SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

(An Autonomous Institution)

Puducherry

B.TECH.

COMPUTER AND COMMUNICATION ENGINEERING

ACADEMIC REGULATIONS 2023
(R-2023)

CURRICULUM AND SYLLABI

VISION AND MISSION OF THE INSTITUTE

Vision

To be globally recognized for excellence in quality education, innovation and research for thetransformation 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 growth of society

VISION AND MISSION OF THE DEPARTMENT

Vision

To promote students with latest technology and research in the field of Computer and Communication Engineering to meet global socio-economic needs

Mission

M1- Technical Knowledge:	To provide academic excellence in the field of computer and Communication engineering to meet the needs of the Society.
M2-Innovation and Exposure:	To conduct recognized research analytically in multi-disciplinary Research areas of the framework at National and International levels
M3-Employability and Entrepreneurship:	To provide complementary technical, inter and intrapersonal skills for employability and entrepreneurship
M4-Ethics:	To instruct integrity, ethical principles and interactive skills among the students to form a better nation

PROGRAM OUTCOMES

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.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Technical Knowledge	To satisfy the requirements of industry, Research and Development organizations by employing technological knowledge in Computer and Communication Engineering.
PEO2: Leadership Skill	To lead, contribute and innovate new technologies andsystems in the key domains of Computer andCommunication Engineering
PEO3:Researchand Development	To get exposed to collaborative work that can beimplemented for society's well-being through advanceresearch expertise
PEO4: Professional Behavior	Gains code of conduct, etiquettes to establish boundaries in environment.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO1- Basic Knowledge in CCE	Use the latest tools and technologies to apply the fundamental concepts of computer and communication engineering principles to software development, mobilecommunication and computing
PSO 2-Network Design and Security	Design and Interpret computer networks, Internet ofThings with efficient data analytics and security.
PSO 3- Algorithmic Thinking and Programming Skill	Develop efficient algorithms to solve real time problemsthrough powerful programming and problem solving skills

STRUCTURE FOR UNDERGRADUATE ENGINEERING PROGRAM

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)	29
4	Professional Core Courses (PC)	65
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		**169**

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 Science (HS)	5	3	1	1	2			3	15
2	Basic Sciences(BS)	4	7	5	4					20
3	Engineering Sciences (ES)	12	13		4					29
4	Professional Core (PC)			16	11	12	15	11		65
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	Ability Enhancement	-	-	-	-	-	-	-	-	**-**
10	Mandatory courses (MC*)	-	-	-	-	-	-	-	-	**-**
Total		**22**	**21**	**23**	**22**	**23**	**21**	**22**	**20**	**169**

**** 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 -V**

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	U23CSTC01	Programming in C	ES	3	0	0	3	25	75	100
3	U23CSTC02	Problem Solving Approach	ES	3	0	0	3	25	75	100
4	U23ESTC03	Basics of Electrical and Electronics Engineering	ES	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	U23CCC1XX	Certification Course – I**	AEC	0	0	4	-	100	-	100
Mandatory Course										
11	U23CCM101	Induction Programme	MC	3 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	U23CSTC03	Data Structures	ES	3	0	0	3	25	75	100
4	U23ADTC01	Programming in Python	ES	3	0	0	3	25	75	100
5	U23CCT201	Digital Electronics	ES	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	U23ADPC01	Programming in Python Laboratory	ES	0	0	2	1	50	50	100
8	U23CSPC02	Data Structures Laboratory	ES	0	0	2	1	50	50	100
9	U23CCP201	Digital Electronics Laboratory	ES	0	0	2	1	50	50	100
10	U23ESPC02	Design Thinking and IDEA Lab	ES	0	0	2	1	50	50	100
Ability Enhancement Course										
11	U23CCC2XX	Certification Course - II**	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CCM202	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	U23CCT302	Computer organization and Architecture	PC	3	0	0	3	25	75	100
3	U23CCT303	Analog Electronics	PC	3	0	0	3	25	75	100
4	U23CCT304	Principles of Communication Engineering	PC	3	0	0	3	25	75	100
5	U23CCT305	Software Engineering Principles and Testing Techniques	PC	2	2	0	3	25	75	100
Theory Cum Practical										
6	U23CSBC01	Design and Analysis of Algorithms	PC	2	0	2	2	50	50	100
Practical										
7	U23MAPC01	Engineering Mathematics Laboratory	BS	0	0	2	1	50	50	100
8	U23ENPC01	General Proficiency-I	HS	0	0	2	1	50	50	100
9	U23CCP302	Principles of Communication Engineering Laboratory	PC	0	0	2	1	50	50	100
Ability Enhancement Course										
10	U23CCS301	Skill Enhancement Course-I*	AEC	0	0	4	-	100	-	100
11	U23CCC3XX	Certification Course -III*	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CCM303	Environmental Science	MC	0	0	2	-	100	-	100
							22	625	575	1200

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	U23CCT406	Computer and Communication Networks	PC	3	0	0	3	25	75	100
4	U23CSTC06	Database Management Systems	PC	3	0	0	3	25	75	100
5	U23CCE4XX	Professional Elective - I[#]	PE	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23CCB401	Operating Systems Principles and Practices	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	U23CCP403	Computer and Communication Networks 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	U23CCS402	Skill Enhancement Course-II*	AEC	0	0	4	-	100	-	100
12	U23CCC4XX	Certification Course –IV**	AEC	0	0	2	-	100	-	100
Mandatory Course										
13	U23CCM404	Indian Constitution	MC	0	0	2	-	100	-	100
							23	675	625	1300

