



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE

(An Autonomous Institution)
Puducherry – 605 107

*6th - Board of Studies Meeting
in the Department of*
Computer and Communication Engineering

for the Programme
B.Tech – Computer and Communication Engineering

Venue
Seminar Hall, Department of CCE
Sri Manakula Vinayagar Engineering College
Madagadipet, Puducherry – 605 107

Date & Time
20.07.2023 & 2.45 pm

MINUTES OF BOARD OF STUDIES

The sixth Board of Studies meeting for B.Tech. Computer and Communication Engineering was held on 20th July 2023 at 2.45 P.M in the Seminar Hall, Department of CCE, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS
1	Dr. V.Bharathi Professor and Head, Department of CCE	Chairman
2	Dr. G. Nagarajan Professor, Department of ECE Pondicherry Engineering College, Puducherry	Member
3	Dr. G. Lakshmi Sutha Professor & Head, Department of ECE, National Institute of Technology, Karaikal	Member
4	Dr. T. T. Mirnalinee, Professor, Department of Computer Science and Engineering, SSN College of Engineering, Chennai	Member
5	Porseezhian Arumugugam Senior Engineering Manager Capgemini Engineering, Bengaluru	Member

6	Dr. S. Premkumar Associate Professor/ECE Sri Manakula Vinayagar Engineering College	Member
7	Ms. V.Logisvary Assistant Professor /ECE Sri Manakula Vinayagar Engineering College	Member
8	Ms. T.Sivaranjani Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
9	Ms. M.Indhumathi Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
10	Mr. Sackthivel Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
11	Mr.M.Gopinath Assistant Professor/CCE Sri Manakula Vinayagar Engineering College	Member
12	Arokiaraj Christian St.Hubert Assistant Professor /CSE Sri Manakula Vinayagar Engineering College	Member
13	Mrs.G.Namitha Assistant Professor /English Sri Manakula Vinayagar Engineering College	Member
14	Mrs. S.Geetha Assistant Professor /physics Sri Manakula Vinayagar Engineering College	Member
15	Dr. S. Savithri Assistant Professor /Chemistry Sri Manakula Vinayagar Engineering College	Member
16	Ms. R. Revathy Assistant Professor /Mathematics Sri Manakula Vinayagar Engineering College	Member
17	Mr.V.Suresh Sr.Lead Engineer,Qualcom, Chennai	Member (Alumni)

AGENDA OF THE MEETING

Item No.	Particulars
BoS /2023 /UG/CCE 6.1	To review and confirm the minutes of fifth BoS meeting held on 10 th September 2022
BoS /2023 /UG/CCE 6.2	To discuss and Approve Regulation 2023(R-2023) for the B.Tech Programme for the students admitted from the academic year 2023-24
BoS /2023 /UG/CCE 6.3	To discuss and approve curriculum structure and credit distribution for B.Tech Computer and Communication Engineering Programme under the Regulation R-2023

BoS /2023 /UG/CCE 6.4	To discuss and approve the syllabi of Semester I and II for B.Tech Computer and Communication Engineering Programme under R-2023 regulation
BoS /2023 /UG/CCE 6.5	To apprise and approve the elective courses and certification courses opted by our students under regulation 2020.
BoS /2023 /UG/CCE 6.6	Any other items with the permission of chair

MINUTES OF THE MEETING

Dr. V.Bharathi, Chairman, BoS initiated the meeting with a warm welcome and introduced the external members, the internal and co-opted members, and thanked them for accepting the invitation to the 6th BoS meeting. The Chairman proceeded with the presentation to deliberate on the agenda items.

