly of physical components.							K3	
	CO4	Cultivate the skills necessary for developing innovative and desirable products, including the ability to integrate user needs, market trends, and technological advancements into the design process.							K4	
	CO5	Apply iterative design methodologies to refine and improve solutions based on feedback, user testing, and evaluation of functional, aesthetic, and usability aspects							K4	
Design process: Traditional design, Design thinking, Existing sample design projects, Study on designs around us, Compositions/structure of a design, Innovative design: Breaking of patterns, Reframe existing design problems, Principles of creativity Empathy: Customer Needs, Insight-leaving from the lives of others/standing on the shoes of others, Observation										
Design team-Team formation, Conceptualization: Visual thinking, Drawing/sketching, New concept thinking, Patents and Intellectual Property, Concept Generation Methodologies, Concept Selection, Concept Testing, Opportunity identification Prototyping: Principles of prototyping, Prototyping technologies, Prototype using simple things, Wooden model, Clay model, 3D printing; Experimenting/testing.										
Sustainable product design, Ergonomics, Semantics, Entrepreneurship/business ideas, Product Data Specification, Establishing target specifications, Setting the final specifications. Design projects for teams.										
List of Lab Activities and Experiments										
1. Schematic and PCB layout design of a suitable circuit, fabrication and testing of the circuit.										
2. Machining of 3D geometry on soft material such as softwood or modelling wax.										
3. 3D scanning of computer mouse geometry surface. 3D printing of scanned geometry using FDM or SLA printer.										
4. 2D profile cutting of press fit box/casing in acrylic (3 or 6 mm thickness)/cardboard, MDF (2 mm) board using laser cutter & engraver.										
5. 2D profile cutting on plywood /MDF (6-12 mm) for press fit designs.										
6. Familiarity and use of welding equipment.										
7. Familiarity and use of normal and wood lathe.										
8. Embedded programming using Arduino and/or Raspberry Pi.										
9. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.										
10. Discussion and implementation of a mini project.										
11. Documentation of the mini project (Report and video).										
Lecture Periods:-			Tutorial Periods: -			Practical Periods:30		Total Periods:30		
Text Books										
1. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation HarperCollins Publishers Ltd.										
2. Workshop / Manufacturing Practices (with Lab Manual), Khanna Book Publishing.										

Reference Books

1. Ulrich and Eppinger, Product Design and Development, 3rd Edition, McGraw Hill, 2004
2. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018.
3. The Total Inventors Manual (Popular Science): Transform Your Idea into a Top-Selling Product. Sean Michael Ragan, Weldon Owen; 2017.
4. The Art of Electronics. 3rd edition. Paul Horowitz and Winfield Hill. Cambridge University Press.
5. Practical Electronics for Inventors. 4th edition. Paul Sherz and Simon Monk. McGraw Hill.
6. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education.
7. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill.
8. Venuvinod, PK., MA. W., Rapid Prototyping – Laser Based and Other Technologies, Kluwer
9. Chapman W.A.J, "Workshop Technology", Volume I, II, III, CBS Publishers and Distributors, 5th Edition, 2002.

Web References

1. https://onlinecourses.nptel.ac.in/noc23_mg72

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	2	-	-	2	-	3	2	-	-	-
2	3	3	3	2	2	2	-	-	2	-	3	2	-	-	-
3	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-
4	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-
5	3	3	3	2	3	2	-	-	2	-	3	2	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

