SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

CURRICULUM & SYLLABI
B.Tech. INFORMATION TECHNOLOGY

(CHOICE BASED CREDIT SYSTEM)

REGULATIONS – 2023

(For the students admitted in the academic year 2023 – 2024 onwards)

Note: The regulations hereunder are subject to amendments as may be decided by the Academic Council of the Sengunthar Engineering College from time to time. Any or all such amendments will be effective from such date and to such batches of candidates including those already undergoing the programme under the same Regulation as may be decided by the Academic Council.

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DEPARTMENT

OF

INFORMATION TECHNOLOGY

REGULATION 2023

CURRICULUM AND SYLLABI

FOR B. Tech. INFORMATION TECHNOLOGY

(For the students admitted in the academic year 2023 – 2024 onwards)

FIRST SEMESTER

TO

EIGHTH SEMESTER

INDEX

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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001
ISO 9001 REGISTERED

SCHEME FOR CURRICULUM

B.Tech.-INFORMATION TECHNOLOGY

REGULATIONS 2023

CHOICE BASED CREDIT SYSTEM

B. Tech. INFORMATION TECHNOLOGY

VISION

- To achieve global standards in quality of Education, Research and skills in the field of Information Technology with moral and ethical values to achieve excellence in academic, Industry and research by adapting to the rapid technological advancement..

MISSION

- To empower individuals through transformative IT education and skills development.
- To Foster a culture of innovation, creativity, and research in the field of IT.
- To produce technologically competent and ethically responsible graduates through balanced and dynamic curriculum.
- To produce successful graduates with personal and professional responsibilities and commitment of lifelong learning..

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates can

- ✓ Possess a strong foundation in the core principles of Information Technology, enabling them to pursue further studies or embark on careers in the field.
- ✓ Demonstrate comprehensive knowledge and skills in diverse areas of Information Technology, including software development, network administration, data analytics, and cybersecurity, allowing them to excel as professionals in these domains.
- ✓ Exhibit advanced critical thinking and problem-solving abilities, empowering them to analyse complex IT challenges and apply innovative solutions effectively.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design / development of solutions**	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4	**Conduct investigations of complex problems**	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	**The engineer and society**	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1	Acquire strong foundational knowledge and understanding of core concepts in information technology, including programming, data structures, algorithms, networking, databases, and software engineering principles.
PSO2	Develop analytical and problem-solving skills to analyze complex IT problems, design innovative solutions, and implement them using appropriate technologies and tools.
PSO3	Cultivate effective communication and teamwork skills to collaborate with multidisciplinary teams, understand client requirements, and deliver IT solutions that meet business and societal needs.

MAPPING OF COURSE OUTCOME AND PROGRAM OUTCOME

Year	Sem	Course Name	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
I	I	23HST101 - Professional English - I	-	-	-	-	-	1.4	2.2	1.25	1.8	3	-	3	-	-	-
		23MAT101 - Matrices and calculus	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
		23HST102 - தமிழர்மரபு/Heritage of Tamils	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		23PHE102 – Applied Physics for computer Engineering	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
		23CYE101 - Engineering Chemistry	1.6	1.6	2.4	1.25	1.8	1	2	-	-	-	-	1.5	-	-	-
		23GEE101 - Programming in C	2	2.3	2.3	1.2	2	1.7	1	0.8	2	0.2	2.8	2.3	1.8	2.2	-
		23EEC101 - Soft Skills	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		23MDC101 - Induction Program (2 Weeks)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	II	23HST201 - Professional English - II	-	-	-	-	2	1.2	1.2	1	2	3	-	3	-	-	-
		23MAT201 - Statistics and Numerical Methods with MATLAB	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
		23PHT202-Advanced Physics for computer Engineering	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
		23CYT201 - Environmental Science and Sustainability	1.5	1.8	2.2	1.8	1.5	1.4	2.2	2	1	2	-	1	-	-	-
		23HST202 - தமிழரும்தொழில்நுட்பமும் / Tamils and Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		23GEE201 - Engineering Graphics	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
		23EEE202 – Basic Electrical and Electronics Engineering	3	3	3	2	3	-	-	-	3	2	-	3	3	1	2
		23GEL201 - Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
		23EEC201 - Communication Skills/Foreign Language	-	-	-	-	-	1.2	1.5	1.5	1.8	3	-	3	-	-	-

		23MDC201 - Life skills & Leadership Enhancement Programme	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MAPPING OF COURSE OUTCOME AND PROGRAM OUTCOME

Year	Sem	Course Name	PO												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
II	III	23MAT303 – Discrete Mathematics	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
		23CST301 – Data Structures and Algorithms	2	2	1	2	2	1	1	0	1	2	1	2	2	1	2
		23ECT302 –Analog and Digital Communication	2	2	2	1	-	-	-	-	-	2	2	2	2	1	2
		23CSE301 – Object Oriented Programming	2	1	2	2	2	-	-	-	2	2	1	2	3	2	2
		23GEE301 – Problem Solving and Python	2.33	2.5	1.5	1.83	1.83	-	-	-	-	-	1.5	0.66	2.66	0.5	-
		23ECE303 - Digital Principles and Computer architecture	3	2	2	3	2	2	-	-	-	-	2	2	3	3	2
		23EEC301- Professional Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	IV	23ITT401-Object Oriented Software Design	2.5	1.6	1.8	2	1	-	-	-	2	1.5	1.8	2.6	1.6	1.6	1.8
		23CST403- Foundations of Data Science	2	2	1	2	2	1	1	-	1	1	1	2	2	2	2
		23CST302- Operating Systems	2	2	2	1	-	-	-	-	-	2	2	2	2	1	2
		23CAE401-Artificial Intelligence and Machine Learning	2	1	2	2	1	-	-	-	2	2	2	3	2	2	2
		23CSE402- Database Management Systems	2	2	3	2	1	-	-	-	2	2	2	2	2	2	3
		23ECE404- Embedded Systems and IoT	3	3	3	2	2	2	-	-	-	-	2	2	3	3	2
		23EEC401 - Value Added Course - I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(For the Students Admitted in the Academic Year 2023-2024 onwards)

B.Tech. – INFORMATION TECHNOLOGY - FIRST SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23HST101	Professional English - I	HS	3	0	0	3	40	60	100
23MAT101	Matrices and calculus	BS	3	1	0	4	40	60	100
23HST102	தமிழர்மரபு / Heritage of Tamils	HS	1	0	0	1	40	60	100
EMBEDDED COURSE									
23PHE102	Applied Physics for Computer Engineering	BS	3	0	2	4	50	50	100
23CYE101	Engineering Chemistry	BS	3	0	2	4	50	50	100
23GEE101	Programming in C	ES	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC101	Soft Skills	EEC	1	0	0	1	100	-	100
MANDATORY COURSE									
23MDC101	Induction Program (2 Weeks)	MC	-	-	-	-	-	-	-
TOTAL CREDITS IN SEMESTER - I			21						

HS : Humanities and Social Sciences
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GE : General Elective
OE : Open Elective
EEC : Employability Enhancement Courses
MC : Mandatory Courses
L : Lecture
T : Tutorial
P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination
TOT : Total

B. Tech. - INFORMATION TECHNOLOGY –SECOND SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23HST201	Professional English II	HS	3	0	0	3	40	60	100
23MAT201	Statistics and Numerical Methods With MAT LAB	BS	3	1	0	4	40	60	100
23PHT202	Advanced Physics for Computer Engineering	BS	3	0	0	3	40	60	100
23CYT201	Environmental Science and Sustainability	HS	3	0	0	3	40	60	100
23HST202	தமிழரும்தொழில்நுட்பமும் / Tamils and Technology	HS	1	0	0	1	40	60	100
EMBEDDED COURSE									
23GEE201	Engineering Graphics	ES	3	0	2	4	50	50	100
23EEE202	Basic Electrical And Electronics Engineering	ES	3	0	2	4	50	50	100
PRACTICALS									
23GEL201	Engineering Practices Laboratory	ES	0	0	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC201	Communication Skills/Foreign Language	EEC	0	0	4	2	100	-	100
MANDATORY COURSE									
23MDC201	Life skills & Leadership Enhancement Programme	MC	3	0	0	0	-	-	-
	TOTAL CREDITS IN SEMESTER - II					26			

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TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - THIRD SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23MAT303	Discrete Mathematics	BS	3	1	0	4	40	60	100
23CST301	Data Structures and Algorithms	PC	3	0	0	3	40	60	100
23ECT302	Analog and Digital Communication	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23CSE301	Object Oriented Programming	PC	3	0	2	4	50	50	100
23GEE301	Problem Solving and Python Programming	PC	3	0	2	4	50	50	100
23ECE303	Digital Principles and Computer Architecture	ES	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC301	Professional Development	EEC	0	0	2	1	100	-	100
TOTAL CREDITS IN SEMESTER - III			23						

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MC : Mandatory Courses
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ESE : End Semester Examination

TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - FOURTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23ITT401	Object Oriented Software Design	PC	3	0	0	3	40	60	100
23CST403	Foundations of Data Science	PC	3	0	0	3	40	60	100
23CST302	Operating Systems	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23CSE401	Artificial Intelligence and Machine Learning	PC	3	0	2	4	50	50	100
23CSE402	Database Management Systems	PC	3	0	2	4	50	50	100
23ECE404	Embedded Systems and IoT	PC	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC401	Value Added Course-I	EEC	0	0	4	2	100	-	100
TOTAL CREDITS IN SEMESTER - IV			23						

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EEC : Employability Enhancement Courses
MC : Mandatory Courses
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CIA : Continuous Internal Assessment
ESE : End Semester Examination

TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - FIFTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23CST402	Automata Theory	PC	3	1	0	4	40	60	100
	Professional Elective I	PE	3	0	0	3	40	60	100
	Professional Elective II	PE	3	0	0	3	40	60	100
	Professional Elective III	PE	3	0	0	3	40	60	100
EMBEDDED COURSE									
23ITE501	Full Stack web Development	PC	3	0	2	4	50	50	100
23CSE501	Computer Networks	PC	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC501	Value Added Course-II	EEC	0	0	4	2	100	-	100
MANDATORY COURSE									
23MDC501	Mandatory Course I	MC	3	0	0	0	-	-	-
TOTAL CREDITS IN SEMESTER - V			23						

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EEC : Employability Enhancement Courses
MC : Mandatory Courses
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P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination

TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - SIXTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
	Professional Elective IV	PE	3	0	0	3	40	60	100
	Professional Elective V	PE	3	0	0	3	40	60	100
	Professional Elective VI	PE	3	0	0	3	40	60	100
	Open Elective-I/NCC L1/ L3	OE	3	0	0	3	40	60	100
EMBEDDED COURSE									
23ITE601	Mobile Computing	PC	3	0	2	4	50	50	100
23CSE601	Cloud Computing	PC	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23ITJ601	Project Work	EEC	0	0	10	5	40	60	100
MANDATORY COURSE									
23MDC601	Mandatory Course II	MC	3	0	0	0	-	-	-
TOTAL CREDITS IN SEMESTER - VI			25						

HS : Humanities and Social Sciences
BS : Basic Sciences
ES : Engineering Sciences
PC : Professional Core
PE : Professional Elective
OE : Open Elective
GE : General Elective
EEC : Employability Enhancement Courses
MC : Mandatory Courses
L : Lecture
T : Tutorial
P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination

TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - SEVENTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23HST701	Human Values and Ethics	HS	3	0	0	3	40	60	100
	Elective-Management	GE	3	0	0	3	40	60	100
	Open Elective-II/NCC-II L2/ L4	OE	3	0	0	3	40	60	100
	Open Elective-III	OE	3	0	0	3	40	60	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC701	Research Paper Writing and Publication	EEC	0	0	4	2	100	-	100
TOTAL CREDITS IN SEMESTER - VII			14						

HS : Humanities and Social Sciences
BS : Basic Sciences
ES : Engineering Sciences
PC : Professional Core
PE : Professional Elective
OE : Open Elective
GE : General Elective
EEC : Employability Enhancement Courses
MC : Mandatory Courses
L : Lecture
T : Tutorial
P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination
TOT : Total

B. Tech. - INFORMATION TECHNOLOGY - EIGHTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
EMPLOYABILITY ENHANCEMENT COURSE									
23ITJ801	Innovative Product Development	EEC	0	0	14	7	40	60	100
23EEC801	Internship	EEC	0	0	4	2	100	-	100
TOTAL CREDITS IN SEMESTER - VIII			9						

HS : Humanities and Social Sciences
BS : Basic Sciences
ES : Engineering Sciences
PC : Professional Core
PE : Professional Elective
OE : Open Elective
GE : General Elective
EEC : Employability Enhancement Courses
MC : Mandatory Courses
L : Lecture
T : Tutorial
P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination
TOT : Total

LIST OF HUMANITIES AND SOCIAL SCIENCES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23HST101	Professional English - I	HS	3	0	0	3	40	60	100
23HST102	தமிழர்மரபு / Heritage of Tamils	HS	1	0	0	1	40	60	100
23HST201	Professional English - II	HS	3	0	0	3	40	60	100
23CYT201	Environmental Sciences and Sustainability	HS	3	0	0	3	40	60	100
23HST202	தமிழரும்தொழில்நுட்பமும் / Tamil and Technology	HS	1	0	0	1	40	60	100
23HST701	Human Values and Ethics	HS	3	0	0	3	40	60	100

LIST OF BASIC SCIENCES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23MAT101	Matrices and Calculus	BS	3	1	0	4	40	60	100
23PHE102	Applied Physics for Computer Engineering	BS	3	0	2	4	40	60	100
23CYE101	Engineering Chemistry	BS	3	0	2	4	40	60	100
23MAT201	Statistics and Numerical Methods with MATLAB	BS	3	0	0	3	40	60	100
23PHT202	Advanced Physics for Computer Engineering	BS	3	1	0	4	40	60	100
23MAT303	Discrete Mathematics	BS	3	1	0	4	40	60	100

LIST OF ENGINEERING SCIENCES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT

23GEE101	Programming in C	ES	3	0	2	4	50	50	100
23GEE201	Engineering Graphics	ES	3	0	2	4	50	50	100
23EEE202	Basic Electrical And Electronics Engineering	ES	3	0	2	4	50	50	100
23GEL201	Engineering Practices Laboratory	ES	0	0	4	2	60	40	100
23GEE301	Problem Solving and Python Programming	ES	3	0	2	4	50	50	100
23ECE303	Digital Principles and Computer Architecture	ES	3	0	2	4	50	50	100