BoS /2023 /UG/CCE 6.1

To review and confirm the minutes of fifth BoS meeting held on 10th September 2022

The fifth BoS Meeting for B.Tech.-Computer and Communication Engineering under regulation 2020 was held on 10-09-2022 and confirmed the following points

- Discussed and Approved Syllabi of Semester VIII under Regulation 2020
- Discussed and Approved Syllabi of Semester VIII Professional Elective Courses under regulation 2020
- Apprised and Approved Open Elective and Professional Elective Courses opted in the academic year 2021-22
- Apprised and Approved Certification Courses opted by students in the academic year 2021-22

Minutes are Reviewed and Confirmed

BoS /2023 /UG/CCE 6.2

To discuss and Approve Regulation 2023 (R-2023) for the B.Tech Programme for the students admitted from the academic year 2023-24

The BoS members reviewed the following matters in the Regulation 2023 and approved without Modification

- Credit Details of the courses
- Credit distribution of various categories of courses
- Honours Degree in the same Engineering discipline
- Assessment Procedure and Awarding Marks for Theory, Practical, Theory cum Practical, Ability enhancement courses, Internship, project works and Mandatory courses

Approved and recommended to Academic Council.

BoS /2023 /UG/CCE 6.3

To discuss and approve curriculum structure and credit distribution for B.Tech Computer and Communication Engineering Programme under the Regulation R-2023

The members of the Board of Studies examined the current structure of the curriculum, including category of courses, the distribution of core, compulsory, and elective courses across the different semesters .

- After thorough discussions and deliberations, it was decided to maintain the structure and Credit Distributions as such without modification
- Board discussed about the Courses offered for Cyber Security Honours degree in B. Tech computer and Communication Engineering Programme and Suggested to provide equivalent NPTEL courses are 12 weeks courses.
- The Board discussed the compulsory and elective courses offered in the curriculum. After careful consideration, it was recommended to make the following changes
 - Suggested to change the Professional Elective Course title, “Optical Networks” to “Optical Communication Networks”
 - Suggested to change Professional Elective Course title “LTE and 5G Communication” as Recent Communication Techniques
 - Suggested to provide Open Elective Course offered by Department of Computer and Communication Engineering to other Departments is “Introduction to Communication Techniques”

Suggestions are considered and updated in the Curriculum. The details are provided in Annexure-I

Approved the Semester I-VIII curriculum, Elective courses and Honours Degree courses are recommended to Academic Council.

BoS /2023 /UG/CCE 6.4

To discuss and approve the syllabi of Semester I and II for B.Tech Computer and Communication Engineering Programme under R-2023 regulation

The Board of Studies members reviewed the Semester I and II syllabi in depth and suggested the following changes,

S.No	Regulation	Semester	Subject Name with Code	Unit	Particulars
1	R-2023	I	Universal Human Values-II	-	Suggested to include two more text books and reference website links
2	R-2023	I	Programming in C Laboratory	-	Suggested to rename the experiments

Suggestions are considered and updated in the syllabi. The details are provided in Annexure-II

Semester I and II syllabi are approved and recommended to Academic council

Department of Computer and Communication Engineering – Sixth BoS Meeting

BoS /2023 /UG/CCE 6.5

To apprise and approve the elective courses and certification courses opted by our students under regulation 2020.

BoS chairman presented the following Professional Elective, open Elective courses, skill Development Courses and certification courses are opted by the students in the academic year 2022-23

Professional Elective	Soft Computing(Sem VI) Computer Vision(Sem V)
Open Elective	Platform Technologies(Sem VI) Product Design and Development (Sem V)
Certification Course	Azure Devops(Sem VI) Cyber Security(Sem V)
Skill Development Courses	Presentation using ICT Skills(Sem V) Career Development Course-I(Sem V) NPTEL(Sem VI) Technical Seminar(Sem VI)

Appreciated for the methodology adopted for selecting Professional Elective, Open Elective and Certification courses

BoS /2023 /UG/CCE 6.6

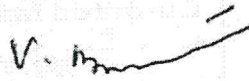
Any other suggestions for improvement

The Board Chairman Briefed about the following Department activities carried out in the academic year 2022-23,


- Guest Lectures organized
- Seminar and Workshop conducted
- Students' online certification course completion
- Students Achievements
- NSS activities
- Industrial Visits arranged
- Idea Lab training to the students
- Faculty Training Details

Appreciated for the activities carried in the Department

The Board of Studies resolved to approve the above suggestions for B.Tech. Computer and Communication Engineering brought forward by the Chairman incorporating the above changes. The meeting was concluded at 4:30 PM with a vote of thanks by **Dr. V. Bharathi**, Head of Department, Computer and Communication Engineering.