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

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

SEMESTER – V										
Sl. No.	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
				L	T	P		CAM	ESM	Total
Theory										
1	U23HST202	Research Methodology	HS	2	0	0	2	25	75	100
2	U23ECTC01	Microcontroller and Interfacing	PC	3	0	0	3	25	75	100
3	U23CSTC07	Artificial Intelligence	PC	3	0	0	3	25	75	100
4	U23CCT507	Cyber Physical System Design	PC	3	0	0	3	25	75	100
5	U23CCE5XX	Professional Elective - II#	PE	3	0	0	3	25	75	100
6	U23XXO5XX	Open Elective-I$	OE	3	0	0	3	25	75	100
Practical										
7	U23CCP504	Cyber Physical System Design Laboratory	BS	0	0	2	1	50	50	100
8	U23ECPC01	Microcontroller and Interfacing Laboratory	PC	0	0	2	1	50	50	100
9	U23CSPC05	Artificial Intelligence Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23CCW501	Micro Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23CCC5XX	Certification Course – V**	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CCC505	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	U23CCT608	Internet Programming	PC	3	0	0	3	25	75	100
2	U23ITTC04	Machine Learning	PC	3	0	0	3	25	75	100
3	U23ECTC02	Embedded Systems Design	PC	3	0	0	3	25	75	100
4	U23CCE6XX	Professional Elective - III#	PE	3	0	0	3	25	75	100
5	U23XXO6XX	Open Elective-II$	OE	3	0	0	3	25	75	100
Theory Cum Practical										
6	U23CCB602	Data Science for Networking	OE	2	0	2	3	50	50	100
Practical										
7	U23CCP605	Internet Programming Laboratory	PC	0	0	2	1	50	50	100
8	U23ITPC04	Machine Learning Laboratory	PC	0	0	2	1	50	50	100
9	U23ECPC02	Embedded Systems Design Laboratory	PC	0	0	2	1	50	50	100
Project Work										
10	U23CCW602	Mini Project	PA	0	0	2	1	100	-	100
Ability Enhancement Course										
11	U23CCC6XX	Certification Course – VI**	AEC	0	0	4	-	100	-	100
Mandatory Course										
12	U23CCM606	Professional Ethics	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	U23ECTC03	Internet of Things	PC	3	0	0	3	25	75	100
2	U23CCT709	Cloud Computing and Distributed Systems	PC	3	0	0	3	25	75	100
3	U23CCT710	Blockchain Technology and Application	PC	3	0	0	3	25	75	100
4	U23CCE7XX	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	U23ECPC03	Internet of Things Laboratory	PC	0	0	2	1	50	50	100
7	U23CCP706	Cloud Computing and Distributed Systems Laboratory	PC	0	0	2	1	50	50	100
Project Work										
8	U23CCW703	Project Phase – I	PA	0	0	4	2	50	50	100
9	U23CCW704	Internship / Inplant Training	PA	0	0	2	1	100	-	100
Mandatory Course										
10	U23CCC707	Professional Ethics	MC	2	0	0	-	100	-	100
							20	475	525	1000

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	U23CCE8XX	Professional Elective – V#	PE	3	0	0	3	25	75	100
3	U23CCE8XX	Professional Elective – VI#	PE	3	0	0	3	25	75	100
Project Work										
4	U23CCW805	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	U23CCE401	Compiler Design
2	U23CCE402	Network Analysis and Management
3	U23CCE403	Information coding Theory
4	U23CCE404	Computer Graphics
5	U23CCE405	Signal Processing
Professional Elective – II (Offered in Semester V)		
Sl. No.	**Course Code**	**Course Title**
1	U23CCE506	Azure Development and Operations
2	U23CCE507	Wireless Adhoc and Sensor Networks
3	U23CCE508	Data Mining and Information Warehousing
4	U23CCE509	Computational Intelligence
5	U23CBEC01	Business Intelligence and Applications
Professional Elective – III (Offered in Semester VI)		
Sl. No.	**Course Code**	**Course Title**
1	U23CCE610	Image Processing and vision Technologies
2	U23CCE611	Advanced Communication Techniques
3	U23CCE612	Artificial Neural Networks
4	U23ITEC02	Natural Language Processing
5	U23ITEC01	Software Defined Networks
Professional Elective – IV (Offered in Semester VII)		
Sl. No.	**Course Code**	**Course Title**
1	U23CCE713	Optical Networks
2	U23ITEC03	Robotic Process Automation
3	U23CCE714	Software Project Management
4	U23ECEC01	Satellite Communication
5	U23CCE715	Deep Learning and Applications
Professional Elective – V (Offered in Semester VIII)		
Sl. No.	**Course Code**	**Course Title**
1	U23CCE816	Multiple Input Multiple Output Communication
2	U23ECEC03	High Speed Networks
3	U23CCE817	Telecommunication and Switching Techniques
4	U23CCE818	Bigdata Analytics
5	U23CCE819	Game Theory and its Application
Professional Elective – VI (Offered in Semester VIII)		
Sl. No.	**Course Code**	**Course Title**
1	U23CCE820	Millimeter Wave Personal Communication Systems
2	U23CCE821	Recent Communication Technologies
3	U23CCE822	Mobile Application Engineering
4	U23CCE823	Green Computing
5	U23ITEC04	Human Computer Interaction