LIST OF PROFESSIONAL CORE

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23CST301	Data Structures and Algorithms	PC	3	0	0	3	40	60	100
23ECT302	Analog and Digital Communication	PC	3	0	0	3	40	60	100
23ECE303	Digital Principles and Computer Organization	PC	3	0	2	4	50	50	100
23CSE301	Object Oriented Programming	PC	3	0	2	4	50	50	100
23CST403	Foundations of Data Science	PC	3	0	0	3	40	60	100
23CST302	Operating Systems	PC	3	0	0	3	40	60	100
23ITT401	Object Oriented Software Design	PC	3	0	0	3	40	60	100
23CSE401	Artificial Intelligence and Machine Learning	PC	3	0	2	4	50	50	100
23CSE402	Database Management Systems	PC	3	0	2	4	50	50	100
23ECE404	Embedded Systems and IoT	PC	3	0	2	4	50	50	100
23CST402	Automata Theory	PC	3	1	0	4	40	60	100
23ITE501	Full Stack web Development	PC	3	0	2	4	50	50	100
23CSE501	Computer Networks	PC	3	0	2	4	50	50	100
23ITE601	Mobile Computing	PC	3	0	2	4	50	50	100
23CSE601	Cloud Computing	PC	3	0	2	4	50	50	100

LIST OF PROFESSIONAL ELECTIVE COURSES

PROFESSIONAL ELECTIVE - I

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23CSP501	Data Warehousing and Mining	PE	3	0	0	3	40	60	100
23CSP502	Exploratory Data Analysis	PE	3	0	0	3	40	60	100
23CSP503	Recommender Systems	PE	3	0	0	3	40	60	100
23CSP504	Text and Speech Analysis	PE	3	0	0	3	40	60	100
23ITP501	Image and Video Analytics	PE	3	0	0	3	40	60	100
23ITP502	Computer Vision	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE - II

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23ITP503	TCP/IP Design and Implementation	PE	3	0	0	3	40	60	100
23CSP508	Cloud Services Management	PE	3	0	0	3	40	60	100
23CSP509	UI and UX Design	PE	3	0	0	3	40	60	100
23CSP510	Software Testing and Automation	PE	3	0	0	3	40	60	100
23CSP511	Web Application Security	PE	3	0	0	3	40	60	100
23CSP512	DevOps	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE - III

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23ITP504	Internet of Things	PE	3	0	0	3	40	60	100
23CSP513	Virtualization	PE	3	0	0	3	40	60	100

23ITP505	Storage Technologies	PE	3	0	0	3	40	60	100
23CSP514	Software Defined Networks	PE	3	0	0	3	40	60	100
23CSP515	Stream Processing	PE	3	0	0	3	40	60	100
23CSP516	Security and Privacy in Cloud	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE - IV

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23CSP601	Hacking Techniques	PE	3	0	0	3	40	60	100
23ITP601	Digital and Mobile Forensics	PE	3	0	0	3	40	60	100
23CSP602	Social Network Security	PE	3	0	0	3	40	60	100
23CSP603	Engineering Secure Software Systems	PE	3	0	0	3	40	60	100
23CCP601	Cryptocurrency and Block chain Technologies	PE	3	0	0	3	40	60	100
23ITP602	Information Security	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE -V

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23CSP604	Augmented Reality / Virtual Reality	PE	3	0	0	3	40	60	100
23CSP605	Robotic Process Automation	PE	3	0	0	3	40	60	100
23ADP601	Neural Networks and Deep Learning	PE	3	0	0	3	40	60	100
23CSP606	Cyber Security	PE	3	0	0	3	40	60	100
23CSP607	Quantum Computing	PE	3	0	0	3	40	60	100
23ITP603	Game Development	PE	3	0	0	3	40	60	100

PROFESSIONAL ELECTIVE - VI

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23ADP503	Knowledge Engineering	PE	3	0	0	3	40	60	100
23CSP608	Soft Computing	PE	3	0	0	3	40	60	100
23ITP604	Information Assurance and Security	PE	3	0	0	3	40	60	100
23CSP610	Optimization Techniques	PE	3	0	0	3	40	60	100
23CSP611	Game Theory	PE	3	0	0	3	40	60	100
23CSP612	Ethics And AI	PE	3	0	0	3	40	60	100

LIST OF OPEN ELECTIVE COURSES

OPEN ELECTIVE - I

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23MEO601	Introduction to Industrial Engineering	OE	3	0	0	3	40	60	100
23ECO602	Fundamentals of Electronic Devices and Circuits	OE	3	0	0	3	40	60	100
23EEO603	Electric Vehicle Technology	OE	3	0	0	3	40	60	100
23EEO604	Renewable Energy System	OE	3	0	0	3	40	60	100
23MEO605	Resource Management Technique	OE	3	0	0	3	40	60	100
23MAO606	Graph Theory	OE	3	0	0	3	40	60	100
23CEO607	Environmental and Social Impact Assessment	OE	3	0	0	3	40	60	100
23PMO608	Pharmaceutical Nanotechnology	OE	3	0	0	3	40	60	100
23RAO609	Foundation of Robotics	OE	3	0	0	3	40	60	100
23CSO610	Introduction to Drone Technologies	OE	3	0	0	3	40	60	100
23MDO611	Bio Molecules	OE	3	0	0	3	40	60	100
23CSO612	Cyber Forensics and Ethical Hacking	OE	3	0	0	3	40	60	100

OPEN ELECTIVE- II

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23HSO701	English for Competitive Examinations	OE	3	0	0	3	40	60	100
23MGO702	Democracy and Good Governance	OE	3	0	0	3	40	60	100
23MEO703	Fundamentals of Mechatronics	OE	3	0	0	3	40	60	100
23CEO704	Remote Sensing Concepts	OE	3	0	0	3	40	60	100
23MEO704	Nano Technology	OE	3	0	0	3	40	60	100
23MDO705	Ultrasound Principles and its Medical Applications	OE	3	0	0	3	40	60	100
23PMO706	IPR for Pharma Industry	OE	3	0	0	3	40	60	100
23RAO707	Concepts in Mobile Robots	OE	3	0	0	3	40	60	100
23ECO708	Energy Technology	OE	3	0	0	3	40	60	100
23EEO709	Sensors and Actuators	OE	3	0	0	3	40	60	100
23MAO710	Operations Research	OE	3	0	0	3	40	60	100
23CSO711	Introduction to Cyber Security	OE	3	0	0	3	40	60	100
23MEO712	3D Printing and Design	OE	3	0	0	3	40	60	100

OPEN ELECTIVE - III

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23HSO713	Project Report Writing	OE	3	0	0	3	40	60	100
23MAO714	Advanced Numerical Methods	OE	3	0	0	3	40	60	100
23CSO715	Fundamentals of Block Chain Technology	OE	3	0	0	3	40	60	100
23EEO716	Electrical, Electronic and Magnetic Materials	OE	3	0	0	3	40	60	100
23CEO717	Geographical Information System	OE	3	0	0	3	40	60	100
23ECO718	VLSI Design	OE	3	0	0	3	40	60	100

23MDO719	Wearable Technology	OE	3	0	0	3	40	60	100
23MEO720	Additive manufacturing	OE	3	0	0	3	40	60	100
23RAO721	Nano Materials and Application	OE	3	0	0	3	40	60	100
23MGO722	Cost Management of Engineering Projects	OE	3	0	0	3	40	60	100
23HSO723	Food Safety and Quality Regulations	OE	3	0	0	3	40	60	100
23MDO724	Lifestyle Diseases	OE	3	0	0	3	40	60	100

GENERAL ELECTIVES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23NCCL01	NCC AIRFORCE LEVEL-1	GE	3	0	0	3	40	60	100
23NCCL02	NCC AIRFORCE LEVEL - 2	GE	3	0	0	3	40	60	100
23NCCL03	NCC ARMY LEVEL - 3	GE	3	0	0	3	40	60	100
23NCCL04	NCC ARMY LEVEL - 4	GE	3	0	0	3	40	60	100

ELECTIVE - MANAGEMENT

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23MGT701	Principles of Management	GE	3	0	0	3	40	60	100
23MGT702	Total Quality Management	GE	3	0	0	3	40	60	100
23MGT703	Engineering Economics and Financial Accounting	GE	3	0	0	3	40	60	100
23MGT704	Human Resource Management	GE	3	0	0	3	40	60	100
23MGT705	Knowledge Management	GE	3	0	0	3	40	60	100
23MGT706	Industrial Management	GE	3	0	0	3	40	60	100
23MGT707	Hospital Management	GE	3	0	0	3	40	60	100
23MGT708	e-Waste Management	GE	3	0	0	3	40	60	100

LIST OF EMPLOYABILITY ENHANCEMENT COURSES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23EEC101	Soft Skills	EEC	1	0	0	1	100	-	100
23EEC201	Communication Skills / Foreign Language	EEC	0	0	4	2	100	-	100
23EEC301	Professional Development	EEC	0	0	2	1	100	-	100
23EEC401	Value Added Course-I	EEC	0	0	4	2	100	-	100
23EEC501	Value Added Course-II	EEC	0	0	4	2	100	-	100
23EEJ601	Project Work	EEC	0	0	10	5	40	60	100
23EEC701	Research Paper Writing and Publication	EEC	0	0	4	2	100	-	100
23EEJ801	Innovative Product Development	EEC	0	0	14	7	40	60	100
23EEC801	Internship	EEC	0	0	4	2	100	-	100

LIST OF MANDATORY COURSES

MANDATORY COURSES - I

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23MDC501	Introduction to Women and Gender Studies	MC	3	0	0	0	-	-	-
23MDC502	Elements of Literature	MC	3	0	0	0	-	-	-
23MDC503	Film Appreciation	MC	3	0	0	0	-	-	-
23MDC504	Disaster Risk Reduction and Management	MC	3	0	0	0	-	-	-
23MDC505	Constitution of India	MC	3	0	0	0	-	-	-

MANDATORY COURSES - II

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23MDC601	Well Being with Traditional Practices- Yoga, Ayurveda and Siddha	MC	3	0	0	0	-	-	-
23MDC602	History of Science and Technology in India	MC	3	0	0	0	-	-	-
23MDC603	Political and Economical Thought for a Human Society	MC	3	0	0	0	-	-	-
23MDC604	State, Nation Building and Politics in India	MC	3	0	0	0	-	-	-
23MDC605	Industrial Safety	MC	3	0	0	0	-	-	-

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(For the Students Admitted in the Academic Year 2023-2024onwards)

CREDIT SUMMARY

B.Tech. INFORMATION TECHNOLOGY

Category	Credits Per Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
HS	4	7	-	-	-	-	3	-	14
BS	12	7	4	-	-	-	-	-	23
ES	4	10	4	-	-	-	-	-	29
GE	-	-	-	-	-	-	3	-	3
PC	-	-	14	22	12	8	-	-	45
PE	-	-	-	-	9	9	-	-	18
OE	-	-	-	-	-	3	6	-	9
EEC	1	2	1	2	2	5	2	9	24
MC	-	-	-	-	-	-	-	-	0
Total	21	26	23	24	23	25	14	9	165

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001
ISO 9001 REGISTERED

SCHEME FOR SYLLABI

B.Tech. – INFORMATION TECHNOLOGY

SEMESTER I

23HST101	**PROFESSIONAL ENGLISH - I**	**L T P C**
	(Common to all B.E. & B.Tech. Branches)	**3 0 0 3**

OBJECTIVES

- To develop learning English language through grammar.
- To use grammar efficiently for demonstrating all the four language skills (LSRW).
- To write business letters, dialogue writing, paragraph and essay writing.
- To speak effectively about self introduction and real time situation.
- To build the reading skills through reading comprehension and note taking.

UNIT I VOCABULARY **8**

Synonyms and Antonyms - Word Formation - Sentence Types (declarative, imperative, interrogative & exclamatory) - Single Word Substitutes - Use of Abbreviations and Acronyms- Homonyms and Homophones - Collocation - British and American Vocabulary.

UNIT II GRAMMAR **10**

Parts of speech - Be, Have and Do verbs - Punctuation - Tenses - Numerical Adjectives - modal verbs - Single line Definition - Direct and Indirect Speech - Gerunds and Infinitives - Same Word Used as Different Parts of Speech.

UNIT III WRITING **9**

Letter Writing - Business communications - quotations, placing orders, complaints, replies to queries from business customers - Dialogue Writing – Paragraph Writing (descriptive, narrative, expository & persuasive) - Essay Writing - Writing Instructions.

UNIT IV SPEAKING **9**

Self-introduction - Giving personal and factual information - Talking about present circumstances, past experiences and future plans - Expressing opinions and justifying opinions - Agreement / disagreement - Likes and dislikes - Tongue twisters.

UNIT V READING SKILLS **9**

Reading Comprehension – Reading techniques, pre-reading, post-reading, comprehension questions (multiple choice questions or short questions) - Short Comprehension Passages, practice skimming - Scanning and Predicting - Reading the passage and taking (Note making) Notes - Scan and understand main contents of the passage.

TOTAL: 45 PERIODS

Mandatory activity: Self Introduction

OUTCOMES

Upon completion of the course, the students will be able to:

- Use a wide range of vocabulary in oral and written communication
- Frame grammatically correct sentences.
- Write letters, frame paragraphs and Essays, develop conversation.
- Develop speaking skills for self-Introduction, delivering speeches and Technical

Presentation

- Read and comprehend the passage, technical content and take notes

TEXT BOOKS

1. Board of Editors. Using English A Course book for Under graduate Engineers and Technologists. Orient Black Swan Limited, Hyderabad: 2015.
2. Richards, C. Jack. Interchange Students' Book-2 New Delhi: CUP, 2015.

REFERENCES

1. Department of English, Anna University, "Mindscapes: English for Technologists and Engineers", First Edition, Orient Black Swan, Chennai, 2012.
2. MacMillan, Krishna Mohan, Meera Banerji, Developing Communication Skills, Paperback, 2019.

E-RESOURCES

1. http://www.usingenglish.com
2. https://www.khanacademy.org/humanities/grammar

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	1	3	1	2	3	-	3	-	-	-
2	-	-	-	-	-	1	2	-	1	3	-	3	-	-	-
3	-	-	-	-	-	3	3	2	3	3	-	3	-	-	-
4	-	-	-	-	-	1	2	1	2	3	-	3	-	-	-
5	-	-	-	-	-	1	1	1	1	3	-	3	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	-	-	-	-	-	1.40	2.20	1.25	1.80	3.00	-	3.00	-	-	-

1- Low 2-Medium 3-High '-' – No Correlation

23MAT101 **MATRICES AND CALCULUS** **LT P C**

(Common to all B.E. & B.Tech. Branches) **3 1 0 4**

OBJECTIVES

- To develop the use of matrix algebra techniques those are needed by engineers for practical applications.
- To familiarize the students with differential and integral calculus.
- To describe the student with functions of several variables.
- To acquire the student with mathematical tools needed in evaluating multiple integrals and their applications.
- To acquaint the student with the concepts of vector calculus that is needed for problems in engineering disciplines.

UNIT I MATRICES **9+3**

Eigen values and Eigen vectors – Properties of Eigen values – Cayley-Hamilton theorem – Reduction of quadratic form to canonical form by orthogonal transformation – Nature of quadratic form.

UNIT II DIFFERENTIAL AND INTEGRAL CALCULUS **9+3**

Differentiation rules: Derivatives of polynomials and exponential functions – The product and quotient Rules – Derivatives of trigonometric functions – The Chain rule – Implicit differentiation – Applications of differentiation: Maximum and Minimum Values – Techniques of integration: Integration by parts – Trigonometric integrals – Integration of rational functions by partial fractions.