Dr. V. Bharathi
Chairman
Professor and Head
Department of CCE, SMVEC



Dr. G. Nagarajan
Professor, Department of ECE
Pondicherry Engineering College, Puducherry



Dr. G. Lakshmi Sutha
Professor & Head, Department of ECE,
National Institute of Technology, Karaikal



Dr. T. T. Mirnalinee,
Professor, Department of Computer Science
and Engineering,
SSN College of Engineering, Chennai



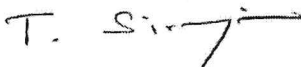
Porseezhian Arumugugam
Senior Engineering Manager
Caggemini Engineering, Bengaluru



Dr. S. Premkumar
Associate Professor/ECE



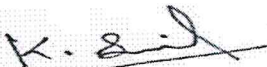
Ms. V. Logisvary
Assistant Professor /ECE



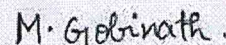
Ms. T. Sivaranjani
Assistant Professor/CCE



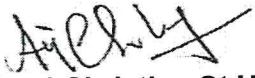
Ms. M. Indhumathi
Assistant Professor/CCE




Mr. K. Sackthivel
Assistant Professor/CCE





Mr. M. Gopinath
Assistant Professor/CCE

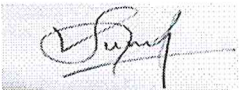

Arokiaraj Christian St. Hubert
Assistant Professor /CSE


Mrs. G. Namitha
Assistant Professor /English


Mrs. S. Geetha
Assistant Professor /physics


Dr. S. Savithri
Assistant Professor /Chemistry


Ms. R. Revathy
Assistant Professor /Chemistry


Mr. V. Suresh
Sr. Lead Engineer, Qualcomm, Chennai

Annexure-I

Curriculum of B.Tech Computer and Communication Engineering Under Regulation 2023

2.A.12.10



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 the transformation of lives to serve the society

Mission

M1 - Quality Education

To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2 -Research and Innovation

To foster value based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3 - Employability and Entrepreneurship

To inculcate the employability and entrepreneurial skills through value and skill based training

M4:- Ethical values

To instill deep sense of human values by blending societal righteousness with academic professionalism for 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 and systems in the key domains of Computer and Communication Engineering
PEO3: Research and Development	To get exposed to collaborative work that can be implemented for society's well-being through advanced research 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, mobile communication and computing
PSO 2- Network Design and Security	Design and Interpret computer networks, Internet of Things with efficient data analytics and security.
PSO 3- Algorithmic Thinking and Programming Skill	Develop efficient algorithms to solve real time problems through 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

B.Tech. Computer and Communication Engineering

2. A. 12. 19

V. M. S.

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 ^s	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

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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	U23CCCX12	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

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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

V. M. S.

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 Equity	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 – 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.

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Annexure-II
Semester I and II Syllabi

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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, 9 th 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, 9 th Edition, 2023									
2. Dr. A. Singaravelu, "Engineering Mathematics – I", Meenakshi publications, Tamil Nadu, 2019.									
3. Erwin Kreyszig, "Advanced Engineering Mathematics ", Wiley, 10 th Edition, 2019.									
4. B.V.Ramana, " Higher Engineering Mathematics", Tata McGraw – Hill, New Delhi, 6 th Edition, 2018.									
5. C W. Evans, "Engineering Mathematics", A Programmed Approach, 3 rd Edition, 2019.									
Web References									
1. http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra-slides-systems-of-equation-handout.pdf									
2. http://www.math.cum.edu/~wn0g/2ch6a.pdf									
3. https://nptel.ac.in/courses/122/104/122104017/									
4. https://nptel.ac.in/courses/111/106/111106051/									
5. https://nptel.ac.in/courses/111/108/111108081/									

* TE – Theory Exam, LE – Lab Exam

W. M. S.

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

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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, 8 th Edition, 2019.									
2. YashvantKanetkar, "Let us C", BPB Publications, 16 th Edition, 2017									
3. Herbert Schildt, "C: The Complete Reference", McGraw Hill, 4 th 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, 2 nd Edition, 2012.									
4. P.Visu, R.Srinivasan and S.Koteeswaran, "Fundamentals of Computing and Programming", Sri Krishna Publications, 4 th Edition, 2012.									
5. Pradip Dev, Manas Ghoush, "Programming in C", Oxford University Press, 2 nd 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