Annexure – II

OPEN ELECTIVE COURSES

S. No	Course Code	Course Title	Offering Department	Permitted Departments
Open Elective – I / II (Offered in Semester V/VI)				
1	U23CCOX01	Introduction to Communication Technologies	CCE	EEE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS
2	U23CCOX02	Introduction to Computer Networks	CCE	EEE, MECH, CIVIL, ICE, Mechatronics, BME, AIDS
Open Elective – III (Offered in Semester VII)				
3	U23CCO701	Web App Development	CCE	EEE, ECE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS
4	U23CCO702	Network Essentials and Security	CCE	EEE, MECH, CSE, IT, CIVIL, ICE, Mechatronics, BME, AIDS

Annexure – III

ABILITY ENHANCEMENT COURSES – (A). CERTIFICATION COURSES

S. No	Course Code	Course Title	Certified By
1	U23CCCX01	Adobe Photoshop	Adobe
2	U23CCCX02	Adobe Animate	Adobe
3	U23CCCX03	Adobe Dreamweaver	Adobe
4	U23CCCX04	Adobe After Effects	Adobe
5	U23CCCX05	Adobe Illustrator	Adobe
6	U23CCCX06	Adobe InDesign	Adobe
7	U23CCCX07	Autodesk AutoCAD -ACU	Autodesk
8	U23CCCX08	Autodesk Inventor - ACU	Autodesk
9	U23CCCX09	Autodesk Revit - ACU	Autodesk
10	U23CCCX10	Autodesk Fusion 360 - ACU	Autodesk
11	U23CCCX11	Autodesk 3ds Max - ACU	Autodesk
12	U23CCX12	Autodesk Maya - ACU	Autodesk
13	U23CCCX13	Cloud Security Foundations	AWS
14	U23CCCX14	Cloud Computing Architecture	AWS
15	U23CCCX15	Cloud Foundation	AWS
16	U23CCCX16	Cloud Practitioner	AWS
17	U23CCCX17	Cloud Solution Architect	AWS
18	U23CCCX18	Data Engineering	AWS
19	U23CCCX19	Machine Learning Foundation	AWS
20	U23CCCX20	Robotic Process Automation / Medical Robotics	Blue Prism
21	U23CCCX21	Advance Programming Using C	CISCO
22	U23CCCX22	Advance Programming Using C ++	CISCO
23	U23CCCX23	C Programming	CISCO
24	U23CCCX24	C++ Programming	CISCO
25	U23CCCX25	CCNP Enterprise: Advanced Routing	CISCO
26	U23CCCX26	CCNP Enterprise: Core Networking	CISCO
27	U23CCCX27	Cisco Certified Network Associate - Level 2	CISCO
28	U23CCCX28	Cisco Certified Network Associate- Level 1	CISCO
29	U23CCCX29	Cisco Certified Network Associate- Level 3	CISCO
30	U23CCCX30	Fundamentals Of Internet Of Things	CISCO
31	U23CCCX31	Internet Of Things	CISCO
32	U23CCCX32	Java Script Programming	CISCO
33	U23CCCX33	NGD Linux Essentials	CISCO
34	U23CCCX34	NGD Linux I	CISCO
35	U23CCCX35	NGD Linux II	CISCO
36	U23CCCX36	Advance Java Programming	Ethnotech
37	U23CCCX37	Android Programming / Android Medical App Development	Ethnotech
38	U23CCCX38	Ansys	Ethnotech
39	U23CCCX39	Catia	Ethnotech
40	U23CCCX40	Communication Skills for Business	Ethnotech
41	U23CCCX41	Coral Draw	Ethnotech
42	U23CCCX42	Data Science Using R	Ethnotech

43	U23CCCX43	Digital Marketing	Ethnotech
44	U23CCCX44	Embedded System Using C	Ethnotech
45	U23CCCX45	Embedded System With IOT	Ethnotech
46	U23CCCX46	English For IT	Ethnotech
47	U23CCCX47	Entrepreneurship And Business Plan	Ethnotech
48	U23CCCX48	Estimation And Current Practices	Ethnotech
49	U23CCCX49	Financial Planning, Banking and Investment Management	Ethnotech
50	U23CCCX50	Foundation Of Stock Market Investing	Ethnotech
51	U23CCCX51	Machine Learning / Machine Learning for Medical Diagnosis	Ethnotech
52	U23CCCX52	IOT Using Python	Ethnotech
53	U23CCCX53	Plaxis	Ethnotech
54	U23CCCX54	Soft Skills, Verbal, Aptitude	Ethnotech
55	U23CCCX55	Software Testing	Ethnotech
56	U23CCCX56	Solar And Smart Energy System With IOT	Ethnotech
57	U23CCCX57	Solid Edge	Ethnotech
58	U23CCCX58	Solid works	Ethnotech
59	U23CCCX59	Staad Pro	Ethnotech
60	U23CCCX99	Total Station	Ethnotech
61	U23CCCX60	Hydraulic	Festo
62	U23CCCX61	PLC	Festo
63	U23CCCX62	Pneumatic	Festo
64	U23CCCX63	Agile Methodologies	IBM
65	U23CCCX64	Block Chain	IBM
66	U23CCCX65	Devops	IBM
67	U23CCCX66	Artificial Intelligence	ITS
68	U23CCCX67	Cloud Computing	ITS
69	U23CCCX68	Computational Thinking	ITS
70	U23CCCX69	Cyber Security	ITS
71	U23CCCX70	Data Analytics	ITS
72	U23CCCX71	Databases	ITS
73	U23CCCX72	Java Programming	ITS
74	U23CCCX73	Networking	ITS
75	U23CCCX74	Python Programming	ITS
76	U23CCCX75	Web Application Development (HTML, CSS, JS)	ITS
77	U23CCCX76	Network Security	ITS & Palo alto
78	U23CCCX77	MATLAB	MathWorks
79	U23CCCX78	Azure Fundamentals	Microsoft
80	U23CCCX79	Azure AI (AI-900)	Microsoft
81	U23CCCX80	Azure Data (DP -900)	Microsoft
82	U23CCCX81	Microsoft 365 Fundamentals (SS-900)	Microsoft
83	U23CCCX82	Microsoft Security, Compliance and Identity (SC-900)	Microsoft
84	U23CCCX83	Microsoft Power Platform (PI-900)	Microsoft
85	U23CCCX84	Microsoft Dynamics Fundamentals 365 – CRM	Microsoft
86	U23CCCX85	Microsoft Excel	Microsoft
87	U23CCCX86	Microsoft Excel Expert	Microsoft
88	U23CCCX87	Securities Market Foundation	NISM
89	U23CCCX88	Derivatives Equinity	NISM