UNIT III FUNCTIONS OF SEVERAL VARIABLES **9+3**

Partial derivatives – Homogeneous functions – Euler's theorem – Total derivative – Jacobians –Taylor's theorem for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV MULTIPLE INTEGRALS **9+3**

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double integrals.

UNIT V VECTOR CALCULUS **9+3**

Scalar and vector point functions – Gradient – Divergence and curl – Line integral – Surface integral – Green's theorem in a plane – Volume integral – Divergence theorem – Irrotational and Solenoidal fields.

LIST OF TUTORIALS

1. Computation of Eigen values and Eigenvectors.
2. Calculate differentiation and integration of simple functions.
3. Determining Maxima and minima of functions for two variables.
4. Evaluating double and triple integrals.
5. Computing Gradient, divergence and curl of point functions.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Classify the matrix algebra methods for solving practical problems.
- Discover differential calculus tools in solving various application problems and compare different methods of integration in solving practical problems.
- Develop differential calculus ideas on several variable functions.
- Apply multiple integral ideas in solving areas, volumes and other practical problems.
- Solve engineering problems using the concept of vector calculus.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, Fourty Third Edition, New Delhi, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, Seventh Edition, New Delhi, 2015.

REFERENCES

1. Bali N.P, Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, Seventh Edition, 2009.
2. Kanti B. Dutta., "Mathematical Methods of Science and Engineering – Aided with MATLAB", Cengage Learning, New Delhi, 2013.

E-RESOURCES

1. https://nptel.ac.in/courses/111105121 (Differential Calculus and Integral Calculus)
2. https://nptel.ac.in/courses/111107112 (matrix analysis)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
2	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
3	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
4	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
5	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	3	2	-	-	-	-	-	-	-	1	2	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation.

23HST102 **HERITAGE OF TAMILS** **L T P C**
1 0 0 1

UNIT I LANGUAGE AND LITERATURE **3**

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE **3**

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils..

UNIT III FOLK AND MARTIAL ARTS **3**

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu,Oyillattam,Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils

UNIT IV THINAI CONCEPT OF TAMILS **3**

Flora and Fauna of Tamils &Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE **3**

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL: 15 PERIODS

TEXT BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியிடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

23HST102 **தமிழர் மரபு** **L T P C**
1 0 0 1

அலகு I மொழி மற்றும் இலக்கியம்:
3
இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி- தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமய சார்பற்ற தன்மை-சங்க இலக்கியத்தில் பகிர்தல் அறம்- திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க்காப்பியங்கள் , தமிழத்தில் சமணபௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம் , ஆழ்வாழ்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு .

அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள்வரை – சிற்பக்கலை:
3
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினை பொருட்கள் ,பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள்- குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள்- மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புற கலைகள் மற்றும் வீரவிளையாட்டுகள்:
3
தெருக்குத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி ,புலியட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக்கோட்பாடுகள்:
3

தமிழகத்தின் தாவரங்களும் விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள் - தமிழர்கள் போற்றிய அருட்கோட்பாடு - சங்ககாலத்தில் தமிழ்கத்தில் எழுத்தறிவும் கல்வியும்- சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாற்றிக்குத் தமிழர்களின் பங்களிப்பு

3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு இந்தியாவின் பிறபகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுய மரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள் , கையழுத்துப்படிகள் - தமிழ்ப்புத்தகங்களின் அச்சு வரலாறு.

TOTAL: 15 PERIODS

TEXT - CUM - REFERENCE BOOKS

1. தமிழக வரலாறு -மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியிடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் -முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை-ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

23PHE102 APPLIED PHYSICS FOR COMPUTER ENGINEERING LT P C
(Common to CSE, CSE-SC, IT and AI&DS) 3 0 2 4

OBJECTIVES

- To explore the principles of lasers and the uses for them in general.
- To Utilize Schrödinger's wave equation and the fundamentals of quantum mechanics to investigate the complicated physical phenomena.
- To understand the basic concepts of IC's and digital components.
- To enhance the knowledge on magnetic and optical storage devices.
- To learn the fundamentals of nano material's and synthesis methods.
- To observe the physical concept used in the fields of semiconductors, optics and electronics.

UNIT I PHOTONICS 9

Spontaneous and Stimulated Emission- Population Inversion - Derivation of Einstein's A and B coefficients – Principle and working of Laser - Nd:YAG laser – He Ne Laser - Direct bandgap and Indirect Bandgap Semiconductors - Semiconductor Diode Laser (Homojunction & heterojunction) - Applications of Lasers in Science, Engineering and Medicine – Working principle of Laser printer - Digital Laser Material Processing technology – Laser Projection Television.

UNIT II QUANTUM PHYSICS 9

Black Body Radiation – Planck's theory (derivation) – Wave particle duality – Electron Diffraction – Wave function and its Physical significance – Schrödinger's wave equation: Time Independent and Time Dependent Equations – Particle in a One-Dimensional Box - Scanning Electron Microscope - Transmission Electron Microscope - Quantum Tunneling –

Scanning Tunneling Electron Microscope.

UNIT III FUNDAMENTALS OF DIGITAL ELECTRONICS AND LOGIC DESIGN 9

INTEGRATED ELECTRONICS: Introduction of ICs - Steps in Fabrication of Monolithic IC's – General applications of IC's.

DIGITAL ELECTRONICS AND LOGIC DESIGN : Number System and Representation - Programs - Boolean Algebra and Logic Gates – Demorgan's Theorem - Gate Level Minimization - Combinational Logic Circuits - Flip-Flops and Sequential Circuits - Register and Counters - Memory and Programmable Logic Devices.

UNIT IV DATA STORAGE MATERIALS 9

PRIMARY STORAGE: Random Access Memory (RAM)– Static RAM – Dynamic RAM – Read only Memory (ROM) - SECONDARY STORAGE : Magnetic Disc Memories –Hard Disk Drive and Solid State Drive -

TERTIARY STORAGE : Optical Data Storage Devices: Principle-Disc data storage-Structure and Operating Principle of CD-ROM – DVD - Blu-ray Disc - OFF-LINE STORAGE : Floppy Disk – Zip diskette – USB Flash drive – Memory card – FUTURE STORAGE DEVICES (QUALITATIVE) : Holographic data storage - DNA digital data storage - Helium Drives - Shingled Magnetic Recording (SMR) - non-volatile, random access memories (NVRAM) - Rack scale design - 5D Optical storage.

UNIT V INTRODUCTION TO NANO SCIENCE & NANOELECTRONICS 9

Emergence of Nanoscience - Role of Particle Size - quantum structures: Quantum Well, Quantum Wire And Quantum Dot- Properties at Nano scale (optical, electronic and magnetic) - Synthesis of Nanomaterials : Physical Vapour Deposition (PVD) - Pulsed Laser Deposition (PLD) - Ball Milling- NANO-ELECTRONIC TECHNOLOGIES : Nano capacitors, Single electron transistors, Coulomb blockade, Nano lithography - Data storage – Nano Photonics - Nano Electronic and Magnetic Devices – Spintronics - Nanotechnology in Computer Science.

LIST OF EXPERIMENTS

(Common to CSE, CSE-SC, IT and AIDS)

(Eight experiments are to be conducted in Lab)

1. Determination of wavelength of laser.
2. Determination of particle Size lycopodium powder using laser.
3. Fibre Optics: Determination of Numerical Aperture and Acceptance angle.
4. Determination of velocity of ultrasonic in liquid.
5. Verification of truth tables of logic gates using IC's: (OR, AND, NOT, XOR, NOR and NAND)
6. Verification of Universal NOR & NAND gates.
7. Determination of Young's modulus - Uniform bending.
8. Determination of bandgap of a given semiconductor diode.
9. Determination of Kinetic Energy - Photoelectric Effect.(Virtual).
10. Determination of frequency of an electrically driven tuning fork- Melde's string

method (Virtual)

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

Upon completion of this course, students will be able to;

- Learn the basics of lasers and their use in some applications
- Apply the basic principles of quantum mechanics and Schrödinger's wave equation to study the complex physical phenomenon
- Acquire knowledge and apply it to various electronic devices
- Get knowledge about storage material and devices
- Understand the fundamentals of nano materials and various synthesize methods.
- Compose principles of elasticity, optics and semiconductor properties in engineering applications through experiments

TEXT BOOKS

1. A Text book of Material Science, K.G.Aswani, S. Chand & Company ltd, (2001).
2. Semiconductor Physics and Optoelectronics, M.Arumugam, Anuradha Agencies, 2019.
3. Nanostructured Materials and Nanotechnology - Hari Singh Nalwa, Academic Press, 2012 .

REFERENCES

1. Avadhanulu M.N & Kshirsagar P.G "Text Book of Engineering Physics". S.Chand, 2006
2. Hanson, G.W. "Fundamentals of Nanoelectronics". Pearson Education, 2009
3. Nanocrystals: Synthesis, Properties and Applications, C.N.R. Rao, P.J. Thomas and G.U. Kulkarni, Springer (2007).

E-RESOURSES

1. https://archive.nptel.ac.in/courses/122/107/122107035/
2. https://nptel.ac.in/courses/118102003

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
2	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
3	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
4	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
5	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
6	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-
AVG	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-

1. Low 2-Medium 3-High '-' – No Correlation

23CYE101 **ENGINEERING CHEMISTRY** **LT P C**

(Common to CSE, EEE, ECE, CSE (CS), MDE, AI&DS, IT &PT) **3 0 2 4**

OBJECTIVES

- To classify the impurities of water and know the treatment and the conditioning methods for domestic and industrial uses.
- To develop an understanding the fundamentals of polymers.
- To gain knowledge the phase rule and its applications in engineering field.
- To explain the basics of Nanochemistry, synthesis, properties and applications of nano materials.
- To be familiar with the types of corrosion and control measures and working of batteries.
- To inculcate practical skills in the determination of water quality parameters and instrumental analysis.

UNIT I WATER TECHNOLOGY **9**

Introduction - Characteristics - Hardness - Estimation of hardness by EDTA method - Alkalinity and its estimation - Boiler feed water - Requirements –Boiler troubles (Scale and Sludge) - Internal conditioning (colloidal, phosphate, calgon and carbonate conditioning methods) - External conditioning - Zeolite process, Demineralization process – Desalination of brackish water by reverse osmosis- Nano filtration - Municipality water treatment - Break point chlorination.

UNIT II POLYMER CHEMISTRY **9**

Introduction - Classification of polymers - Natural and Synthetic; Thermoplastic and Thermosetting plastic. Functionality - Degree of polymerization. Types of polymerization: Addition Condensation and Copolymerization, Properties of polymers: Glass transition temperature, Tacticity- Molecular weight - Weight average, Number average and Polydispersity index- Preparation, properties and uses of PVC, Nylon 6,6, Polyethylene - Rubbers - Types - Vulcanization of rubber - Plastics - Moulding constituents of plastics - Moulding of plastics - Compression, injection and blow moulding - Biodegradable polymers - Conducting polymers.

UNIT III PHASE RULE AND ALLOYS 9

Phase rule - Explanation of terms involved - One component system - Water system - Condensed phase rule - Construction of phase diagram by thermal analysis - Simple eutectic systems (Lead - Silver system only). Alloys: Introduction - Definition - Properties of alloys - Significance of alloying, functions and effect of alloying elements - Ferrous alloys - Nichrome and stainless steel - Heat treatment of steel, non-ferrous alloys - Brass and bronze.

UNIT IV CHEMISTRY OF NANO MATERIALS 9

Nano chemistry - Basics (Surface area to volume ratio - Quantum confinement - 0D, 1D, 2D& 3D) - Distinction between molecules, nanoparticles and bulk materials - Characterization of nanomaterials using EDX and HR-TEM. Synthesis of nano materials: Top down approach - Ball milling - Bottom up approach - Sol-gel method, Chemical vapour deposition - Properties of nanomaterials and Applications of nanomaterials (Nano products of today).

UNIT V ELECTROCHEMISTRY, CORROSION AND ITS CONTROL 9

Introduction - Electrochemical cells, applications of electrochemical series - Reference Electrode - standard calomel electrode, ion selective electrode, glass electrode, Potentiometric titration - Redox titration, Conductometric titration- Strong acid vs Strong base. Corrosion - Types - Chemical Corrosion - Electrochemical Corrosion (galvanic and differential aeration) - Factors influencing corrosion - Material selection and design aspects- Control methods of corrosion - Sacrificial anodic and impressed current cathodic protection.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by Argentometric method.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Estimation of sodium and potassium present in water using flame photometer.
7. Conductometric Precipitation Titration using $BaCl_2$ and Na_2SO_4.
8. Conductometric titration of strong acid vs strong base.
9. Estimation of Ferrous ions by Potentiometric Titration.
10. Estimation of copper content in the brass by Iodometry.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Infer the quality of water and Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerization processes and some special properties and applications of polymers.
- Apply the knowledge of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and apply the basic concepts of in engineering applications.
- Analyze the causes of corrosion, suggest the control measures and discuss the functions of batteries.
- Determine the water quality parameters and perform quantitative chemical analysis bypH metery, flame photometry, conductometry and potentiometry.

TEXT BOOKS

1. Jain P.C and Monika Jain, "Engineering Chemistry", Seventeeth Edition, Dhanpet Rai Publishing Company (P) Ltd. New Delhi, 2015.
2. Viswanathan B, "Nanomaterials" Alpha Science International Ltd, 2009.
3. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, Second Edition, 2017.

REFERENCES

1. S. S. Dara and S. S. Umare, "A Textbook of Engineering Chemistry", S. Chand & Company Ltd, New Delhi, 2015.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.
3. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.

E-RESOURCES

1. https://nptel.ac.in/courses/104105084
2. http://library.iitbbs.ac.in/open-access-e-resources.ph

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	3	-	1	-	3	-	-	-	-	2	-	-	-
2	1	-	2	-	1	-	-	-	-	-	-		-	-	-
3	2	2	3	1	1	1	-	-	-	-	-	1	-	-	-
4	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-
5	2	1	2	1	3	-	1	-	-	-	-	-	-	-	-
6	2	3	-	2	3	-	-	-	-	-	-	-	-	-	-
AVG	1.6	1.6	2.4	1.25	1.8	1	2	-	-	-	-	1.5	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation

23GEE101	PROGRAMMING IN C (Lab Embedded Theory Course)	L T P C 3 0 2 4

OBJECTIVES

- To understand the constructs of C Language.
- To study arrays and strings for developing C programs
- To know the functions and pointers application in C programs
- To understand the concepts of structures and Union.
- To understand input/output and file handling in C.
- To develop programs and applications using C.

UNIT I BASICS OF C PROGRAMMING 9

Introduction to programming paradigms – Structure of C program – C programming: Data Types– variables–Storage classes – Constants – Enumeration Constants – Keywords – Operators: Precedence and Associativity – Expressions –Input/Output statements, Assignment statements – Decision making statements – Switch statement – Looping statements – Pre-processor directives – Compilation process.