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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

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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 RECURSIVE ALGORITHMS						Periods: 9			
Key word Searching – Text Line Adjustment – Linear Pattern Search – Sub Linear Pattern Search. Recursion: Towers of Hanoi – Sample Generation – Combination Generation – Permutation Generation – Pseudocode and Flow Chart.										CO5
Lecture Periods: 45			Tutorial Periods: -			Practical Periods: -			Total Periods: 45	
Text Books										
1. David Riley and Kenny Hunt, "Computational Thinking for Modern Problem Solver", Chapman & Hall/CRC 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; 2 nd Edition, 2017.										
3. V Anton Spraul, "Think Like a Programmer: An Introduction to Creative Problem Solving", Cengage Learning EMEA, 2012.										
4. Sham Tickoo "A Problem-solving Approach", Delmar/Cengage Learning, 2009.										
5. Harold Abelson & Gerald Jay Sussman, "Structure and Interpretation of Computer Programs", McGraw-Hill Book Company, 1997.										
Web References										
1. https://www.edx.org/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										

V. M. S.

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

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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 operation of semiconductor diode and its applications.						K2	
	CO5	Explain the characteristics and operation of BJT and FET.						K2	
	CO6	Relate and Explain Different Communication Systems.						K2	
SECTION A - ELECTRICAL ENGINEERING									
UNIT-I	DC CIRCUITS					Periods: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:-		Total Periods:60			
Text Books									
1. R.K. Rajput, "Basic Electrical and Electronics Engineering", University Science Press, 2 nd Edition, 2012									
2. R. Saravanakumar V. Jegathesan, K. Vinoth Kumar, "Basic Electrical and Electronics Engineering", Wiley, 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.

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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						BT Mapping (Highest Level)	
Course Outcomes	The course will enable the student to							
	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=8ovkLRYXlJE>

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

N. M...

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									CO4	
Listening: Self Introduction videos										
Speaking: Self-Introduction, Extempore, and Role Play										
Reading: Non-Technical Comprehension Passage										
Writing: Common Errors in Writing										
UNIT-V	Interpersonal Communication-I						Periods:15			
List of Exercises									CO5	
Listening: Speech Sounds, Interview Videos										
Speaking: Debate, Structured Group Discussion, and Conversation										
Reading: Commonly Confused Words										
Writing: Transcription										
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

N. Anand

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			
<ol style="list-style-type: none"> Create a C program to find the Area of the triangle. 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. Write a C program to check whether a given character is vowel or not using Switch – Case statement. Print the numbers from 1 to 10 along with their squares using C program. Demonstrate do-While loop in C to find the sum of 'n' numbers. Find the factorial of a given number using Functions in C. Check whether a given string is palindrome or not? Check whether a value is prime or not? Develop a C program to swap two numbers using call by value and call by reference. Construct a C program to find the smallest and largest element in an array. Implement matrix multiplication using C program. Create a C program to perform various string handling functions like strlen, strcpy, strcat, strcmp. Develop a C program to remove all characters in a string except alphabets. Create a C program to find the sum of an integer array using pointers. Find the Maximum element in an integer array using pointers. Construct a C program to display Employee details using Structures Display the contents of a file on the monitor screen. Create a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands. Write a C program to create two files with a set of values. Merge the two file contents to form a single file Create a C program to pass the parameter using command line arguments. 										
Lecture Periods:			Tutorial Periods:			Practical Periods: 30		Total Periods: 30		
Reference Books										
<ol style="list-style-type: none"> Zed A Shaw, "Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C)", Addison Wesley, 2016. Anita Goel and Ajay Mittal, "Computer Fundamentals and programming in C", Pearson Education, First edition, 2011. Maureen Sprankle, Jim Hubbard, "Problem Solving and Programming Concepts," Pearson, 9th Edition, 2011. Yashwanth Kanethkar, "Let us C", BPB Publications, 13th Edition, 2008. B.W.Kernighan and D.M. Ritchie, "The C Programming Language", Pearson Education, 2nd Edition, 2006. 										
Web References										
<ol style="list-style-type: none"> https://alison.com/course/introduction-to-c-programming https://www.geeksforgeeks.org/c-programming-language/ http://cad-lab.github.io/cadlab_data/files/1993_prog_in_c.pdf https://www.tenouk.com/clabworksheet/clabworksheet.html 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

V. M...

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
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
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Reference Books

1. T.Jeyapooan 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 Compan 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.