Department	Artificial Intelligence and Data Science			Programme: B.Tech							
Semester	II			Course Category: ES			End Semester Exam Type: LE				
Course Code	U23ADPC01			Periods/Week			Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM	
Course Name	Programming in Python Laboratory			0	0	2	1	50	50	100	
(Common to All Branches)											
Prerequisite	NIL										
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)		
	CO1	Describe common Python functionality and features used for data science.								K2	
	CO2	Query Data Frame structures for cleaning and processing.								K2	
	CO3	Configure your programming environment								K3	
	CO4	Experiment the concept using data visualization.								K3	
	CO5	Analyze real time datasets,								K3	
List of Exercises											
1. Build a python program to implement Fibonacci series. 2. Build a python program to get a range of numbers from user and to separate even numbers and odd numbers respectively. 3. Build a function in Python to check duplicate letters. It must accept a string, i.e., a sentence. The function should return True if the sentence has any word with duplicate letters, else return False. 4. Build a program to perform arithmetic operations using lambda function. 5. Build a Python program that takes a list of numbers as input and returns a new list containing only the even numbers from the input list. 6. Build a python program to create a class called Car with attributes Company, model, and year. Implement a method that returns the age of the car in years. 7. Build a python program to create a base class called Shape that has a method called area which returns the area of the shape (set it to 0 for now). Then, create two derived classes Rectangle and Circle that inherit from the Shape class to calculate the area of derived classes. 8. Build a python program to implement aggregation using Numpy. 9. Build a python program to perform Indexing and Sorting. 10. Build a python program to perform Handling of missing data. 11. Build a python program to perform usage of Pivot table using Titanic datasets 12. Build a python program to perform use of eval () and query () 13. Build a python program to perform Scatter Plot 14. Build a python program to perform 3D plotting 15. Implement an application to process a real time data.											
Lecture Periods: -			Tutorial Periods: -			Practical Periods:30		Total Periods:30			
Reference Books											
1. Chirag Shah, "A Hands-On Introduction to Data Science", Cambridge University Press, 2020. 2. Siddhartha Chatterjee, Michal Krystyanczuk, "Python Social Media Analytics", Packt Publishing, 2017. 3. Jake VanderPlas, "Python Data Science Handbook - Essential Tools for Working with Data", O'Reilly Media Inc, 2016. 4. Zhang.Y, "An Introduction to Python and Computer Programming", Springer Publications, 2016. 5. Wesley J Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2006.											
Web References											
1. https://nptel.ac.in/courses/106/106/106106212/ 2. https://www.geeksforgeeks.org/data-analysis-visualization-python/ 3. https://www.coursera.org/learn/python-data-analysis 4. https://www.python.org/ 5. https://www.programiz.com/python-programming											

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	2	1	3	-	-	-	-	-	-	-	2	2	2
2	2	3	2	2	3	-	-	-	-	-	-	-	2	3	2
3	3	3	3	2	3	-	-	-	-	-	-	-	3	3	3
4	3	3	3	3	3	-	-	-	-	-	-	-	3	3	3
5	3	3	3	3	3	-	-	-	-	-	-	-	3	3	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Methods

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

Department	Computer Science and Engineering				Programme: B.Tech.						
Semester	II/III				Course Category: PC		*End Semester Exam Type: LE				
Course Code	U23CSPC02				Periods/Week		Credit	Maximum Marks			
					L	T	P	C	CAM	ESE	TM
Course Name	Data Structures Laboratory				0	0	2	1	50	50	100
(Common to allBranches)											
Prerequisite	Basic Programming Knowledge										
Course Outcomes	On completion of the course, the students will be able to										BT Mapping (Highest Level)
	CO1	Analyse the algorithm's / program's efficiency in terms of time and space complexity.									K3
	CO2	Solve the given problem by identifying the appropriate Data Structure.									K3
	CO3	Solve the problems of searching and sorting techniques.									K3
	CO4	Solve problems in linear Data Structures.									K4
	CO5	Solve problems in non-linear Data Structures.									K4
List of Experiments:											
1. Write a C program to implement recursive and non-recursive i) Linear search ii) Binary Search. 2. Write a C program to implement i) Bubble sort ii) Selection sort iii) Insertion sort iv) Shell sort v) Heap sort. 3. Write a C program to implement the following using an array. a) Stack ADT b) Queue ADT 4. Write a C program to implement list ADT to perform following operations a) Insert an element into a list. a) Delete an element from list b) Search for a key element in list c) count number of nodes in list. 5. Write a C program to implement the following using a singly linked list. a) Stack ADT b) Queue ADT. 6. Write a C program to implement the dequeue (double ended queue) ADT using a doubly linked list and an array. 7. Write a C program to perform the following operations: a) Insert an element into a binary search tree. b) Delete an element from a binary search tree. c) Search for a key element in a binary search tree. 8. Write a C program that use recursive functions to traverse the given binary tree in a) Preorder b) Inorder c) Postorder. 9. Write a C program to perform the AVL tree operations. 10. Write a C program to implement Graph Traversal Techniques. 11. Write a C program to implement the Set operations. a) Union b) Intersection c) Difference.											
Lecture Periods:		-	Tutorial Periods:		-	Practical Periods: 30		Total Periods: 30			
Reference Books											
1. Yashavant Kanetkar, "Data Structures through C", BPB Publications, 3rd Edition, 2019. 2. Tenebaum Aaron M, "Data Structures using C", Pearson Publisher, 1st Edition, 2019. 3. Manjunath Aradhya M and Srinivas Subramiam, "C Programming and Data Structures", Cengage India 1st Edition, 2017. 4. Reema Thareja, "Data structures using C", Oxford University, 2nd Edition, 2014. 5. Gav.pai, "Data Structures and Algorithms", McGraw-Hill India, 1st Edition, 2013.											
Web References											
1. https://www.tutorialspoint.com/data_structures_algorithms/ 2. https://www.w3schools.in/data-structures-tutorial/intro/ 3. https://nptel.ac.in/courses/106103069/ 4. https://swayam.gov.in/nd1_noc20_cs70/preview 5. https://nptel.ac.in/courses/106103069											
* TE – Theory Exam, LE – Lab Exam											