UNIT II ARRAYS AND STRINGS 9

Introduction to Arrays: Declaration, Initialization – One dimensional array – Example Program**:** Computing Mean, Median and Mode – Two dimensional arrays – Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) – String operations: length, compare, concatenate, copy –Sorting – Selection sort, Insertion sort, Merge sort, quick sort –Searching – linear and binary search.

UNIT III FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function call, Built–in functions (string functions, math functions) – Recursion – Example Program: Computation of Sine series, Scientific calculator using built-in functions – Pointers – Pointer operators – Arrays and pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

UNIT IV STRUCTURES AND UNION 9

Structure – Example Programs – Nested structures – Pointer in Structures – Array of structures - Example Program using structures and pointers – Self referential structures – Dynamic memory allocation - Union- Storage classes

UNIT V FILE PROCESSING 9

Files – Operations of File – Types of file processing: Sequential access, Random access – Sequential access file – Random access file – Command line arguments.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Programs using I/O statements, expressions and decision–making constructs.
2. Write a program to find whether the given year is leap year or Not.
3. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of a number.
4. Check whether a given number is Armstrong number or not?
5. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions.
   a) 5 if it is a perfect cube.
   b) 4 if it is a multiple of 4 and divisible by 6.
   c) 3 if it is a prime number.
6. Populate an array with height of persons and find how many persons are above the average height.
7. From a given paragraph perform the following using built–in functions:(i)Find the total number of words.(ii)Capitalize the first word of each sentence.(iii)Replace a given word with another word.
8. Solve towers of Hanoi using recursion.
9. Locate and Display the Contents of an Array using Pointers.
10. Generate salary slip of employees using structures and pointers.
11. Count the number of account holders whose balance is less than the minimum balance using sequential access file.

TOTAL: 45 +15 = 60 PERIODS

OUTCOMES

Upon completion of the course, the students will be able to,

- Build C programs for simple applications using basic constructs
- Develop C programs using arrays and strings.
- Construct C programs using functions, recursion and pointers
- Implement applications in C using structures.
- Develop applications in C using file processing.
- Develop applications using C programming constructs

TEXT BOOKS

1. E.Balagurusamy,"Programming in ANSI C", Tata McGraw Hill, Eighth Edition, 2019.
2. Kernighan, B.W and Ritchie,D.M,"The C Programming language", Second Edition, Pearson Education, 2016.

REFERENCES

1. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.
2. Juneja, B. L and Anita Seth, "Programming in C", CENGAGE Learning India pvt.Ltd., 2011.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105085/ (Introduction to C Programming)
2. https://nptel.ac.in/courses/106/106/106106210/ (Stack Operations)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	2	2	1	2	1	1	1	2	-	3	2	1	2	-
2	2	2	2	1	2	1	1	1	2	-	3	3	2	2	-
3	2	3	2	1	2	1	1	1	2	-	3	2	2	2	-
4	3	2	2	1	3	1	1	1	2	-	3	3	2	2	-
5	2	3	3	1	2	1	2	1	2	-	3	2	2	3	-
6	2	2	3	2	1	2	-	-	2	1	2	2	2	2	-
AVG	2	2.3	2.3	1.16	2	1.7	1	1	2	1	2.8	2.3	1.8	2.2	-

1-Low 2-Medium 3-High '-' – No Correlation.

SEMESTER II

23HST201	**PROFESSIONAL ENGLISH - II**	**L T P C**
	(Common to all B.E. & B.Tech. Branches)	**3 0 0 3**

OBJECTIVES

- To use grammatical components effectively in written communication.
- To read and understand on comprehend technical writing.
- To develop skills for writing email, business letters, Job Application Letter and Resume.
- To write checklist, recommendation, transcoding graphics and letter.
- To speak fluently in real contexts.

UNIT I GRAMMAR **9**

Articles - Prepositions - Compound words - Conditionals - Subject verb agreement - Active and Passive voice - Impersonal Passive Voice.

UNIT II LISTENING & READING **9**

Syllabification - Reading Vocabulary - Reading Newspapers - Listening to Youtube Documentaries - Listening to Podcast - Listening to Motivational Movies.

UNIT III BUSINESS WRITING **9**

E-mail writing - fixing an appointment, cancelling appointment, conference details, training programme details, paper submission for seminars and conferences - Job Application Letter and Résumé.

UNIT IV WRITING **9**

Checklist - Writing Recommendations - Transcoding Graphics - Bar Chart, Flow Chart, Pie Chart and Tables - Formal Letter Writing - inviting dignitaries and declining invitations.

UNIT V SPEAKING **9**

Collaborative task - Turn taking (initiating and responding appropriately) - Negotiating - Exchanging - Suggesting - Comparing and Contrasting – Expressing - Finding out facts, attitudes and opinions - Situational Role-play.

TOTAL: 45 PERIODS

Mandatory activity: PowerPoint Presentation

OUTCOMES

Upon completion of the course, the students will be able to:

- Use grammar to frame sentences and write sentences in passive forms
- Read vocabulary, newspaper and improve listening skills
- Draft emails, write business letters, construct resume with job application letter.
- Frame checklist, write recommendation and Transcoding graphical representation.
- Develop speaking skill for taking part in Collaborative task and Situational Role-play.

TEXT BOOKS

1. S. Sumant Maven Learning. Technical English II.
2. KN Shoba, Lourdes Joavani Rayen. Communicative English. Published by Cambridge university, 2017.

REFERENCES

1. Dr K Elango, Dr. Veena Selvam, Dr. Sujatha Priyadarshini, "Resonance English for Engineers and Technologists", Cambridge University Press, First Edition, Foundation Books, New Delhi, 2013.
2. Seely, John. Oxford Guide to Effective Writing and Speaking. Indian ed. New Delhi: Oxford University Press. 2005.
3. Norman Whitby, Business Benchmark- Pre-Intermediate to Intermediate, Students book, Cambridge University Press, 2006.

E-RESOURCES

1. https://www.fluentu.com/Blog/english/english-small-talk
2. https://www.britishcouncil.com

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	1	1	-	2	3	-	3	-	-	-
2	-	-	-	-	2	1	1	1	2	3	-	3	-	-	-
3	-	-	-	-	2	1	2	1	2	3	-	3	-	-	-
4	-	-	-	-	-	1	1	1	1	3	-	3	-	-	-
5	-	-	-	-	-	2	1	1	3	3	-	3	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	-	-	-	-	2.00	1.20	1.20	1.00	2.00	3.00	-	3.00	-	-	-

1- Low 2-Medium 3-High '-' – No Correlation

23MAT201 STATISTICS AND NUMERICAL METHODS WITH MATLAB LT P C

(Common to all B.E. & B.Tech. Branches) **3 1 0 4**

OBJECTIVES

- To provide the necessary basic concepts in testing of hypothesis for small and large samples which plays an important role in real life problems.
- To acquaint the knowledge of classifications of design of experiments.
- To extend the basic concepts of solving algebraic and transcendental equations.
- To apply the numerical techniques of interpolation and integration.
- To produce the knowledge of various techniques in solving ordinary differential equations.

UNIT I TESTING OF HYPOTHESIS 9+3

Sampling distribution - Testing of significance for single proportion, single mean and difference of means - Test of significance for small samples by 't' test - Snedecor's F- test of significance - Chi-square test : Chi-square test of goodness of fit - Independent of attributes.

UNIT II DESIGN OF EXPERIMENTS 9+3

Basic principles of experimental design - Completely randomised design - Analysis of vaiance for one way classification - Randomised block design - Analysis of variation for two factor experiments variations - Latin square design.

UNIT III SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9+3

Solution of algebraic and transcendental equations by Newton Raphson method - Solution of simultaneous algebraic equations by Gauss elimination, Gauss Jordan and Gauss Seidel methods - Matrix Inversion by Gauss Jordan method - Eigen values of a matrix by Power method.

UNIT IV INTERPOLATION AND NUMERICAL INTEGRATION 9+3

Interpolation: Newton's forward and backward interpolation formulae - Lagrange's interpolation formula - Newton's divided difference formula - Numerical integration by Trapezoidal and Simpson's 1/3 rule - Numerical double integration by Trapezoidal rule.

UNIT V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+3

Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order equations - Taylor's series method - Predictor-corrector methods: Milne's method - Adams-Bash forth method.

LIST OF TUTORIALS

1. Solving one sample and paired sample't' test.
2. Determination of roots of a polynomial.
3. Solution of linear system of equations by Gauss Seidel methods.
4. Evaluation of line integrals by Trapezoidal rule.
5. Solution of ordinary differential equations by Euler's method.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Analyze the concept of testing of hypothesis for small and large samples in real life problems.
- Apply the basic concepts of classifications of design of experiments in the field of agriculture.
- Summarize the numerical techniques of interpolation in various intervals and apply the numerical techniques of integration for engineering problems.
- Produce various techniques and methods for solving first and second order ordinary differential equations.
- Solve the partial and ordinary differential equations with initial conditions by using certain techniques with engineering applications.

TEXT BOOKS

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Dr.Kandasamy. P, Dr.Thilagavathy . K and Dr. Gunavathy .K., "Statistics and Numerical Methods", S. Chand and Company Ltd., NewDelhi, 2010.

REFERENCES

1. Burden, R.L and Faires, J.D, "Numerical Analysis", Nineth Edition, Cengage Learning, 2016.
2. Gupta S.C. and Kapoor V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, Twelth12th Edition, New Delhi, 2020.

E-RESOURCES

1. https://nptel.ac.in/courses/111/105/111105041/ (Statistics)
2. https://nptel.ac.in/courses/111/107/111107105/ (Numerical Methods)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
2	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
3	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
4	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
5	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	3	1	1	2	-	-	-	1	-	2	3	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation

23PHT202 ADVANCED PHYSICS FOR COMPUTER ENGINEERING L T P C
(Common to CSE, CSE-SC, IT and AI&DS) **3 0 0 3**

OBJECTIVES

- To acquire knowledge on semiconductor and apply it to various electronic devices
- To develop the knowledge in Superconducting and Dielectric materials.
- To make use of the light phenomenon in optical device fabrications.
- To apply the knowledge Quantum Electronics
- To enlarge knowledge about fiber optics and data transmission systems

UNIT I PHYSICS OF SEMICONDUCTORS 9

Elemental and Compound Semiconductors – Intrinsic Semiconductor – Carrier Concentration Derivation – Fermi level – Extrinsic Semiconductor - Carrier Concentration in N-type and P-type semiconductor(Qualitative) – Hall Effect and applications - PN junction Diode – Schottky Diode- Ohmic contacts- Tunnel Diode.

UNIT II MAGNETIC AND SUPERCONDUCTING MATERIALS 9

Electron Theory of Magnetism; Dia, Para, Ferromagnetism and their Properties- Domain Theory of Ferromagnetism – Hard and Soft magnetic Materials - Ferrites - Superconductivity: Properties – Type I and Type II superconductors – BCS theory of superconductivity – General applications of Superconductors –Cryotron and Magnetic Levitation.

UNIT III OPTICAL AND DISPLAY DEVICES 9

Introduction-Electroluminescence Process - LED materials - Fabrication of LED - Liquid Crystal Display - Principle and Fabrication of Twisted Nematic LCD systems - Thin Film Transistor-LCD (TFT-LCD) Organic LED – Fabrication Various types of OLEDs - PDPs (Plasma display panels) – Laser powered phosphor display - Attributes of a good display device.

UNIT IV FIBER OPTICS AND DATA TRANSMISSION SYSTEMS 9

Principle and Propagation of Light in an Optical Fibers - Fiber Optics: Principle, Numerical Aperture, Acceptance Angle & Acceptance cone — types of Optical Fibers (Material, Refractive Index, Mode) – Fiber Optic Communication Systems – Bluetooth - Wi-Fi – Li-Fi – Infrared Data Transfer - Data Transfer Project - Kiss Connectivity.

UNIT V EMERGING TECHNOLOGIES 9

Quantum Computing - 3D Printing - 5G & 6G Cellular Communications - Explainable Artificial Intelligence(AI) - Biometrics - Cloud Computing - Computer-assisted Translation(CAT) - Holographic Imaging - Quantum Cryptography - Robotics - Quick Response Codes (QR codes) -Wearable Computing - Ultra-High Definition(UHD) - Vision Enhancement - Virtual Reality(VR) – Augmented Reality (AR) – Mixed Reality (MR).

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of this course, students will be able to;

- Acquire knowledge on basics of semiconductor physics and its applications in various devices
- Be familiarizing with superconducting and dielectric properties of materials.

- Understand the function of optical materials and display devices.
- Expand the knowledge on quantum computing in electronic systems
- Learn the basics of optical fibers and some applications in communication systems

TEXT BOOK

1. R Murugesan "Optics and Spectroscopy" S. Chand Publishing, Fifth Edition (2013)
2. Raghavan V, Materials Science and Engineering: A First Course, PHI Publications, 2015
3. V. Gupta, P. Mandayam and V. S. Sunder. "The Functional Analysis of Quantum Information Theory" In Springer Lecture Notes in Physics, Vol 902 (2015).

REFERENCES

1. Rajendran V. "Engineering Physics". Tata McGraw Hill Publications, 2012.
2. Avadhanulu M.N & Kshirsagar P.G "Text Book of Engineering Physics". S.Chand, 2006.
3. R Murugesan "Modern Physics", S Chand Publishing; Eighteenth edition 2016

E – RESOURCES

1. https://archive.nptel.ac.in/courses/115/101/115101092/
2. https://nptel.ac.in/courses/108104113

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
2	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
3	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
4	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
5	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
6	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-
AVG	3	2	1	1	1	1	1	-	-	-	-	-	-	-	-

1- Low 2-Medium 3-High '-' – No Correlation

23CYT201 ENVIRONMENTAL SCIENCE AND SUSTAINABILITY LT P C

(Common to all B.E. & B.Tech. Branches) **3 0 0 3**

OBJECTIVES

- To understand the importance of the environment, ecosystem, biodiversity and its conservation.
- To impart knowledge on various kinds of pollutions, solid waste management and precautionary measures for disasters.
- To be familiar with the social issues and identify the possible way to improve the quality of the environment.
- To analyze the problems of overpopulation and understand the value education.
- To familiarize the concept of sustainability and implement sustainable practices in various fields.

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 9

Definition, scope and importance of environment - Need for public awareness - Concept of an ecosystem - Structure and function of an ecosystem - Producers, consumers and decomposers - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, rivers, oceans) - Introduction to biodiversity definition: genetic, species and ecosystem diversity - Biogeographically classification of India - Value of biodiversity - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conservation of biodiversity: In-Situ and Ex-Situ conservation of biodiversity.

Activity: Biodiversity in and around the campus and report submission.

UNIT II ENVIRONMENTAL POLLUTION 9

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste management: causes, effects and control measures of municipal solid wastes - E-waste – Role of an individual in prevention of pollution - Pollution case studies – Disaster management: floods, earthquake and cyclone.

Activity: Local pollution case study and report submission.

UNIT III SOCIAL ISSUES AND THE ENVIRONMENT 9

From unsustainable to sustainable development – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, case studies - Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – Wasteland reclamation – Green Chemistry and principles - Environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – Public awareness.

Activity: Creating environmental awareness.