90	U23CCCX89	Research Analyst	NISM
91	U23CCCX90	Portfolio Management Services	NISM
92	U23CCCX91	Cyber Security	Palo alto
93	U23CCCX92	Cloud Security	Palo alto
94	U23CCCX93	PMI – Ready	PMI
95	U23CCCX94	Tally – GST & TDS	Tally
96	U23CCCX95	Advance Tally	Tally
97	U23CCCX96	Associate Artist	Unity
98	U23CCCX97	Certified Unity Programming	Unity
99	U23CCCX98	VR Development	Unity

Annexure – IV

ABILITY ENHANCEMENT COURSES – (B). SKILL ENHANCEMENT COURSES

Sl. No	Course Code	Course Title
1	U23CCS301	Skill Development Course 1 *:
		1)Computer on Office Automation
		2)Animation Practices
		3)PCB and Circuit Design
2	U23CCS402	Skill Development Course 2 *
		1)Computer Hardware and Troubleshooting
		2)Mobile Servicing
		3)Android App Development

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

Annexure – V

Honours Programme – Cyber Security

COURSE DETAILS											
Sl. No.	Semester	Course Code	Course Title	Category	Periods			Credits	Max. Marks		
					L	T	P		CAM	ESM	Total
Theory											
1	IV	U23CCH401	Cyber Laws and Vulnerabilities	PC	3	1	0	4	25	75	100
2	V	U23CCH502	Digital Forensic	PC	3	1	0	4	25	75	100
3	VI	U23CCH603	Malware Analysis and Reverse Engineering	PC	3	1	0	4	25	75	100
4	VII	U23CCH704	Embedded, IoT and Cloud security	PC	3	1	0	4	25	75	100
5	VIII	U23CCH805	Ethical Hacking	PC	3	1	0	4	25	75	100
	Total							**20**	**125**	**375**	**500**
Equivalent NPTEL courses[##]											
1	IV-VII	U23CCHN01	Cyber Security and Privacy					3	**12 Weeks Course**		
			Introduction to Cyber Security					3			
			Digital Forensic					3			
			Statistical learning for Reliability Analysis					3			
			Cryptography and Network Security					3			
			Ethical Hacking					3			

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

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	TM
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 of two variables 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: Areas 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 Stokes Theorem applications (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, Madras, 2016.
2. N. P Bali and Manish Goyal, "A Text Book of Engineering Mathematics", Lakshmi Publications, New Delhi, 9th Edition, 2018.
3. S. Narayanan and T.K. Manicavachagom 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, 9th Edition, 2023
2. Dr. A. Singaravelu, "Engineering Mathematics – I", Meenakshi publications, Tamil Nadu, 2019.
3. Erwin Kreyszig, "Advanced Engineering Mathematics ", Wiley, 10th Edition, 2019.
4. B.V.Ramana," Higher Engineering Mathematics", Tata McGraw – Hill, New Delhi, 6th Edition, 2018.
5. C W. Evans, "Engineering Mathematics", A Programmed Approach, 3rd 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 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: **ES**			*End Semester Exam Type: **TE**			
Course Code	U23CSTC01	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**PROGRAMMING IN C**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
	(Common to All Branches)							
Prerequisite	NIL							

Course Outcome		On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1	Comprehend the basic of Computers.	**K2**
	CO2	Illustrate the basics constructs of C programming concepts of control structures and looping in C Program.	**K2**
	CO3	Implement programs using arrays and functions.	**K3**
	CO4	Demonstrate programs using Structure and Pointers.	**K3**
	CO5	Build programs Union and understand the concept of 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, 8th Edition,2019.
2. YashvantKanetkar, "Let us C", BPB Publications, 16th Edition, 2017
3. Herbert Schildt," C: The Complete Reference", McGraw Hill, 4th Edition,2014

Reference Books

1. Vikas B. Agarwal Jyoti P. Mirani, "Computer Fundamentals , Nirali Prakashan 2019
2. Ashok N Kamthane, "Computer Programming", Pearson education, Second Impression,2012.
3. VikasVerma, "A Workbook on C ", Cengage Learning, 2nd Edition,2012.
4. P.Visu, R.Srinivasan and S.Koteeswaran, "Fundamentals of Computing and Programming", Sri Krishna Publications, 4th Edition, 2012.
5. Pradip Dev, Manas Ghoush, "Programming in C", Oxford University Press, 2nd Edition, 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 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**	Course Category: **ES**				*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								