V. Anand

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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

V. M...

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									
<ol style="list-style-type: none"> 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. Drawing a Title Block with necessary text and projection symbol. Drawing 2D sketch by applying modify tools like fillet, mirror, array, etc., Drawing front view and top view of simple solids like prism, pyramid, cylinder, cone, etc., and Dimensioning. Drawing front view, top view and side view of objects from the given pictorial views (eg. Simple stool, V-block, Mixie Base). Drawing a plan of residential building (Two bed rooms, kitchen, hall, etc.) Drawing sectional views of prism, pyramid, cylinder, cone, etc, Drawing lateral surface development of prism, pyramid, cylinder, cone, etc, Drawing isometric projection of simple objects. Creating 3D model of simple object and obtaining 2D multi-view drawings. Note: Plotting of drawings must be made for each exercise and attached to the records written by Students. 									
Lecture Periods: -			Tutorial Periods: -			Practical Periods: 30		Total Periods: 30	
Reference Books									
<ol style="list-style-type: none"> James D. Bethune, Engineering Graphics with AutoCAD A Spectrum book 1st Edition, Macromedia Press, Pearson, 2020. NS Parthasarathy and Vela Murali, Engineering Drawing, Oxford university press, 2015. M.B Shah, Engineering Graphics, ITL Education Solutions Limited, Pearson Education Publication, 2011. Bhatt N.D and Panchal V.M, Engineering Drawing: Plane and Solid Geometry, Charotar Publishing House, 2017. Jeyapoovan T, Engineering Drawing and Graphics Using AutoCAD, Vikas Publishing House Pvt Ltd., 7th Edition, New Delhi, 2016. C M Agrawal, Basant Agrawal, Engineering Graphics, McGraw Hill, 2012. Dhananjay A. Jolhe, Engineering Drawing: With An Introduction To CAD McGraw Hill, 2016. James Leach, AutoCAD 2017 Instructor, SDC Publications, 2016. 									
Web References									
<ol style="list-style-type: none"> http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/egraphics_lab/labs/index.php http://www.nptelvideos.in/2012/12/computer-aided-design.html https://mech.iitm.ac.in/meiitm/course/cad-in-manufacturing/ https://autocadtutorials.com https://dwgmodels.com 									

* TE – Theory Exam, LE – Lab Exam

V. Murali

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

V. Anand

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		
Course Name	CERTIFICATION COURSE- I	L	T	P	C	CAM	ESE	TM
		-	-	-	-	-	-	-
(Common to all Branches)								
<p>Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.</p> <p>Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.</p>								

Evaluation Method

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

V. M...

Department	Mathematics		Programme : B.Tech.						
Semester	II		Course Category : BS		*End Semester Exam Type: TE				
Course Code	U23MATC02		Periods/Week		Credit	Maximum Marks			
Course Name	ENGINEERING MATHEMATICS – II		L	T	P	C	CAM	ESE	TM
	(Common to ALL Branches Except CSBS,FT)		3	1	-	4	25	75	100
Prerequisite	Basic Mathematics								
Course Outcomes	On completion of the course, the students will be able to								
	CO1	Convert a periodic function into series form.							BT Mapping (Highest Level) 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, 18 th Edition, 2022.									
5. B.V. Ramana, "Higher Engineering Mathematics", Tata McGraw Hill, New Delhi 2017.									
Web References									