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
3	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
4	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3
5	3	2	1	1	-	-	-	-	-	-	-	-	3	2	3

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	viva				
Marks	15	5	5	15	10	50	100



Department	Information Technology			Programme: B.Tech.						
Semester	II			Course Category: PC			*End Semester Exam Type: LE			
Course Code	U23ITPC01			Periods/Week			Credit	Maximum Marks		
				L	T	P	C	CAM	ESE	TM
Course Name	Digital Design and System Architecture Laboratory			0	0	2	1	50	50	100
(Common to CSE and IT)										
Prerequisite	NIL									
Course Outcomes	On completion of the course, the students will be able to								BT Mapping (Highest Level)	
	CO1	Experiment simplifications of Boolean functions							K3	
	CO2	Develop any combinational logic functions and design combinational circuit							K3	
	CO3	Demonstrate the behavior of sequential circuits							K3	
	CO4	Simulate basic knowledge of computer organizations							K3	
	CO5	Design memory unit and simulate memory operations							K3	
List of Exercises							Periods:30			
<div>1. HDL code to realize all the logic gates</div> <div>2. Design and Simulation of adder, Serial Binary Adder, Multi Precession Adder, Carry Look Ahead Adder.</div> <div>3. Design of 2-to-4 decoder</div> <div>4. Design of 8-to-3 encoder (without and with parity)</div> <div>5. Design of flip flops: SR, D, JK, T</div> <div>6. Design of a N- bit Register of Serial- in Serial –out, Serial in parallel out, Parallel in Serial out and Parallel in Parallel Out.</div> <div>7. Design of ALU to Perform – ADD, SUB, AND-OR, 1’s and 2’s Compliment,</div> <div>8. Design of ALU to Perform – Multiplication, and Division.</div> <div>9. Memory unit design and perform memory operations.</div> <div>10. 8-bit simple ALU design</div> <div>11. 8-bit simple CPU design</div> <div>12. Interfacing of CPU and Memory</div>										
Lecture Periods: -			Tutorial Periods: -			Practical Periods:30		Total Periods:30		
Reference Books										
<div>1. J. Bhasker, “Verilog Hdl Synthesis, a Practical Primer”, Trade Paperback, 2018.</div> <div>2. Massimo Alioto, Elio Consoli, Gaetano Palumbo, “Flip-Flop Design in Nanometer CMOS”, Springer, 2015.</div> <div>3. Charles Platt, “Make: More Electronics”, Make:community, 2014.</div> <div>4. M K Gooroochurn,” Introduction to Digital Logic & Boolean Algebra”, Paperback, 2018.</div> <div>5. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, fifth edition, Tata McGraw Hill Education, 2011.</div>										
Web References										
<div>1. http://www.ee.surrey.ac.uk/Projects/CAL/digital-logic/gatesfunc/</div> <div>2. https://www.javatpoint.com/computer-organization-and-architecture-tutorial</div> <div>3. https://www.tutorialspoint.com/digital_circuits/digital_circuits_flip_flops</div> <div>4. https://www.geeksforgeeks.org/hardware-description-language/</div>										

* TE – Theory Exam, LE – Lab Exam

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	2	-	1	-	-	-	-	1	-	-	3	-	-
2	2	1	2	-	1	-	-	-	-	1	-	-	3	-	-
3	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-
4	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-
5	3	1	2	-	1	-	-	-	-	1	-	-	3	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 – High

Evaluation Method

Evaluation Method							
Assessment	Continuous Assessment Marks (CAM)					End Semester Examination (ESE) Marks	Total Marks
	Performance in practical classes			Model Practical Examination	Attendance		
	Conduction of practical	Record work	Viva				
Marks	15	5	5	15	10	50	100

Department	Computer Science and Engineering	Programme: B.Tech.						
Semester	II	Course Category: AEC			End Semester Exam Type:-			
Course Code	U23CSC2XX	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	Certification Course – II	-	-	4	-	100	-	100
<p>Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.</p> <p>Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree</p>								
Lecture Periods: -		Tutorial Periods: -		Practical Periods: 50			Total Periods: 50	