Course Outcome	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 RECURCIVE 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 Textbooks 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; 2nd 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/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

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	**EEE/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,CCE,AI&DS, FT, MCTR, 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 operator 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:10**
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:10**
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:10**
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.		**CO3**

SECTION B – ELECTRONICS ENGINEERING

UNIT-IV	**SEMICONDUCTOR DIODES AND APPLICATIONS**	**Periods:10**
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:10**
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:10**
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 – Fiber Optical Communication System.		**CO6**

Lecture Periods:45	**Tutorial Periods:-15**	**Practical Periods:-**	**TotalPeriods:60**

Text Books

1. R.K. Rajput, "Basic Electrical and Electronics Engineering", University Science Press,2nd Edition, 2012
2. R. Saravanakumar V. Jegathesan, K. Vinoth Kumar, "Basic Electrical and Electronics Engineering", Wielly, 2022
3. R.Muthusubramaniam, S.Salivahanan and K.A. Mureleedharan, Basic Electrical Electronics and Computer Engineering, Tata McGraw Hill, 2018

Reference Books

1. Sudhakar.A and ShyamMohan.S.P, "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. Theraja B. L and Theraja A. K., "A Textbook of Electrical Technology", Vol. II, S Chand & Co. Ltd., New Delhi, 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", 6th Edition, Pearson Education, 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/

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 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 and Communication Engineering**	Programme: **B.Tech.**						
Semester	**I/II**	Course Category: **HS**			End Semester Exam Type: **TE**			
Course Code	U23HSTC01	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**UNIVERSAL HUMAN VALUES - II**	**2**	**-**	**-**	**2**	**25**	**75**	**100**
	(Common to all Branches)							

Prerequisite	UHV-I: Universal Human Values-Introduction		
Course Outcomes	The course will enable the student 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 in the 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. A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019.

Reference Books

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

5. Small is Beautiful - E. F Schumacher
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

Web References

1. https://www.uhv.org.in/uhv-ii
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=8ovkLRYXIjE

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 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	**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/

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 Methods

Theory						
Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	5	5	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		40
Listening (L)*	10	Listening (L)*	10	
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	**Computer Science and Engineering**	Programme: **B.Tech.**						
Semester	**I/II**	Course Category : **ES**			*End Semester Exam Type: **LE**			
Course Code	U23CSPC01	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**PROGRAMMING IN C 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 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 **Periods: 09**

1. Create a C program to find the Area of the triangle.
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.
3. Write a C program to check whether a given character is vowel or not using Switch – Case statement.
4. Print the numbers from 1 to 10 along with their squares using C program.
5. Demonstrate do—While loop in C to find the sum of ‘n’ numbers.
6. Find the factorial of a given number using Functions in C.
7. Check whether a given string is palindrome or not?
8. Check whether a value is prime or not?
9. Develop a C program to swap two numbers using call by value and call by reference.
10. Construct a C program to find the smallest and largest element in an array.
11. Implement matrix multiplication using C program.
12. Create a C program to perform various string handling functions like strlen, strcpy, strcat, strcmp.
13. Develop a C program to remove all characters in a string except alphabets.
14. Create a C program to find the sum of an integer array using pointers.
15. Find the Maximum element in an integer array using pointers.
16. Construct a C program to display Employee details using Structures
17. Display the contents of a file on the monitor screen.
18. Create a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands.
19. Write a C program to create two files with a set of values. Merge the two file contents to form a single file
20. Create a C program to pass the parameter using command line arguments.

Lecture Periods:	**Tutorial Periods:**	**Practical Periods: 30**	**Total Periods: 30**

Reference Books

1. Zed A Shaw,”Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)”, Addison Wesley,2016.
2. Anita Goel and Ajay Mittal, ”Computer Fundamentals and programming in C”,Pearson Education,First edition, 2011.
3. Maureen Sprankle,Jim Hubbard,” Problem Solving and Programming Concepts,” Pearson,9th Edition, 2011.
4. Yashwanth Kanethkar, “Let us C”, BPB Publications,13th Edition,2008.
5. B.W.Kernighan and D.M. Ritchie, “The C Programming Language”, Pearson Education, 2nd Edition, 2006.

Web References

1. https://alison.com/course/introduction-to-c-programming

2. https://www.geeksforgeeks.org/c-programming-language/
3. http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf
4. https://www.tenouk.com/clabworksheet/clabworksheet.html
5. https://fresh2refresh.com/c-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	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 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	**EEE and ECE**	Programme: **B.Tech.**						
Semester	**I/II**	Course Category: **ES**			*End Semester Exam Type: **LE**			
Course Code	U23ESPC01	Periods / Week			Credit	Maximum Marks		
		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,CCE, AI&DS, FT, MCTR, 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 wirings 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

PART – A
ELECTRICAL EXPERIMENTS

Demonstration on Power Sources, Ammeters, Voltmeters, Wattmeter and Energy meter are Pre-requisite for conducting this Electrical Engineering Lab.

1. Electrical safety precautions and study of tools, accessories, electrical joints and electrical symbols.
2. Domestic Wiring Practice
   - Staircase wiring
   - Doctor's room wiring
   - Godown wiring
   - Wiring of Ceiling fan, LED lamps and Iron Box.
3. Design of Domestic power distribution.
4. Measurement of 3-phase power using two wattmeter method.
5. Load test on DC shunt motor.
6. Load test on single phase transformer.
7. Load test on single phase Induction Motor.