Reference Books

1. A Foundation Course in Human Values and Professional Ethics, R.R Gaur, R. Asthana, G.P. Bagaria, 2nd 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. $\frac{\partial}{\partial x} \left(\frac{\partial y}{\partial t} + \frac{\partial y}{\partial x} \right) - \frac{\partial^2 y}{\partial x^2} = 0$, $\frac{\partial y}{\partial x} = 0$, $\frac{\partial y}{\partial t} = 0$, $\frac{\partial^2 y}{\partial x^2} = 0$: $\frac{\partial y}{\partial x} = 0$
 $\frac{\partial y}{\partial x} = 0$, $\frac{\partial y}{\partial t} = 0$, $\frac{\partial^2 y}{\partial x^2} = 0$, 2002.
10. $\frac{\partial}{\partial x} \left(\frac{\partial y}{\partial t} + \frac{\partial y}{\partial x} \right) - \frac{\partial^2 y}{\partial x^2} = 0$, $\frac{\partial y}{\partial x} = 0$, $\frac{\partial y}{\partial t} = 0$, $\frac{\partial^2 y}{\partial x^2} = 0$.
11. $\frac{\partial}{\partial x} \left(\frac{\partial y}{\partial t} + \frac{\partial y}{\partial x} \right) - \frac{\partial^2 y}{\partial x^2} = 0$, $\frac{\partial y}{\partial x} = 0$, $\frac{\partial y}{\partial t} = 0$, $\frac{\partial^2 y}{\partial x^2} = 0$.

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>

V. *mmmm*

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 12 th standard or equivalent / Chemistry of 12 th 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	

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

V. M...

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. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", PHI, Third Edition, 2010.									
3. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, "Data Structures and Algorithms", 4 th Edition, 2009.									
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.									
Web References									

Text Books

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

Reference Books

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

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1. https://www.sciencedaily.com/terms/materials_science.htm.
2. https://www.acs.org/content/acs/en/careers/college-to-career/chemistry-careers/materials_science.html.
3. <https://study.com/academy/lesson/semiconductors-superconductors-definition-properties.html>
4. <https://mechanicalc.com/reference/engineering-materials>
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*		
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’Reilly 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”, 2 nd Edition, John Wiley& Sons, 2019.									
2. Jesus Rogel-Salazar, “Data Science and Analytics with Python”, CRC Press Taylor and Francis Group, 2017.									
3. Brian Draper, “Python Programming A Complete Guide for Beginners to Master and Become an Expert in Python Programming Language”, CreateSpace Independent Publishing Platform, 2016.									
4. Mark Lutz, Laura Lewin, Frank Willison, “Programming Python”, O’Reilly Media, 3 rd Edition, 2006.									
5. Gowrishankar S, Veena A, “Introduction to Python Programming”, CRC Press, 2018..									
Web References									
1. https://nptel.ac.in/courses/106/106/106106212/									
2. https://www.geeksforgeeks.org/data-analysis-visualization-python/									
3. https://www.coursera.org/learn/python-data-analysis									
4. https://www.python.org/									

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

V. M. S.

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									
Reference Books .									
1. S.Salivahanan and S.Arivazhagan, "Digital Electronics", 1st 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.									

Web References

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

V. Munnis

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								CO4	
Listening: Letter writing tips									
Speaking: Just a Minute, Impromptu Speech, Contemporary Issues									
Reading: Variety of examples for Modes of Writing									
Writing: Different types of letters									
UNIT-V	Interpersonal Communication-II				Periods:15				
List of Exercises								CO5	
Listening: Videos on different types of Etiquettes									
Speaking: Team Presentation, Negotiation Skills									
Reading: Phrases and Clauses									
Writing: Free writing on any given topic, Paraphrasing Practice									
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.									
Reference Books									
1. Sahukar, Nimeran , Bhalla, Prem,, "The book of Etiquettes and Manners".PustakMahal Publisher, New Delhi; 1st Edition 2009.									
2. Gerson Sharon J, Steven M. Gerson, "Technical Writing Process and Product", Pearson Education Pvt. Ltd. 3 rd Edition, 2009.									
3. Grussendorf, Marion, "English for Presentations". Oxford University Press, Oxford, 2007.									
4. Seely John, "The Oxford Guide to Writing and Speaking", Oxford University Press, 2006.									
5. R.C. Sharma, Krishna Mohan, "Business Correspondence and Report Writing", Tata McGraw Hill &Co.Ltd., New Delhi,									

2001.