UNIT IV HUMAN POPULATION AD THE ENVIRONMENT 9

Population growth, variation among nations – Population explosion – Family welfare programme – Environment and human health – Human rights – Value education – HIV / AIDS – Women and child welfare – Role of information technology in environment and human health – Case studies.

Activity: Visit to local primary health center.

UNIT V SUSTAINABLE MANAGEMENT 9

Sustainability-Concept, needs and challenges-economic, social and aspects of sustainability-From unsustainability to sustainability-Millennium development goals, and protocols-Sustainable Development Goals-Targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-Case studies. Zero waste and R concept, Material Life cycle assessment, Environmental Impact Assessment, Sustainable habitat: Energy efficiency, Sustainable transports.

Activity: Field trips to local organizations or facilities with sustainable practices in place.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Acquire knowledge on public awareness & about the environment, ecosystem and biodiversity.
- Find solutions for pollutions and waste management to improve the quality of environment.
- Identify the causes of social issues and apply the concept of green chemistry to maintaining a clean environment.
- Analyze the effects of human population and issues related to the environment and human health.
- Understand the different goals of sustainable development and apply them for suitable technological advancement and societal development.

TEXT BOOKS

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.
2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', Second edition, Pearson Education, 2004.
3. Allen, D. T. and Shonnard, D. R., 'Sustainability Engineering: Concepts, Design and Case Studies', Prentice Hall.

REFERENCES

1. Erach Bharucha, 'Textbook of Environmental Studies', Universities Press(I) Pvt Ltd, Hydrabad, 2015.
2. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India Pvt Ltd, New Delhi, 2007.
3. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2005.

E-RESOURCES

1. https://nptel.ac.in/courses/122102006/
2. https://swayam.gov.in/nd1-noc19-ge22/preview

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	1	3	2	-	1	3	-	1	-	-	1	-	-	-
2	2	2	2	2	2	2	1	-	-	-	-	-	-	-	-
3	-	2	2	2	1	1	3	-	-	-	-	-	-	-	-
4	1	2	2	1	1	2	3	3	-	-	-	-	-	-	-
5	-	2	2	2	2	1	1	1	-	2	-	-	-	-	-
AVG	1.5	1.8	2.2	1.8	1.5	1.4	2.2	2	1	2	-	1	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation

23HST202 **TAMILS AND TECHNOLOGY** **LT P C**
1 0 0 1

UNIT I WEAVING AND CERAMIC TECHNOLOGY **3**

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY **3**

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)-ThirumalaiNayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY **3**

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY **3**

Dam, Tank, ponds, Sluice, Significance of KumizhiThoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING **3**

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project

TOTAL: 15 PERIODS

TEXT BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியிடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

23HST202 **தமிழரும் தொழில்நுட்பமும்** **L T P C**

1 0 0 1

அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:
3

சங்க காலத்தில் நெசவுத் தொழில் – பானைத்தொழில்நுட்பம் – கருப்பு சிவப்பு பாண்டங்கள் – பண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:
3

சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்ககாலத்தில் வீட்டுப்பொருட்களில் வடிவமைப்பு- சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் – சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் – மாமல்லபுரச் சிற்பங்களும், கோவில்களும் – சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக்கோயில்கள் மாதிரி கட்டமைப்புகள் பற்றி அறிதல் மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் – செட்டிநாட்டு வீடுகள்–பிரிட்டிஷ்காலத்தில் சென்னையில் இந்தோ – சரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தித் தொழில்நுட்பம்:
3

கப்பல் கட்டும் கலை – உலோகவியல் - இரும்புத் தொழிற்சலை –இரும்பை உருக்குதல், எஃகு – வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் – நாணயங்கள் அச்சடித்தல் – மணி உருவாக்கும் தொழிற்சாலைகள் – கல்மணிகள், கண்ணாடி மணிகள் – சுடுமண் மணிகள் - சங்குமணிகள் – எலும்புத்துண்டுகள் – தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பம்:
3

அணை, ஏரி, குளங்கள், மதகு – சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் – கால்நடை பராமரிப்பு – கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் –

வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் – கடல்சார் அறிவு – மீன்வளம் – முத்து மற்றும் முத்துக்குளித்தல் – பெருங்கடல் குறித்து பண்டைய அறிவு – அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:
3

அறிவியல் தமிழின் வளர்ச்சி – கணித்தமிழ் வளர்ச்சி – தமிழ் நூல்களை மின்பதிப்பு செய்தல் – தமிழ் மென்பொருட்கள் உருவாக்கம் – தமிழ் இணையக் கல்விக்கழகம் – தமிழ் மின்நூலகம் – இணையத்தில் தமிழ்அகராதிகள்– சொற்குவைத் திட்டம்

TOTAL: 15 PERIODS

TEXT - CUM - REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியிடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்)
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

23GEE201 ENGINEERING GRAPHICS LT P C

(Common to all B.E. & B.Tech. Branches) **3 0 2 4**

OBJECTIVES

- To acquire the knowledge of various curves.
- To learn projections of points, lines, planes viewed in different positions.
- To impart the graphic skills for converting pictorial views of solids in to orthographic views and perspective projections.
- To learn the principles of projection of simple solids.
- To gain the knowledge about the section of solids and development of surfaces of the given solids.

UNIT I PLANE CURVES (Manual drafting) 9+3

Principles of Engineering Graphics and their significance, usage of Drawing instruments, Types of Lines, Dimensioning Systems as per BIS conventions. **(Not for Examination)**
Construction of ellipse – Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the curves.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES (Manual drafting) 9+3

Projection of points – Projection of straight lines located in the first quadrant – Determination of true lengths and true inclinations – Projection of polygonal surface and circular lamina inclined to one reference planes.

UNIT III ORTHOGRAPHIC AND PERSPECTIVE PROJECTIONS (Manual drafting) 9+3

Conversion of isometric projection into orthographic projection. Perspective projection of prisms, pyramids, cones and cylinders by visual ray method.

UNIT IV PROJECTION OF SOLIDS (CAD software) 9+3

Projections of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT V SECTION OF SIMPLE SOLIDS AND DEVELOPMENT OF SURFACES (CAD software) 9+3

Sectioning of simple solids like prisms – pyramids, cylinder and cone - Inclined to one reference plane. Development of lateral surfaces of simple and truncated solids: Prisms, Pyramids, Cylinders and Cones.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Predict the construction of various curves.

- Analyze the principles of projection of various planes by different angle to project points, lines and plane surfaces.
- Draw the projection of three dimensional into two dimensional objects and perspective projections**.**
- Draw the principles of projection of simple solids by change of position method.
- Construct the sectional views of components and develop the component surface.

TEXT BOOKS

1. Venugopal K. and Prabhu Raja V., - "Engineering Graphics", Fifteenth Edition, New Age International (P) Limited, 2018.
2. Natarajan K.V., "Engineering Graphics", Thirty Second Edition, Dhanalakshmi Publishers, 2019.
3. Bhatt N.D., "Engineering Drawing", Fifty Third Edition Charotar Publishing House Pvt. Ltd., 2014.

REFERENCES

1. K.R. Gopalakrishna, "Engineering Drawing Volume 1 & 2", Fifty Fifth Edition, Subhas Publications, Bangalore, 2017.
2. T.Jeyapoovan., "Engineering Graphics using Auto CAD" Third Edition, vikas publishing house Pvt Ltd, New Delhi, 2017.
3. Dhananjay A. JoIhe, Engineering Drawing with an introduction to AutoCAD, Tata McGraw Hill Publishing Company Limited, 2008.

E- RESOURCES

1. https://nptel.ac.in/courses/112/103/112103019/ - (Geometric Constructions)
2. https://nptel.ac.in/courses/105/104/105104148/ - (Projections)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
2	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
3	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
4	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
5	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	2	2	-	2	2	-	-	-	2	-	2	2	2	2

1-Low 2-Medium 3-High '-' – No Correlation.

23EEE202 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LT P C

(Lab Embedded Theory Course) **3 0 2 4**

OBJECTIVES

- To understand electric circuit laws, single and three phase circuits, wiring and measuring instruments.
- To know working principles of electrical machines.
- To realize the working principle of various electronic devices and applications.
- To apply the principles of digital electronics in digital world.
- To familiarize the use of various measuring instruments.
- To provide practical knowledge on electrical and electronics engineering

UNIT I ELECTRICAL CIRCUITS 9

DC circuits: Circuit components: Conductor, Resistor, Inductor, Capacitor - Ohm's Law - Kirchhoff's Laws - Independent and Dependent sources - Nodal analysis, Mesh analysis with Independent sources only (Steady state) – Thevenin's theorem – Maximum Power Transfer theorem. Introduction to AC circuits and parameters: Waveforms, Average value, RMS value, Instantaneous power, real power, reactive power and apparent power, power factor - Steady state analysis of RL, RC & RLC circuits.

UNIT II ELECTRICAL MACHINES 9

DC Generators: Construction and working principle, EMF equation, Types and applications – DC Motors: Working principle, Types and applications - Construction, Working principle and applications: Single phase transformer, Three phase alternator and Three phase induction motor – BLDC Stepper Motor – PMSM.

UNIT III ANALOG ELECTRONICS 9

PN junction diodes and its applications - Zener diode: structure, operation, Zener diode as regulator – Biasing of BJT - JFET, SCR, MOSFET, IGBT - Types, VI characteristics.

UNIT IV DIGITAL ELECTRONICS 9

Review of number systems, binary codes, Combinational logic - Representation of logic functions - SOP and POS forms, K-map representations - Minimization using K maps - Half adder, Full adder – Multiplexer, Demultiplexer.

UNIT V MEASUREMENTS AND INSTRUMENTATION 9

Operating principle and Types of Moving coil and Moving iron meters - Measurement of power and Energy meter - Data acquisition.

LIST OF EXPERIMENTS

1. Verification of KVL & KCL.
2. Load test on DC shunt motor.
3. Characteristics of PN and zener diodes
4. Characteristics of BJT.
5. Half wave and full wave rectifiers
6. Verifications of Half adder and Full adder.
7. Measurement of power and Energy meter.

TOTAL : 45+15 PERIODS

OUTCOMES

Upon completion of the course, the students will be able to:

- To understand electric circuits and choose appropriate instruments for electrical measurement for a specific application.
- To understand the concept of different types of DC and AC machines.
- To identify the diode's usage as a rectifier, and Zener diode's usage as an voltage regulator and discuss the basic characteristics of BJT.
- To employ Boolean algebra to implement the combinational logic circuits.
- To understand the operating principles of measuring instruments and choose suitable instrument for measuring the parameters.
- To understand and analyze practical electrical and electronics engineering.

TEXT BOOKS

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020.
2. S. K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2017.

REFERENCES

1. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019.
2. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2021.

E-RESOURCES

1. https://nptel.ac.in/courses/108108076 - (Basics of Electrical Technology).
2. https://www.digimat.in/nptel/courses/video/108105112/L01.html -(Fundamentals of Electrical Engineering).

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	3	-	1	-	3	-	-	-	-	2	-	-	-
2	1	-	2	-	1	-	-	-	-	-	-	-	-	-	-
3	2	2	3	1	1	1	-	-	-	-	-	1	-	-	-
4	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-
5	2	1	2	1	3	-	1	-	-	-	-	-	-	-	-
6	2	3	-	2	3	-	-	-	-	-	-	-	-	-	-
AVG	1.6	1.6	2.4	1.25	1.8	1	2	-	-	-	-	1.5	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation.

23GEL201 ENGINEERING PRACTICES LABORATORY LT P C
0 0 4 2

OBJECTIVES:

The main learning objective of this course is to provide hands on training to the students in:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials used in commonhousehold wood work.
2. Wiring various electrical joints in common household electrical wire work.
3. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.
4. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.GROUP – A (CIVIL & ELECTRICAL)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Preparing plumbing line sketches.
c) Laying pipe connection to the suction side of a pump
d) Laying pipe connection to the delivery side of a pump.
e) Connecting pipes of different materials: Metal, plastic and flexible pipes used inhousehold appliances.

WOOD WORK:

a) Sawing,
b) Planing and
c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

a) Studying joints in door panels and wooden furniture
b) Studying common industrial trusses using models.

PART II ELECTRICAL ENGINEERING PRACTICES 15

a) Introduction to switches, fuses, indicators and lamps - Basic switch boardwiring with lamp, fan and three pin socket
b) Staircase wiring
c) Fluorescent Lamp wiring with introduction to CFL and LED types.
d) Energy meter wiring and related calculations/ calibration
e) Study of Iron Box wiring and assembly
f) Study of Fan Regulator (Resistor type and Electronic type usingDiac/Triac/quadrac)
g) Study of emergency lamp wiring/Water heater

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III MECHANICAL ENGINEERING PRACTICES 15

WELDING WORK:

a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
b) Practicing gas welding.

BASIC MACHINING WORK:

a) (simple)Turning.
b) (simple)Drilling.
c) (simple)Tapping.

ASSEMBLY WORK:

Assembling a centrifugal pump.
Assembling a household mixer.
Assembling an airconditioner.

SHEET METAL WORK:

a) Making of a square tray

FOUNDRY WORK:

a) Demonstrating basic foundry operations.

PART IV ELECTRONIC ENGINEERING PRACTICES 15

SOLDERING WORK:

a) Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

a) Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

Study an elements of smart phone..
Assembly and dismantle of LED TV.
Assembly and dismantle of computer/ laptop.

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this course, the students will be able to:

CO1: Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2: Wire various electrical joints in common household electrical wire work.

CO3: Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.

CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
AVG	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1

1-Low 2-Medium 3-High '-' – No Correlation.

23EEC201 **COMMUNICATION SKILLS** **L T P C**

(Common to all B.E. & B.Tech. branches) **0 0 4 2**

OBJECTIVE

- To use vocabularies appropriately in a sentence and various situations.
- To improve communicative competence through listening.
- To make effective presentations and group discussions.
- To read and recognize different context.
- To write paragraph, essay and special addresses.

UNIT I VOCABULARY **6**

Vocabulary building – Articulate ideas and thoughts; usage of palindromes, greetings, wishes, festival related words - Vocabulary Words with Sentences. - Idiomatic Expressions.

UNIT II LISTENING **6**

Listening Skill- Its importance – Purpose - Process - Types- Barriers - Effective Listening strategies- Listening to telephonic conversations – Watching Inspiring Speech videos on Youtube - Listening native speaker's videos for pronunciation - Listening to broadcast, messages, announcements - Listening to Instagram Videos.

UNIT III SPEAKING **6**

JAM Talk - Role play - Debate - Conversational skills (formal and informal) - Conversation practice - Group Discussion and Interview Skills – Introducing oneself and others – Goal Settings - Immediate, Long term and short term.

UNIT IV READING **6**

Reading for the Main idea- Finding Specific Information - Reading for Detail - Read and recognize different text types ranging from newspaper, articles, magazines, books and Reading autobiographies.

UNIT V WRITING **6**

Paragraph Writing - Essay writing - Creative writing - Special Address on Specific topic - Welcome Address, vote of Thanks.