PART – B
ELECTRONICS EXPERIMENTS

1. Study of Electronic components and equipment: Resistor, Capacitor
2. Measurement of AC signal parameter (Peak-Peak, rms period, frequency) using CRO.
3. VI Characteristics of PN junction diode, Zener diode
4. Input and output characteristics of Common Emitter configuration of BJT
5. Characteristics of JFET
6. Measurement of Ripple factor of HWR, FWR
7. Voltage Regulator using Zener Diode.

Lecture Periods:	**Tutorial Periods:**	**Practical Periods: 30**	**Total Periods: 30**

Reference Books

1. T.Jeyapoovan Nadar, "Engineering Practices Lab Manual", Vikas Publishing House Private Limited, New Delhi, 5th edition, 2014.
2. A.Sudhakar and Shyam Mohan.S.P, "Circuits and Networks Analysis and Synthesis", Tata McGraw Hill Publishing Company Ltd., New Delhi, 4th edition, 2017.
3. D.P.Kothari and I.J. Nagrath, "Electric Machines", Tata McGraw Hill, New Delhi, 5th Edition, 2017.

4. Edward Hughes, John Hiley, Keith Brown, Ian McKenzie Smith, Electrical and Electronics Technology, Pearson Education Limited, New Delhi, 10th edition 2010.
5. S.K. Sahdev, “Fundamentals of Electrical Engineering and Electronics”, DhanpatRai and Co, 2017.

Web References

1. http://eie.sliet.ac.in/laboratories/basic-electrical-engineering-lab/
2. https://www.electronics-tutorials.ws/accircuits/series-circuit.html
3. https://www.allaboutcircuits.com/textbook/experiments/
4. https://www.electronicshub.org/measurements-of-ac-current/
5. http://www.electronics-tutorials.ws

* 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 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	**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 AUTO CAD**	**0**	**0**	**2**	**1**	**50**	**50**	**100**
	(Common to All Branches)							
Prerequisite	-							

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.	**K2**
	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: 3 0**	**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 **Education** Publication, 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 and Communication Engineering**	Programme: **B.Tech.**						
Semester	**I**	Course Category : **AEC**			*End Semester Exam Type:			
Course Code	U23CCC1XX	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**CERTIFICATION COURSE- I**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

(Common to all Branches)

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 throughCentre 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.

Evaluation Method

Assessment	**Continuous Assessment Marks (CAM)**		**Total Marks**
	Attendance	**MCQ Test**	
Marks	10	90	100

Department	**Computer and Communication Engineering**	Programme: **B.Tech.**						
Semester	**I**	Course Category: **MC**			End Semester Exam Type: -			
Course Code	U23CCM101	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**INDUCTION PROGRAMME**	-	-	-	Non-Credit	-	-	-
Prerequisite	**-**							

Course Outcomes	The course will enable the student 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. **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.		**CO3**

UNIT-IV	**Literary activities**	**Periods: 12**
Team building activities - Quiz - Oral Exercises - Group discussion, Debate, Extempore, Role play, சிறப்பு சொற்பொழிவு - தமிழர் மரபு மற்றும் தமிழர் தொழில்நுட்பம்.		**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. A Foundation Course in Human Values and Professional Ethics, R.R Gaur, R. Asthana, G.P. Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
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, 6th Edition, 2018.
5. Dr. A. Singaravelu, “Engineering Mathematics - I”, Meenakshi publications, Tamil Nadu, 2019.
6. E. Balagurusamy, "PROGRAMMING IN ANSI C", Mc Graw Hill, 8th Edition, 2019.
7. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL
8. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL)
9. தமிழக வரலாறு - மக்களும் பண்பாடும், பிள்ளை, கே. கே. , சென்னை : உலகத் தமிழாராய்ச்சி நிறுவனம் , 2002.
10. கணினித்தமிழ் - முனைவர் இல.சுந்தரம், விகடன் பிரசுரம்.
11. கீழடி - வைகை நதிக்கரையில் சங்க கால 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

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 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 ODE of second order with constant coefficients.		**CO4**

UNIT – V	**Z – TRANSFORMS**	**Periods:12**
Standard Z-transforms – Elementary Properties – Inverse Z-transforms (using partial fraction and Residues) – Solution of second order difference equations.		**CO5**

Lecture Periods:45	**Tutorial Periods:15**	**Practical Periods:-**	**Total Periods:60**

Text Books

1. T. Veerarajan, "Engineering Mathematics", Tata McGraw Hill, New Delhi, 3rd Edition, 2011.
2. C. P. Gupta, Shree Ram Singh. M. Kumar, "Engineering Mathematics for semester I & II", Tata McGraw Hill, New Delhi 2016.
3. H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Co. New Delhi, 2019.

Reference Books

1. N.P. Bali and Dr. Manish Goyal, "A TEXTBOOK OF ENGINEERING MATHEMATICS", UNIVERSITY SCIENCE PRESS, India, 8th Edition, 2016.
2. P. Sivaramakrishna Das , and C. Vijayakumari, "Engineering Mathematics", Pearson Education India Education services Pvt. Ltd 2017.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, New Delhi, 10th Edition 2019.
4. G.Balaji, "Engineering Mathematics - Transforms and Partial Differential Equatiojs", G.Balaji Publishers, 18th Edition, 2022.
5. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill, New Delhi 2017.