Web References

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

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		
Listening (L)*	10		Listening (L)*	10	40
Speaking(S)	5		Speaking(S)	5	
Reading(R)*	10		Reading(R)*	10	
Writing(W)*	5		Writing(W)*	5	

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

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V. Srinivas

2.A.12.62

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		BT Mapping (Highest Level)
Course Outcomes	On completion of the course, the students will be able to		
	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
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Reference Books

1. Chirag Shah, "A Hands-On Introduction to Data Science", Cambridge University Press, 2020.
2. Siddhartha Chatterjee, Michal Krystianczuk, "Python Social Media Analytics", Packt Publishing, 2017.
3. Jake VanderPlas, "Python Data Science Handbook - Essential Tools for Working with Data", O'Reilly Media Inc, 2016.
4. Zhang.Y, "An Introduction to Python and Computer Programming", Springer Publications, 2016.
5. Wesley J Chun, "Core Python Programming", Pearson Education, 2nd Edition, 2006.

Web References

1. <https://nptel.ac.in/courses/106/106/106106212/>
2. <https://www.geeksforgeeks.org/data-analysis-visualization-python/>
3. <https://www.coursera.org/learn/python-data-analysis>
4. <https://www.python.org/>
5. <https://www.programiz.com/python-programming>

V. S. S.

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

V. Anand

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: 30		Total Periods: 30		
Reference Books										
1. Yashavant Kanetkar, "Data Structures through C", BPB Publications, 3rd Edition, 2019. 2. Tenebaum Aaron M, "Data Structures using C", Pearson Publisher, 1st Edition, 2019. 3. Manjunath Aradhya M and Srinivas Subramiam, "C Programming and Data Structures", Cengage India 1st Edition, 2017. 4. Reema Thareja, "Data structures using C", Oxford University, 2nd Edition, 2014. 5. Gav.pai, "Data Structures and Algorithms", McGraw-Hill India, 1st Edition, 2013.										
Web References										
1. https://www.tutorialspoint.com/data_structures_algorithms/ 2. https://www.w3schools.in/data-structures-tutorial/intro/ 3. https://nptel.ac.in/courses/106103069/ 4. https://swayam.gov.in/nd1_noc20_cs70/preview 5. https://nptel.ac.in/courses/106103069/										

* TE – Theory Exam, LE – Lab Exam

V. Anand

2.A.12.65

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

V. Anand

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:									
<ol style="list-style-type: none"> 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									
<ol style="list-style-type: none"> 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", 1st 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 									
Web References									
<ol style="list-style-type: none"> 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/ 									

V. Anand

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		
	Conducti on of practical	Record work	viva				
Marks	15	5	5	15	10	50	100

V. M...

Department	Mechanical	Programme: B.Tech.						
Semester	III	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-learning 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

2. A. 12. 69

V. m...

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.

Web References

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

V. M. S.

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	
Course Name	Sports Yoga and NSS		L	T	P	C	CAM	ESE	TM
Prerequisite	-		0	0	2	Non-Credit	100	-	100
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 , 6 th Edition, 2014									
2. B.K.S. Iyengar, "Light on Yoga: The Definitive Guide to Yoga Practice", Thorsons Publishers, Thorsons Classics edition, 2015									
3. Joseph, Siby K, Mahodaya, "Bharat Essays on Conflict Resolution", Institute of Gandhian Studies Publishers, 2007									
4. Barman Prateeti , Goswami, "Document on Peace Education" Triveni Akash Publishers, 2007									

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)								
<p>Students shall choose an International certification course offered by the reputed organizations like Google, Microsoft, IBM, Texas Instruments, Bentley, Autodesk, Eplan and CISCO, etc. The duration of the course is 40-50 hours specified in the curriculum, which will be offered through Centre of Excellence.</p> <p>Pass /Fail will be determined on the basis of participation, attendance, performance and completion of the course. If a candidate Fails, he/she has to repeat the course in the subsequent years. Pass in this course is mandatory for the award of degree.</p>								

Evaluation Method

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

V. Muni

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

V. Verma

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