TOTAL: 30 PERIODS

OUTCOMES

Upon completion of the course, students will be able to:

- Improve vocabulary and express the same contextually.
- Listen and comprehend the general and technical text.
- Speak effectively in presentation, debate and group discussions.
- Read and understand the concept from newspapers, articles, magazines and books.
- Draft special addresses, welcome address, vote of thanks and write paragraph and essay.

TEXT BOOKS

1. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011
2. Brooks,Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011

REFERENCES

1. Davis, Jason and Rhonda LIss. Effective Academic Writing (Level 3) Oxford University Press: Oxford, 2006
2. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan:
3. Anderson, Kenneth et al. Study Speaking: A Course in Spoken English for Academic Purposes. United Kingdom: Cambridge University Press 1992.
4. Technical communication by Asraf rezvi

EXTENSIVE READING

1. Dr. A. P. J. Abdul Kalam " Wings of Fire "

E-RESOURCES

1. https://youglish.com
2. https://newsinlevels.com
3. https://britishcouncil.org
4. https://writeandimprove.com

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	-	-	-	-	-	1	1	1	1	3	-	3	-	-	-
2	-	-	-	-	-	1	-	-	1	3	-	3	-	-	-
3	-	-	-	-	-	1	2	2	3	3	-	3	-	-	-
4	-	-	-	-	-	2	2	-	3	3	-	3	-	-	-
5	-	-	-	-	-	1	1	-	1	3	-	3	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	-	-	-	-	-	1.2	1.5	1.5	1.8	3	-	3	-	-	-

1- Low 2-Medium 3-High '-' – No Correlation

SEMESTER III

23MAT303	DISCRETE MATHEMATICS [Common to CSE, CSE (CS), IT and AI&DS]	L T P C 3 1 0 4

OBJECTIVES

- To acquaint the knowledge of logic and proofs.
- To learn induction and counting techniques in Combinatorics area.
- To understand the knowledge of graph theory.
- To familiarize the applications of algebraic structures.
- To know the concepts and significance of lattices and Boolean algebra.

UNIT I LOGIC AND PROOFS **9+3**

Propositional logic – Propositional equivalences – Predicates and quantifiers – Nested quantifiers – Rules of inference – Introduction to proofs – Normal forms.

.UNIT II INDUCTION AND COUNTING **9+3**

Mathematical induction – Strong induction and well-ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Binomial coefficients – Generating functions – Inclusion and exclusion principle

UNIT III GRAPHS **9+3**

Graphs and graph models – Graph terminology and special types of graphs – Representing Graphs and Graph Isomorphism – Euler and Hamilton paths – Trees: Introduction to Trees.

UNIT IV ALGEBRAIC STRUCTURES **9+3**

Algebraic systems – Semi groups and monoids – Groups: Definitions and examples – Subgroups and homeomorphisms – Cosets and Lagrange's theorem – Normal subgroups – Definitions and examples of Rings and Fields.

UNIT V LATTICES AND BOOLEAN ALGEBRA **9+3**

Lattices as partially ordered sets: Definitions and examples – Some properties of lattices – Lattices as algebraic systems – Sub lattices, direct product and homomorphism – Some special lattices – Boolean algebra.

TOTAL : 45+15=60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Analyze the concept of logic and proofs.
- Apply the basic concepts of induction and counting techniques in Combinatorics area.
- Develop the application of graph theory.
- Classify the concepts and properties of algebraic structures such as groups, rings and fields.
- Develop the real-time applications using lattices.

TEXTBOOKS

1. Kenneth H Rosen, "Discrete Mathematics and its Applications", Seventh Edition, McGraw Hill Education (India) Private Ltd., New Delhi, Special Indian Edition, 2011.
2. Tremblay, J.P. and Manohar.R, " Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw Hill Pub. Co. Ltd, New Delhi, Thirteeth Reprint, 2011.

REFERENCES

1. Ralph P Grimaldi and B.V Ramana., "Discrete and Combinatorial Mathematics: An Applied Introduction", Fifth Edition, Pearson Education limited, 2014.
2. Satinder Bal Gupta., "Discrete Mathematics and structures ", University science press, New Delhi, Fifth Edition, 2008.

E-RESOURCES

1. https://nptel.ac.in/courses/106106183 (Discrete Mathematics)
2. https://nptel.ac.in/courses/106108227 (Discrete Mathematics)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
2	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
3	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
4	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
5	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	3	2	1	-	-	-	-	-	1	-	-	-	-	-

1-Low 2-Medium 3-High '-' – No Correlation

23CST301 DATA STRUCTURES AND ALGORITHMS L T P C
3 0 0 3

OBJECTIVES

- To understand the concepts of ADTs.
- To Learn linear data structures – stacks, and queues.
- To understand non-linear data structures – trees and graphs.
- To understand and apply the algorithm analysis techniques on searching , sorting algorithms.
- To understand different algorithm design techniques and the concepts behind NP Completeness.

UNIT I LISTS 9

Abstract Data Types (ADTs) - List ADT - Array-based implementation - Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT – Radix Sort – Multilists.

UNIT II STACKS AND QUEUES 9

Stack ADT – Operations – Applications-- Balancing Symbols – Evaluating arithmetic expressions – Infix to Postfix conversion – Function Calls - Queue ADT - Operations - Circular Queue – DeQueue – Applications of Queues.

UNIT III TREES AND GRAPHS 9

Tree ADT – Tree Traversals – Binary Tree ADT – Expression trees – Binary Search Tree ADT - AVL Trees - Priority Queue (Heaps) - Binary Heap-B-Tree - B+ Tree - Graph Definition - Representation of Graphs - Types of Graph - Breadth-first traversal - Depth-first traversal - Topological Sort - Dijkstra's algorithm - Minimum Spanning Tree - Prim's algorithm - Kruskal's algorithm.

UNIT IV ALGORITHM ANALYSIS 9

Time and space complexity - Asymptotic Notations and its properties Best case, Worst case and average case analysis - Recurrence relation: substitution method - Lower bounds - Searching: linear search and binary search . Sorting: Insertion sort and heap sort.

UNIT V ALGORITHM DESIGN TECHNIQUES 9

Divide and Conquer methodology: Finding maximum and minimum - Merge sort - Quick sort Dynamic programming: Elements of dynamic programming – Matrix-chain multiplication - Multi stage graph – Optimal Binary Search Trees. Greedy Technique: Elements of the greedy strategy - Activity-selection problem -- Optimal Merge pattern – Huffman Trees.NP-algorithms - NP-hardness and NP-completeness.

TOTAL : 45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Implement the ADT's concepts.
- Understand linear and non–linear data structure operations.
- Apply graph algorithms to solve problems and analyse their efficiency.
- Analyze the efficiency of recursive and non-recursive algorithms mathematically.
- Implement and analyze the problems using different algorithmic design techniques.

TEXTBOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education,2005.
2. Kamthane, "Introduction to Data Structures in C, First Edition", Pearson Education, 2007
3. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

REFERENCES

1. Langsam, Augenstein and Tanenbaum, "Data Structures Using C and C++", Second Edition, Pearson Education, 2015.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms",Reprint Edition, Pearson Education, 2006.
3. S. Sridhar, "Design and Analysis of Algorithms", Oxford university press, 2014.

E-RESOURCES

1. https://archive.nptel.ac.in/courses/106/106/106106127/ (Data structures and algorithms)
2. https://archive.nptel.ac.in/courses/106/102/106102064/ (Introduction to data structures)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3
6	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
AVG	2	2	1	2	2	1	1	0	1	2	1	2	2	1	2

1-Low 2-Medium 3-High '-' – No Correlation

23ECT302 ANALOG AND DIGITAL COMMUNICATION L T P C
3 0 0 3

OBJECTIVES

- To learn the concepts of Analog Modulation.
- To study the various pulse modulation techniques.
- To study the various digital communication techniques.
- To learn the information theory and coding.
- To study the spread spectrum and multiple access.

UNIT I ANALOG MODULATION 9

Amplitude Modulation – AM, DSBSC, SSBSC, VSB – PSD, modulators and demodulators – Angle modulation – PM and FM – PSD, modulators and demodulators – Super heterodyne receivers.

UNIT II PULSE MODULATION 9

Low pass sampling theorem – Quantization – PAM – Line coding – PCM, DPCM, DM, and ADPCM And ADM, Channel Vocoder – Time Division Multiplexing, Frequency Division Multiplexing.

UNIT III DIGITAL MODULATION AND TRANSMISSION 9

Phase shift keying – BPSK, DPSK, QPSK – Principles of M-ary signaling M-ary PSK & QAM – Comparison, ISI – Pulse shaping – Duo binary encoding – Cosine filters – Eye pattern, equalizers.

UNIT IV INFORMATION THEORY AND CODING 9

Measure of information – Entropy – Source coding theorem – Shannon-Fano coding, Huffman Coding, LZ Coding – Channel capacity – Shannon-Hartley law – Shannon's limit – Error control codes – Cyclic codes, Syndrome calculation – Convolution Coding, Sequential and Viterbi decoding.

UNIT V SPREAD SPECTRUM AND MULTIPLE ACCESS 9

PN sequences – properties – m-sequence – DSSS – Processing gain, Jamming – FHSS – Synchronization and tracking – Multiple Access – FDMA, TDMA, CDMA.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to,

- Discuss the concepts of Analog Modulation.
- Develop the Pulse modulation and Multiplexing.
- Classify the digital modulation and transmission techniques.

- Analyze Source and Error control coding.
- Determine the Multiple access techniques.

TEXT BOOKS

1. H Taub, D L Schilling, G Saha, "Principles of Communication Systems", Third Edition, TMH 2007.
2. S. Haykin, "Digital Communications", Fourth Edition,John Wiley, 2005.

REFERENCES

1. B.P.Lathi, "Modern Digital and Analog Communication Systems", Third edition, Oxford University Press, 2007.
2. H P Hsu, "Analog and Digital Communications", Schaum Outline Series, TMH, 2006.

E – RESOURCES

1. https://nptel.ac.in/courses/117/105/117105143/ (Analog Communication).
2. https://nptel.ac.in/courses/117/102/117102059/(Introduction to Communication Engineering)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	1	1	-	2	1	-	-	1	-	2	2	1	2
2	2	2	3	3	2	2	2	--	-	1	1	2	2	2	2
3	2	2	3	2	2	2	1	-	-	1	1	2	2	2	2
4	2	2	3	2	2	2	1	-	-	1	1	2	2	2	2
5	2	2	2	2	2	2	1	-	-	2	2	1	2	2	1
6	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**-**	**-**	**1**	**1**	**2**	**2**	**2**	**2**
AVG	2	1	1	1	-	2	1	-	-	1	-	2	2	1	2

1-Low 2-Medium 3-High '-' – No Correlation

23CSE301 OBJECT ORIENTED PROGRAMMING L T P C

3 0 2 4

OBJECTIVES

- To understand Object Oriented Programming concepts and basics of Java programming language.
- To know the principles of packages, inheritance and interfaces.
- To develop a java application with exceptions and threads.
- To learn I/O streams and String handling functions.
- To study and build Graphical User Interface Application using JAVAFX.
- To implement the java applications in OOPs concepts.

UNIT I INTRODUCTION TO OOP AND JAVA 9

Overview of OOP – Object oriented programming paradigms – Features of Object Oriented Programming – Java Buzzwords – Overview of Java – Data Types, Variables and Arrays – Operators – Control Statements – Programming Structures in Java – Defining classes in Java – Constructors-Methods -Access specifiers - Static members- Java Doc comments

UNIT II INHERITANCE, PACKAGES AND INTERFACES 9

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding – Dynamic Method Dispatch –Abstract Classes – final with Inheritance. Packages and Interfaces: Packages – Packages and Member Access –Importing Packages – Interfaces.

UNIT III EXCEPTION HANDLING AND MULTITHREADING 9

Exception Handling basics – Multiple catch Clauses – Nested try Statements – Java's Built-in Exceptions – User defined Exception. Multithreaded Programming: Java Thread Model– Creating a Thread and Multiple Threads – Priorities – Synchronization – Inter Thread Communication- Suspending –Resuming, and Stopping Threads –Multithreading. Wrappers – Auto boxing**.**

UNIT IV I/O, GENERICS, STRING HANDLING 9

I/O Basics – Reading and Writing Console I/O – Reading and Writing Files. Generics: Generic Programming – Generic classes – Generic Methods – Bounded Types – Restrictions and Limitations. Strings: Basic String class, methods and String Buffer Class.

UNIT V JAVAFX EVENT HANDLING, CONTROLS AND COMPONENTS 9

JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, ToggleButton – RadioButtons – ListView – ComboBox – ChoiceBox – Text Controls – ScrollPane. Layouts – FlowPane – HBox and VBox – BorderPane – StackPane – GridPane. Menus– Basics – Menu – Menu bars – Menu Item.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Solve problems by using sequential search, binary search, and quadratic sorting algorithms(selection, insertion)
2. Develop stack and queue data structures using classes and objects.
3. Develop a java application with an Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for staff club funds. Generate pay slips for the employees with their gross and net salary.
4. Write a Java Program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea( ) that prints the area of the given shape.
5. Implement exception handling and creation of user defined exceptions.
6. Write a java program that implements a multi-threaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, the second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of the cube of the number.
7. Write a program to perform file operations.
8. Develop applications to demonstrate the features of generics classes.
9. Develop applications using JavaFX controls, layouts and menus.
10. Develop a mini project for any application using Java concepts.

TOTAL: 45 +15=60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Apply the concepts of classes and objects to implement java applications.
- Develop programs using inheritance, packages and interfaces.
- Discuss exception handling mechanisms and multithreaded model to solve real world problems.
- Apply the Java applications with I/O packages, string classes, Collections and generics concepts.
- Explain the concepts of event handling and Java FX components and controls for developing GUI based applications.
- Implementation of GUI based java application using OOPs concepts.

TEXT BOOKS

1. Herbert Schildt, "Java: The Complete Reference", Eleventh Edition, McGraw Hill Education, NewDelhi, 2019
2. Herbert Schildt, "Introducing Java FX 8 Programming", First Edition, McGraw Hill Education, NewDelhi, 2015

REFERENCES

1. Cay S. Horstmann, "Core Java Fundamentals", Volume 1, Eleventh Edition, Prentice Hall,2018.
2. Reema Therja, "Programming in C", Oxford University Press, Second Edition, 2016.

E-RESOURCES

1. https://nptel.ac.in/courses/106/105/106105085/ (Introduction to C Programming)
2. https://nptel.ac.in/courses/106/105/106106210/ (Stack Operations)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	1	1	3	1	3	-	-	-	3	2	2	2	3	1	2
2	2	1	3	2	1	-	-	-	2	1	1	3	3	3	2
3	3	3	1	2	2	-	-	-	3	2	1	2	3	1	3
4	3	1	2	2	2	-	-	-	1	2	1	3	3	1	1
5	1	1	2	3	2	-	-	-	3	2	1	2	3	3	3
6	1	1	2	3	1				1	1	3	2	3	1	2
AVG	2	1	2	2	2	-	-	-	2	2	1	2	3	2	2

1-Low 2-Medium 3-High '-' – No Correlation

23GEE301 PROBLEM SOLVING AND PYTHON PROGRAMMING L T P C
3 0 2 4

OBJECTIVES

- To understand the basics of algorithmic problem solving.
- To learn the data types, expressions and the statements in python.
- To study the Python functions and function calls to solve problems.
- To learn python data structures-list, tuples, dictionaries to represent complex data.
- To understand the file modules and python packages.
- To practice various computational operations and develop solutions using python.