Department	Computer Science and Engineering			Programme: B.Tech.							
Semester	II			CourseCategory:MC			End Semester Exam Type: -				
CourseCode	U23CSM202			Periods/Week			Credit	Maximum Marks			
				L	T	P	C	CAM	ESE	TM	
Course Name	Sports Yoga and NSS			0	0	2	Non-Credit	100	-	100	
Prerequisite	NIL										
Course Outcomes	On completion of the course, the students will be able to									BT Mapping (Highest Level)	
	CO1	Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility and relaxation.									K2
	CO2	Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.									K2
	CO3	Develop understanding of psychological problems associated with age and lifestyle.									K2
	CO4	Recognize the importance of national service in community development.									K2
	CO5	Convert existing skills into socially relevant life skills.									K2
UNIT - I	Introduction to Physical Education						Periods: 06				
Definition,Aims and Objectives of Physical Education-Changing trends in Physical Education Physical Fitness, Wellness and Lifestyle: Importance of Physical Fitness and Wellness -Components of Physical fitness - Components of Health related fitness -Components of wellness -Preventing Health Threats through Lifestyle Change -Concept of Positive Lifestyle.											CO1
UNIT - II	Yoga and Lifestyle						Periods: 06				
Importance of Yoga - Elements of Yoga -Introduction - Asanas, Pranayama, Meditation and Yogic Kriyas - Yoga for concentration and related Asanas (Sukhasana,Tadasana, Padmasana andShashankasana) - Relaxation Techniques for improving concentration - Yog-nidra. Asanas as preventive measures – Hypertension – Obesity-Back Pain-Diabetes-Asthema.											CO2
UNIT - III	Training and Planning In Sports						Periods: 06				
Training-Warming up and limbering down-Skill, Technique and Style-Objectives of Planning – Tournament- Knock-Out, League/Round Robin and Combination. Psychology and Sports- Important of Psychology in Physical Education and Sports - Differentiate Between Growth and Development - Adolescent problems and their Management- Emotion: Concept, Type and Controlling of emotions - Concepts and Types of Aggressions in Sports- Psychological benefits of exercise - Anxiety and Fear and its effects on Sports Performance - Motivation, its type and techniques - Understanding Stress and Coping strategies											CO3
UNIT - IV	Introduction to National Service Scheme						Periods: 06				
Orientation of NSS volunteers: History, motto, symbol, awards, structure and activities of NSS - Days of National and International Importance- Sensitizing about the thrust areas and awareness activities-Importance of tree plantation and voluntary blood donation-The role of SHGs and NGOs in community development – CSR-Life skills and youth development-extension activities in HELs- various clubs and schemes like RRC, ELC, YRC, UBA, SBA, etc.,											CO4
UNIT - V	Community Issues and The Use Of Technology						Periods: 06				
Common Problems of rural India- Technology developmentand its suitability – Sustainability- Value addition to agricultural products- Service learning and youth volunteering –Shramdaan-Campus cleaning- Field visit to nearby communities- village survey- Initiatives to clean and green environment- preservation of water bodies in adopted villages.											CO5
LecturePeriods:-			TutorialPeriods:-			PracticalPeriods:30			TotalPeriods: 30		
Reference Books											
1. Brar Ajmer Singh, Gill Jagtar Singh, Bains Jagdish, “Modern Textbook of Physical Education Health and Sports- I”, Kalyani Publishers, 6 th Edition, 2014. 2. B.K.S. Iyengar, “Light on Yoga: The Definitive Guide to Yoga Practice”, Thorsons Publishers, Thorsons Classics edition, 2015. 3. Joseph, Siby K, Mahodaya, “Bharat Essays on Conflict Resolution”, Institute of Gandhian Studies Publishers, 2007. 4. Barman Prateeti, Goswami, “Document on Peace Education”, Triveni Akansha Publishing House, New Delhi, 2009. 5. Prof R.B.S. Verma, “Field Work Practicum in Social Work-Emerging Concerns”, Rapid Publisher, Lucknow, 2020. 6. Sibereisen, K, Richard M, “Lerner Approaches to Positive Youth Development”, Sage Publications, New Delhi, 2007. 7. Hoshiar Singh, “Administration of Rural Development in India”, Sterling Publisher, the University of Michigan, 2009.											
Web References											
1. http://www.thebetterindia.com/140/national-service-scheme-nss 2. http://en.wikipedia.org/wiki/national-service-scheme 19= http://nss.nic.in/adminstruct 3. http://nss.nic.in 4. http://socialworknss.org/about.html 5. Young Journal on Youth published by SAGE: http://you.sagepub.com											

Evaluation methods

Assessment	Continuous Assessment Marks (CAM)			Total Marks
	Attendance	MCQ Test	Presentation / Activity / Assignment	
Marks	10	30	60	100