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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 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	**Physics and Chemistry**	Programme: **B.Tech.**						
Semester	**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 12th standard or equivalent / Chemistry of 12th standard or equivalent.							

Course Outcome		**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 Chemistryll" 17thEd. DhanpatRai Pub. Co., NewDelhi, (2015).

Reference Books

1. R.Murugeshan, "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, DhanpatRai Publishing Company. 2022
4. Mars Fontana "Corrosion Engineering", July 2017
5. JinaRedlin, "Handbook of Electrochemistry", March 28, 2005

Web References

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

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 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	**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**	**-**	**-**	**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	**K3**
	CO2 Demonstrate stack, queue and its operation.	**K3**
	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**

Text Books

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", 4th Edition, 2009.

Reference Books.

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++", Addison- Wesley Publishing Company, Illustrated Edition, 1995.
5. Mark Allen Weiss," Algorithms, Data Structures and Problem Solving with C++", Illustrated Edition, Addison-Wesley Publishing Company, 1995.

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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/

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	**Artificial Intelligence and Data Science**	Programme: **B.Tech.**						
Semester	**II/III**	Course Category: **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**	**-**	**-**	**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, 2nd Edition, 2006.

Reference Books.

1. John Paul Mueller, Luca Massaron, "Python for Data Science for Dummies", 2nd 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, 3rd 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

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
3	3	2	2	3	-	-	-	-	-	-	-	2	3	2	3
4	3	3	2	3	-	-	-	-	-	-	-	3	3	3	3
5	3	3	2	3	-	-	-	-	-	-	-	2	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
	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 and Communication Engineering**	Programme: **B.Tech.**						
Semester	**II**	Course Category: **PC**			*End Semester Exam Type: **TE**			
Course Code	U23CCT201	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**DIGITAL ELECTRONICS**	**3**	**-**	**-**	**3**	**25**	**75**	**100**
Prerequisite	Nil							

Course Outcomes		On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1	Interpret fundamental concepts of digital electronics like numbering system and numbering system conversion	**K3**
	CO2	Use Boolean theorems, k-maps and tabulation method for simplification of logical expression	**K3**
	CO3	Implement various combinational circuits using logic gates	**K3**
	CO4	Illustrate design procedures for synchronous sequential circuits	**K3**
	CO5	Design combinational circuits using programmable logic devices.	**K3**

UNIT-I	**Introduction**	**Periods: 09**
Introduction to Digital Electronics- Number Systems – Decimal, Binary, Octal, Hexadecimal Numbering Systems- Conversion of one numbering system to another- Binary numbering system for signed numbers- Sign Magnitude,1's and 2's complements, 1's and 2's Complement Arithmetic-Introduction Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes		**CO1**

UNIT-II	**Boolean Algebra and Simplification Techniques**	**Periods: 09**
Introduction logic gates- universal gates-Introduction to Boolean Algebra-Boolean theorems-Demorgan's theorem, Simplification of Boolean expression- , Sum of products and product of sums, Minterms and Maxterms, Karnaugh map for 2,3,4 and 5 variable- Minimization and Quine-McCluskey method of minimization		**CO2**

UNIT-III	**Combinational Circuit Design**	**Periods: 09**
Introduction to Combinational circuits-Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.		**CO3**

UNIT-IV	**Synchronous Sequential Circuits**	**Periods: 09**
Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters- Ripple Counters, Ring Counters, Shift registers, Universal Shift Register. programs.		**CO4**

UNIT-V	**Programmable Logic Devices**	**Periods: 09**
Programmable Logic Devices – Programmable Logic Array (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) - Implementation of combinational logic circuits using PLA, PAL. Introduction to VHDL-statements- logic expression-Implementation of AND, OR, half adder and full adder and Flip-Flops		**CO5**

Lecture Periods: 45	**Tutorial Periods:**	**Practical Periods: -**	**Total Periods: 45**

Text Books

1. M. Morris Mano and Michael D. Ciletti, "Digital Design", 5th Edition, Pearson, 2014.
2. Charles H.Roth. "Fundamentals of Logic Design", 6th Edition, Thomson Learning, 2013.
3. Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011

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1. S.Salivahanan and S.Arivazhagan, "Digital Electronics", Ist Edition, Vikas Publishing House pvt Ltd, 2012.
2. Anil K.Maini, "Digital Electronics", Wiley, 2014.
3. A.Anand Kumar, "Fundamentals of Digital Circuits", 4th Edition, PHI Learning Private Limited, 2016.
4. Soumitra Kumar Mandal, "Digital Electronics", McGraw Hill Education Private Limited, 2016.
5. S. Salivahanan and S. Arivazhagan, "Digital Circuits and Design.",Vikas Publisher, 2009.

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1. https://www.electronics-tutorials.ws/boolean/bool_1.html
2. https://www.electronics-tutorials.ws/logic/logic_1.html
3. https://nptel.ac.in/courses/117/103/117103064/
4. http://www.asic-world.com/digital/tutorial.html
5. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/

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	-	1	1	-	1	1	1	1	1	-	-
2	3	2	3	2	-	1	1	-	1	1	1	1	1	-	-
3	3	2	3	2	-	1	1	-	1	1	1	1	1	-	-
4	3	2	3	2	-	1	1	-	1	1	1	1	1	-	-
5	3	2	3	3	2	1	1	-	1	1	1	1	1	-	-

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, In plant 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 **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			**CO4**
UNIT-V	**Interpersonal Communication-II**	**Periods:15**	
List of Exercises **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			**CO5**

LecturePeriods: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.