UNIT I COMPUTATIONAL THINKING AND PROBLEM SOLVING 9

Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocksofalgorithms(statements,state,controlflow,functions),notation(pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

UNIT II DATA TYPES, EXPRESSIONS, STATEMENTS 9

Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points

UNIT III CONTROL FLOW, FUNCTIONS, STRINGS 9

Conditionals: Boolean values and operators, conditional (if), alternative (if-else),chained conditional (if-elif-else);Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

UNIT IV LISTS,TUPLES, DICTIONARIES 9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations andmethods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation

UNIT V FILES, MODULES, PACKAGES & DATA VISUALIZATION 9

Files and exceptions: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative

programs: word count, copy file - Importing Matplotlib – Introduction to plotting – visualizing errors – density and contour plots – Histograms.

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LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.)
2. Python programming using simple statements and expressions (exchange the values of two variables, circulate the values of n variables, distance between two points).
3. Scientific problems using Conditionals and Iterative loops.(Number series,Number Patterns, pyramid pattern)
4. Implementation of real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building – operations of list & tuples)
5. Implementation of real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementation of programs using Functions.(Factorial,largest number in a list,area of shape)
7. Implementation of programs using Strings.(reverse,palindrome,charecter
8. count,replacingcharacters)
9. Implemenation of programs using written modules and Python Standard Libraries(p and as, numpy. Matplotlib, scipy)
10. Implementation of real-time/technical applications using File handling.(copy from one file to another, word count, longest word)
11. Implementation of real-time/technical applications using Exception handling.(divide by zero error, voter's age validity, student mark range validation)

TOTAL:45+15= 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Develop algorithmic solutions to solve simple computational problems.
- Develop python programs using expressions to solve the problem.
- Deploy functions and function calls to decompose python programs.

- Implement solutions using compound data in Python lists, tuples, dictionaries.
- Utilize file modules and python packages for developing applications
- Implement python programs for solving various computational problems

TEXT BOOKS

1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", O'Reilly Publishers , Second Edition, , 2016.
2. Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", BCS Learning & Development Limited ,First Edition, 2017.

REFERENCES

1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, First Edition, 2021.
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", Notion Press ,First Edition , 2021.

E-RESOURCES

1. https://nptel.ac.in/courses/106104074(Introduction to Algorithms)
2. https://archive.nptel.ac.in/courses/106/106/106106182/ (Joy of Computing)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	2	3	-	-
3	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
4	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
5	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
6	2	2	-	-	2	-	-	-	-	-	1	-	2	-	-
AVG	2.33	2.5	1.5	1.83	1.83	-	-	-	-	-	1.5	0.66	2.66	0.5	-

1-Low 2-Medium 3-High '-' – No Correlation

23ECE303 DIGITAL PRINCIPLES AND COMPUTER ARCHITECTURE L T P C
3 0 2 4

OBJECTIVES

- To learn the Digital fundamentals, Boolean algebra and its applications in digital systems.
- To study with the design of various combinational digital circuits using logic gates.
- To know the design procedures for synchronous and asynchronous sequential circuits.
- To learn the basic structure and registers of a computer.
- To study the memory hierarchies, cache memories and virtual memories.
- To learn practical experience with designing and implementing concepts of micro processor systems using 8085 micro processor.

UNIT I INTRODUCTION TO DIGITAL CIRCUITS 9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT II COMBINATIONAL CIRCUITS 9

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.

UNIT III SEQUENTIAL CIRCUITS 9

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of synchronous & asynchronous circuits – Design Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters-Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT IV COMPUTER ARCHITECTURE AND REGISTERS 9

Basics of a computer system: Evolution, Ideas, Technology, Performance, Power wall, Uniprocessors to Multiprocessors. Addressing and addressing modes. Instructions: Operations and Operands, Representing instructions, Logical operations, control operations.

UNIT V MEMORY AND I/O ORGANIZATION 9

Memory hierarchy, Memory Chip Organization, Cache memory, Virtual memory. Parallel Bus Architectures, Internal Communication Methodologies, Serial Bus Architectures, Mass storage, Input and Output Devices.

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LIST OF EXPERIMENTS

DIGITAL CIRCUITS

1. Verification of Boolean theorems using digital logic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates.
4. Design and implementation of parity generator / checker, magnitude comparator using basic gates and MSI devices.
5. Design and implementation of application using multiplexers/ Demultiplexers.
6. Design and implementation of Shift registers, Synchronous and Asynchronous counters.

COMPUTER ARCHITECTURE

1. Write a program using 8085 Microprocessor for Decimal, Hexadecimal addition and subtraction of two Numbers.
2. Write a program to arrange an array of data in ascending and descending order.
3. Find the largest and smallest number in an array of data using 8085 instruction set.
4. Write a simple Interrupt service routine to understand interrupt.

TOTAL:45+15= 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Develop real time applications through digital fundamentals.
- Design various combinational digital circuits using logic gates.
- Analyze and design procedures for synchronous and asynchronous sequential circuits.
- Apply the basics of computers, operations and instructions with design of arithmetic and logic unit.
- Discuss the various memory systems and bus architectures.
- Analyze the Digital circuits and 8085 microprocessors instruction set.

TEXT BOOKS

1. M. Morris Mano and Michael D. Ciletti, "Digital Design", Pearson, Fifth Edition, 2014.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann / Elsevier, Fifth Edition, 2014.

REFERENCES

1. S.Salivahanan and S.Arivazhagan, "Digital Electronics", Vikas Publishing House pvt Ltd ,First Edition, 2012.
2. John P. Hayes, "Computer Architecture and Organization", Tata McGraw Hill, Third Edition, 2012.

E-RESOURCES

1. https://nptel.ac.in/courses/108105132 (Digital electronics)
2. https://nptel.ac.in/courses/106102062 (Computer Architecture)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	2	2	2	-	-	-	-	3	3	3	3	2
2	3	2	2	3	2	2	-	-	-	-	2	1	2	3	2
3	3	3	3	2	1	2	-	-	-	-	2	2	3	2	2
4	3	3	2	3	2	2	-	-	-	-	3	2	2	3	1
5	3	2	3	2	2	1	-	-	-	-	2	2	3	3	2
6	3	2	1	3	2	2	-	-	-	-	2	3	2	2	2
AVG	3	2	2	3	2	2	-	-	-	-	2	2	3	3	2

1-Low 2-Medium 3-High '-' – No Correlation

SEMESTER IV

23ITT401 OBJECT ORIENTED SOFTWARE DESIGN L T P C
3 0 0 3

OBJECTIVES

- To understand the fundamentals of Software Engineering concepts.
- To study about the Requirement analysis and different Modelling Diagrams
- To know Design Patterns and Testing Methodology
- To learn the OO Basics and the case diagrams.
- To know the Impact of object orientation Test Cases and Test Plans

UNIT I INTRODUCTION 9

Software engineering concepts – Development activities – Software lifecycle models - Classical waterfall - Iterative waterfall – Prototyping – Evolutionary - Spiral – Software project management – Project planning – Estimation – Scheduling – Risk management – Software configuration management

UNIT II SOFTWARE REQUIREMENT SPECIFICATION 9

Requirement analysis and specification – Requirements gathering and analysis – Software Requirement Specification – Formal system specification – Finite State Machines – Petrinets – Object modelling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Functional modelling – Data Flow Diagram.

UNIT III DESIGN, TESTING & MAINTENANCE 9

Software design – Design process – Design concepts – Coupling – Cohesion – Functional independence – Design patterns –Testing – Unit testing – Black box testing– White box testing – Integration and System testing– Regression testing – Debugging - Program analysis – Symbolic execution – Model Checking-Maintenance and Reengineering-BPR model Reengineering process model-Reverse and Forward Engineering.

UNIT IV UNIFIED PROCESS AND USE CASE DIAGRAMS 9

Introduction to OOAD with OO Basics — Unified Process — UML diagrams — Use Case – Case study — the Next Gen POS system, Inception -Use case Modelling — Relating Use cases — include, extend and generalization — When to use Use-cases - Class Diagram-Aggregation and Composition — Relationship between sequence diagrams and use cases

UNIT V DESIGN PATTERNS & TESTING 9

GRASP: Designing objects with responsibilities — Creator — Information expert — Low Coupling — High Cohesion — Controller Design Patterns — creational — factory method — structural — Bridge - Adapter — behavioural — Strategy — observer –Applying GoF design patterns — Mapping design to code-object Oriented Methodologies — Software Quality Assurance — Impact of object orientation on Testing — Develop Test Cases and Test Plans

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Express software life cycle models with software models
- Identify various scenarios based on software requirements.
- Develop software design into pattern based design using design patterns
- Analyze the OO concepts using UML diagrams
- Identify various Patterns & Methodologies for Software Quality Assurance

TEXT BOOKS

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Pearson Education ,Third Edition, 2005.
2. Bernd Bruegge, Alan H Dutoit, "Object-Oriented Software Engineering", Pearson Education, Second Edition, , 2004.
3. Len Bass, Ingo Weber and Liming Zhu," DevOps: A Software Architect's Perspective", Pearson Education, 2016

REFERENCES

1. Rajib Mall," Fundamentals of Software Engineering", PHI Learning Pvt. Ltd., Third Edition, 2009.
2. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Addison Wesley, Third Edition, 2003

E-RESOURCES

1. https://nptel.ac.in/courses/106/105/106105182 (Software Models)
2. https://onlinecourses.nptel.ac.in/noc20_cs84/preview (OO models)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
6	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
AVG	2.5	1.6	1.8	2	1	-	-	-	2	1.5	1.8	2.6	1.6	1.6	1.8

1-Low 2-Medium 3-High '-' – No Correlation

23CST403 FOUNDATIONS OF DATA SCIENCE L T P C
3 0 0 3

OBJECTIVES

- To understand the data science fundamentals and process.
- To learn to describe the data for the data science process.
- To learn to describe the relationship between data.
- To study the Python libraries for Data Wrangling.
- To understand the data interpretation using visualization libraries in Python.

UNIT I INTRODUCTION 9

Data Science: Benefits and uses – facets of data - Data Science Process: Overview – Defining research goals – Retrieving data – Data preparation - Exploratory Data analysis – build the model– presenting findings and building applications - Data Mining - Data Warehousing – Basic Statistical descriptions of Data

UNIT II DESCRIBING DATA

Types of Data - Types of Variables -Describing Data with Tables and Graphs – Describing Data with Averages - Describing Variability - Normal Distributions and Standard (z) Scores

UNIT III DESCRIBING RELATIONSHIPS 9

Correlation –Scatter plots –correlation coefficient for quantitative data –computational formula for correlation coefficient – Regression –regression line –least squares regression line – Standard error of estimate – interpretation of r2 –multiple regression equations –regression towards the mean

UNIT IV PYTHON LIBRARIES FOR DATA WRANGLING 9

Basics of Numpy arrays –aggregations –computations on arrays –comparisons, masks, boolean logic – fancy indexing – structured arrays – Data manipulation with Pandas – data indexing and selection – operating on data – missing data – Hierarchical indexing – combining datasets – aggregation and grouping – pivot tables

UNIT V DATA VISUALIZATION 9

Importing Matplotlib – Line plots – Scatter plots – visualizing errors – density and contour plots – Histograms – legends – colors – subplots – text and annotation – customization – three dimensional plotting - Geographic Data with Basemap - Visualization with Seaborn.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of this course, the students will be able to:

- Explain the data science process.
- Describe different types of data description for data science process.
- Analyze the knowledge on relationship between data.
- Use the python libraries for data wrangling.
- Apply visualization Libraries in Python to interpret and explore data

TEXT BOOKS

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", ManningPublications, 2016. (Unit I)
2. Robert S. Witte and John S. Witte, "Statistics", Eleventh Edition, Wiley Publications, 2017.(Units II and III)
3. Jake VanderPlas, "Python Data Science Handbook", O'Reilly, 2016. (Units IV and V)

REFERENCES

1. Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.
2. Aviramblum, Johnhopcroft, Ravidrankannan "Foundations of data science",2020.

E-RESOURCES

1. https://nptel.ac.in/courses/106106179(data science for engineers)
2. https://nptel.ac.in/courses/110106072(a brief introduction to machine learning)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
6	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
AVG	2.5	1.6	1.8	2	1	-	-	-	2	1.5	1.8	2.6	1.6	1.6	1.8

1-Low 2-Medium 3-High '-' – No Correlation

23CST302 **OPERATING SYSTEMS** **L T P C**
3 0 0 3

OBJECTIVES

- To learn the basics and functions of operating systems
- To study the scheduling algorithms and process synchronization
- To understand the concept of memory management and segmentation
- To understand the storage management system
- To study the basics of virtual machines and Mobile OS

UNIT I INTRODUCTION **9**

Computer System – Elements and organization; Operating System Overview – Objectives and Functions – Evolution of Operating System; Operating System Structures – Operating System Services – User Operating System Interface – System Calls – System Programs – Design and Implementation – Structuring methods

UNIT II PROCESS MANAGEMENT **9**

Processes – Process Concept – Process Scheduling – Operations on Processes – Inter-process Communication; CPU Scheduling – Scheduling criteria – Scheduling algorithms: Threads – Multithread Models – Threading issues; Process Synchronization – The Critical-Section problem – Synchronization hardware – Semaphores – Mutex – Classical problems of synchronization – Monitors; Deadlock – Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from deadlock.

UNIT III MEMORY MANAGEMENT **9**

Main Memory – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation, Segmentation with paging; Virtual Memory – Demand Paging – Copy on Write – Page Replacement – Allocation of Frames –Thrashing.

UNIT IV STORAGE MANAGEMENT **9**

Mass Storage system – Disk Structure – Disk Scheduling and Management; File-System Interface – File concept – Access methods – Directory Structure – Directory organization – File system mounting – File Sharing and Protection; File System Implementation – File System Structure – Directory implementation – Allocation Methods – Free Space Management; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem

UNIT V VIRTUAL MACHINES AND MOBILE OS **9**

Virtual Machines – History, Benefits and Features, Building Blocks, Types of Virtual Machines and their Implementations, Virtualization and Operating-System Components; Mobile OS – iOS and Android

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Acquire knowledge about basics and functions of operating systems.
- Analyze various scheduling algorithms and process synchronization.
- Compare and contrast various memory management schemes.
- Describe the functionality of file systems, I/O systems, and Virtualization
- Apply Virtualization and compare iOS and Android Operating Systems.

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", John Wiley and Sons Inc., Tenth Edition, 2018
2. Andrew S Tanenbaum, "Modern Operating Systems", Pearson, Fifth Edition, 2022

REFERENCES

1. Ramaz Elmasri, A. Gil Carrick, David Levine, " Operating Systems – A Spiral Approach", Tata McGraw Hill Edition, 2010
2. William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall, Seventh Edition, 2018.