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1. Sahukar, Nimeran , Bhalla, Prem,, "The book of Etiquettes and Manners".PustakMahal Publisher, New Delhi; 1st Edition 2009.
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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=UOceysteIjo

Os/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 Methods

Theory						
Assessment	Continuous Assessment Marks (CAM)				End Semester Examination (ESE) Marks	Total Marks
	CAT 1	CAT 2	Model Exam	Attendance		
Marks	5	5	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		40
Listening (L)*	10	Listening (L)*	10	
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**

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Department	**Artificial Intelligence and Data Science**	Programme: **B.Tech.**						
Semester	**II/III**	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 Experiments:

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. 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’Reily 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.

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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

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 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/III**	Course Category: **ES**			*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 all Branches)

Prerequisite	Basic Programming Knowledge	
Course Outcomes	**On completion of the course, the students will be able to**	BT Mapping (Highest Level)
	CO1 Analyze 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: 3 0**	**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.

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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	Computer and Communication Engineering	Programme: **B.Tech.**						
Semester	**II**	Course Category: **PC**			*End Semester Exam Type: **LE**			
Course Code	U23CCP201	Periods / Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**DIGITAL ELECTRONICS LABORATORY**	**0**	**0**	**2**	**1**	**50**	**50**	**100**
Prerequisite	Nil							

Course Outcomes		On completion of the course, the students will be able to	BT Mapping (Highest Level)
	CO1	Verify Boolean laws using logic gate.	**K3**
	CO2	Design and verify various combination circuits using logic gates.	**K4**
	CO3	Design and implement combinational circuits using MSI devices.	**K4**
	CO4	Design and verify sequential circuits	**K4**
	CO5	Write VHDL code for combinational circuits.	**K4**

List of Experiments:

1. Verification of Boolean Theorems using basic gates.
2. Design and verify Half adder and Full adder using basic gates
3. Design and verify 4-bit Adder / Subtractor Circuits using IC 7483.
4. Design and test Code Converters for BCD to Gray conversion and Excess-3-code to BCD and vice versa
5. Design and test 2-bit Magnitude Comparator and 4x16 decoder using 3 to 8 decoder
6. Design and test 4 to 1 multiplexer and de-multiplexer using IC74153.
7. Design and test Shift Registers using D-flip-flops
8. Design and test magnitude comparator using IC7404, IC7408, and IC7486.
9. Design and test Asynchronous Counters using IC 7476
10. Design and verify Synchronous Counter using IC 7476
11. Design and verify Moore and Mealy Circuits
12. VHDL code for Half adder, Full adder and decoder

Lecture Periods: -	**Tutorial Periods: -**	**Practical Periods: 30**	**Total Periods: 30**

Reference Books

1. M. Morris Mano and Michael D. Ciletti, “Digital Design”, 5th Edition, Pearson, 2014.
2. Charles H.Roth. “Fundamentals of Logic Design”, 6th Edition, Thomson Learning, 2013.
3. Thomas L. Floyd, “Digital Fundamentals”, 10th Edition, Pearson Education Inc, 2011
4. S.Salivahanan and S.Arivazhagan, “Digital Electronics”, Ist Edition, Vikas Publishing House pvt Ltd, 2012.
5. Anil K.Maini, “Digital Electronics”, Wiley, 2014.
6. A.Anand Kumar, “Fundamentals of Digital Circuits”, 4th Edition, PHI Learning Private Limited, 2016.
7. Soumitra Kumar Mandal, “Digital Electronics”, McGraw Hill Education Private Limited, 2016.
8. S. Salivahanan and S. Arivazhagan, “Digital Circuits and Design.”,Vikas Publisher, 2009

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2. https://www.electronics-tutorials.ws/logic/logic_1.html
3. https://nptel.ac.in/courses/117/103/117103064/
4. http://www.asic-world.com/digital/tutorial.html
5. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/

COs/POs/PSOs Mapping

COs	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
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	**Mechanical**	Programme: **B.Tech.**						
Semester	**II/I**	Course Category : **ES**			*End Semester Exam Type: **LE**			
Course Code	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).

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

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

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 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 and Communication Engineering**	Programme: **B.Tech.**						
Semester	**II**	Course Category: **AEC**			*End Semester Exam Type:			
Course Code	**U23CCC2XX**	Periods/Week			Credit	Maximum Marks		
		L	T	P	C	CAM	ESE	TM
Course Name	**CERTIFICATION COURSE - II**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
(Common to all Branches)								

Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, E-plan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered throughCentre 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.

Evaluation Method

Assessment	**Continuous Assessment Marks (CAM)**		**Total Marks**
	Attendance	**MCQ Test**	
Marks	10	90	100

Department	**Computer and Communication Engineering**	Programme: **B.Tech.**						
Semester	**II**	Course Category: **MC**			End Semester Exam Type: -			
Course Code	**U23CCM202**	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	**-**							

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 and Shashankasana) - 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 HEIs - 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 development and 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**

Lecture Periods: -	**Tutorial Periods: -**	**Practical Periods: 30**	**Total Periods: 30**

Reference Books

1. Brar Ajmer Singh, Gill Jagtar Singh, Bains Jagdish, “Modern Textbook of Physical Education Health and Sports- I”, Kalyani Publishers , 6th 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