E-RESOURCES

1. https://nptel.ac.in/courses/106105214(Operating system fundamentals)
2. https://nptel.ac.in/courses/106106144(Introduction to operating systems)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	2	2	-	-	-	-	-	3	2	3	1	1	2
2	2	2	3	1	-	-	-	-	-	2	2	2	3	1	2
3	1	3	2	2	-	-	-	-	-	2	2	1	1	1	1
4	1	3	3	3	-	-	-	-	-	3	2	3	2	3	1
5	3	1	2	2	-	-	-	-	-	3	3	2	2	1	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2	2	2	1	-	-	-	-	-	2	2	2	2	1	2

1-Low 2-Medium 3-High '-' – No Correlation

23CSE401 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING **L T P C**
(Lab Embedded Theory Course) 3 0 2 4

OBJECTIVES

- To learn different search methods in artificial intelligence.
- To learn techniques for reasoning under uncertainty.
- To understand about various genetic algorithms.
- To know about FOIL
- To understand the graphical models of machine learning algorithms.
- To implement the various models in AI.

UNIT I INTRODUCTION **9**

Introduction – Definition- Problem Solving Methods – Search Strategies – Informed – Uninformed – Heuristics – Local Search Algorithms – Constraint Satisfaction Problems – Game Playing.

UNIT II KNOWLEDGE INFERENCE **9**

Knowledge representation -Production based system, Frame based system. Inference – Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster - Shafer theory.

UNIT III NEURAL NETWORKS AND GENETIC ALGORITHMS **9**

Neural Network Representations – perceptrons – Multilayer and Back propogation Algorithm – An Illustrative Examples: Face Recognition Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning – Parallelizing Genetic Algorithms.

UNIT IV LEARNING SET OF RULES **9**

Introduction – Sequential Covering Algorithms – Learning First-Order Rules – learning Sets of First-Order Rules: FOIL – Induction as Inverted Deduction – Inverting Resolution.

UNIT V GRAPHICAL MODELS **9**

Introduction – Geberative Models – d-Separation – Belief Propagation – Learning the Structure of Graphical Models – Hidden Markov Model.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Implementation of Uninformed search algorithms(BFS,DFS)
2. Implementation of Informed search algorithms(A*,memory-bounded A*)
3. Implement naïve Bayes models
4. Implement Bayesian Networks
5. Build Regression models
6. Build decision trees and random forests
7. Build SVM models
8. Implement ensembling techniques
9. Implement clustering algorithms
10. Implement EM for Bayesian networks
11. Build simple NN models
12. Build deep learning NN models

TOTAL: 45+15=60 PERIODS

OUTCOMES

Upon completion of the course, students will be able to,

- Use appropriate search algorithms for problem solving
- Apply appropriate algorithm for inference.
- Discuss neural networks and genetic algorithms for various problems.
- Apply set of rules for machine learning.
- Design systems that use appropriate graph models of machine learning.
- Design and develop various models in AI.

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Prentice Hall,2020.
2. M.TimJones,"Artificial Intelligence: A Systems Approach (Computer Science)",First Edition,Jones and Barlett Publishers,Inc.,2008.

REFERENCES

1. Kevin Night, Elaine Rich, and Nair B., "Artificial Intelligence", McGraw Hill, 2013.
2. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press, 2009.

E-RESOURCES

1. https://nptel.ac.in/courses/106/105/106105152/ (Different Types of Learning)
2. https://nptel.ac.in/courses/106/106/106106202/ (Learning Problem)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	3	-	-	-	-	1	3	3	3	1	2	2
2	1	1	1	3	1	-	-	-	1	2	1	3	2	3	2
3	2	1	2	1	1	-	-	-	2	1	1	3	1	1	1
4	3	1	3	1	-	-	-	-	2	1	2	1	2	2	2
5	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2
6	3	1	1	2	2	-	-	-	2	1	2	1	2	2	2
AVG	3	1	1	2	2	-	-	-	3	1	2	3	2	1	2

1-Low 2-Medium 3-High '-' – No Correlation

23CSE402 **DATABASE MANAGEMENT SYSTEMS** **L T P C**
(Lab Embedded Theory Course) **3 0 2 4**

OBJECTIVES

- To study the fundamentals of data models, relational algebra and SQL.
- To understand the database system using ER diagrams and to learn normalization techniques.
- To know the fundamental concepts of transaction processing– concurrency control techniques and recovery procedures.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To learn different advanced database techniques.
- To provide a practical knowledge about various commands and procedures in a RDBMS**.**

UNIT I RELATIONAL DATABASES **10**

Introduction :Database System Application – Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Embedded SQL– Dynamic SQL

UNIT II DATABASE DESIGN **9**

Entity-Relationship model – E-R Diagrams – Enhanced E-R Model – ER Design Issues – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT III TRANSACTIONS **9**

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery – Save Points – SQL Facilities for Concurrency and Recovery.

UNIT IV IMPLEMENTATION TECHNIQUES **9**

Overview of Physical Storage Media – Magnetic Disks – RAID – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Measure the Cost Estimation.

UNIT V ADVANCED TOPICS **9**

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features – XML Databases: XML Hierarchical Model, purpose of XML – Information Retrieval: IR Concepts and Advantages.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements.
2. Implement Relational model to entitle an strong and weak entities.
3. Database Querying – Simple queries, Nested queries, Sub queries and Joins.
4. Views, Sequences, Synonyms.
5. Database Programming: Implicit and Explicit Cursors.
6. Procedures and Functions.
7. Triggers.
8. Exception Handling.
9. Database Design using ER modelling, normalization and Implementation for any application.
10. Database Connectivity with Front End Tools.
11. Case Study using real life database applications.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Construct SQL queries using relational algebra.
- Design database using ER model and normalize the database.
- Construct queries to handle transaction processing and maintain consistency of the database.
- Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database.
- Analyze different advanced database techniques.
- Apply various commands and procedures to design RDBMS applications.

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts",Sixth Edition, Tata McGraw Hill,2011.
2. Ramez Elmasri,Shamkant B.Navathe," Fundamentals of Database Systems", Sixth Edition, Pearson Education,2011.

REFERENCES

1. C.J.Date,A.Kannan,S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education,2006.
2. Raghu Ramakrishnan, "Database Management Systems", McGraw–Hill, Fourth Edition, College Publications, 2015.

E-RESOURCES

1. https://nptel.ac.in/courses/106/105/106105175/ (Introduction to DBMS)
2. https://nptel.ac.in/courses/106/106/106106093/ (Conceptual Designs)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	2	3	2	1	-	-	-	2	1	1	1	2	1	3
2	3	1	1	2	1	-	-	-	2	3	3	3	1	1	2
3	3	2	3	2	1	-	-	-	2	1	1	2	3	3	3
4	1	2	3	2	-	-	-	-	3	2	3	3	2	2	3
5	1	1	3	3	2	-	-	-	1	3	3	1	2	2	2
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2	2	3	2	1	-	-	-	2	2	2	2	2	2	3

1-Low 2-Medium 3-High '-' – No Correlation

23ECE404 **EMBEDDED SYSTEMS AND IoT** **L T P C**
(Lab Embedded Theory Course) **3 0 2 4**

OBJECTIVES

- To study the concepts of 8085 and 8086.
- To know about the assembly language programming of 8051.
- To learn the layers of IoT.
- To aware the concepts of sensors and transducers.
- To learn Raspberry pi 3 and its configuration.
- To perform 8086 programs and the IoT applications**.**

UNIT I THE 8085 & 8086 MICROPROCESSOR 9

Introduction to Microprocessor(8085, 8086) architecture - Addressing modes - Instruction set and assembler directives - Assembly language programming - Modular Programming - Linking and Relocation - Stacks - Procedures - Macros - Interrupts and interrupt service routines - Byte and String Manipulation.

UNIT II MICROCONTROLLER & ITS INTERFACING 9

Architecture of 8051 - Special Function Registers (SFRs) - I/O Pins Ports and Circuits – Instruction set- Addressing modes-Assembly language programming. Programming8051Timers-SerialPortProgramming-InterruptsProgramming-LCD&Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation- Comparison of Microprocessor, Microcontroller, PIC and ARM processors.

UNIT III LAYERS OF IoT 9

Purpose and requirement specification, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Pillars of Embedded IoT and Physical Devices: The internet of devices.

UNIT IV SENSORS AND TRANSDUCERS 9

Principles – Classification – Parameters – Characteristics – Environmental Parameters (EP) – Characterization. -Inductive Sensors: Sensitivity and Linearity of the Sensor –Types-Capacitive Sensors: Electrostatic Transducer– Force/Stress Sensors Using Quartz Resonators – Ultrasonic Sensors.

UNIT V RASPBERRY PI 3 AND ITS CONFIGURATION 9

Raspberry Pi 3 - Rpi3 introduction and installing the Raspbian Stretch OS, Headless - Computer and Rpi3 configuration to connect through SSH via Ethernet, Headless - connecting Rpi3 remotely without Ethernet cable via SSH, IP address, Rpi 3 - Testing the GPIO pins through Scripts.

LIST OF EXPERIMENTS

8086 Programs using kits and MASM

1. Basic arithmetic and Logical operations.
2. Move a data block without overlap.
3. Ascending Descending Order.
4. Stepper motor control.
5. Keyboard and Display.
6. A/D and D/A interface and Waveform Generation.

Raspberry Pi and Interfacing Experiments

1. Coding simple programs in Python.
2. Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device.
3. Raspberry Pi interact with online services through the use of public APIs and SDKs.
4. Understanding the connectivity of Raspberry-Pi with IR sensor. Write an application to detect obstacle and notify user using LEDs.

TOTAL: 45+15=60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to:

- Analyze the concepts of 8085 and 8086 architecture.
- Discuss the different interfacing with peripheral devices.
- Develop the technology and standards relating to IoT's.
- Determine the classification of sensors and Transducers.
- Analyze the Raspberry Pi 3 and it configuration.
- Design and practice of 8086 and Raspberry Pi programs.

TEXTBOOKS

1. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin Mc Kinlay,"The 8051 Microcontroller and Embedded Systems:Using Assembly and C",Second Edition, Pearson education,2011.
2. RMD Sundaram Shriram K Vasudevan, Abhishek S Nagarajan, "Internet of Things", Second Edition, John Wiley and Sons,2020.

REFERENCES

1. Doughlas V.Hall, "Microprocessors and Interfacing, Programming and Hardware", TMH, 2012.
2. Cuno Pfister, "Getting Started with the Internet of Things", First Edition, Shroff Publisher/Maker Media, 2011.

E-RESOURCES

1. https://nptel.ac.in/courses/108/105/108105102/ (Microprocessors and Microcontrollers)
2. https://freevideolectures.com/course/4638/nptel- introduction - internet things (Interoperability in IoT, Introduction to Arduino Programming)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	2	1	1	1	-	2	1	-	-	1	-	2	2	1	2
2	2	2	3	3	2	2	2	--	-	1	1	2	2	2	2
3	2	2	3	2	2	2	1	-	-	1	1	2	2	2	2
4	2	2	3	2	2	2	1	-	-	1	1	2	2	2	2
5	2	2	2	2	2	2	1	-	-	2	2	1	2	2	1
6	2	2	2	2	2	2	1	-	-	1	1	2	2	2	2
AVG	2	2	3	2	1	-	-	-	2	2	2	2	2	2	3

1-Low 2-Medium 3-High '-' – No Correlation

MINOR DEGREE / HONOURS

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(MINOR/HONOURS DEGREE – MULTIMEDIA)

B.Tech. – INFORMATION TECHNOLOGY

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23ITMT01	Digital Design and Visual Communication	PC	3	0	0	3	40	60	100
23ITMT02	Mixed Reality	PC	3	0	0	3	40	60	100
23ITMT03	Digital Media and Storytelling	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23ITME04	Multimedia Production	PC	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23ITMP01	Project Work	EEC	0	0	12	6	40	60	100
Total Credits			**19**						

HS : Humanities and Social Sciences
BS : Basic Sciences
ES : Engineering Sciences
PC : Professional Core
PE : Professional Elective
OE : Open Elective
GE : General Elective
EEC : Employability Enhancement Courses
MC : Mandatory Courses
L : Lecture
T : Tutorial
P : Practical
C : Credit Point
CIA : Continuous Internal Assessment
ESE : End Semester Examination
TOT : Total

SEMESTER - III

23ITMT01 DIGITAL DESIGN AND VISUAL COMMUNICATION L T P C

3 0 0 3

OBJECTIVES

- To learn visually appealing designs.
- To learn hands-on experience with digital design software like Adobe Creative Suite
- To understand the ability to adapt visual content for diverse digital platforms, considering unique requirements and user experiences.
- To improve creative thinking and problem-solving skills, empowering students to tackle design challenges and devise innovative digital visual solutions.
- To design multimedia presentation for social media.

UNIT I FUNDAMENTALS OF GRAPHIC DESIGN 9

Introduction to visual elements (line, shape, color, etc.), Principles of design (balance, contrast, hierarchy, etc.), Typography and font usage, Creating digital illustrations and graphics

UNIT II DIGITAL IMAGING AND PHOTO EDITING 9

Image resolution and file formats, Photo editing techniques using Adobe Photoshop
Color correction and enhancement, Image manipulation and compositing

UNIT III VECTOR GRAPHICS AND ILLUSTRATION 9

Introduction to vector graphics and Adobe Illustrator, Creating scalable vector illustrations and logos, Working with bezier curves and paths, Using layers and effects for design elements

UNIT IV LAYOUT AND PUBLICATION DESIGN 9

Designing layouts for print and digital publications, Grid systems and page composition, Designing brochures, flyers, and posters, Interactive digital publishing platforms

UNIT V VISUAL COMMUNICATION FOR MULTIMEDIA 9

Applying design principles to multimedia projects, Creating multimedia presentations and infographics, designing for social media and mobile platforms, User engagement through visual storytelling

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Student will be able to:

- Create visually appealing and captivating designs that effectively communicate messages and ideas.

- Design software like Adobe Creative Suite, developing the skills needed to work proficiently in the digital design industry.
- Describe the vector graphics.
- Design brochures, flyers and posters.
- Develop multimedia presentations for social media.

TEXT BOOKS

1. Paul Martin Lester, "Visual Communication: Images with Messages", Routledge Publications, Seventh Edition,2018
2. Ellen Lupton, "Thinking with Type: A Critical Guide for Designers, Writers, Editors, & Students", Princeton Architectural Press Publications, Second Revised and Expanded Edition,2016

REFERENCES

1. Robin Williams, "The Non-Designer's Design Book" , Peach pit Publications, Fourth Edition.2016
2. Elizabeth Resnick ,"Design for Communication: Conceptual Graphic Design Basics" , Wiley Publications, Third Edition,2014

E- RESOURCES

1. https://onlinecourses.nptel.ac.in/noc21_ar17/preview (Visual Communication & Design)
2. https://www.classcentral.com/tag/visual-communication(Visual Communication for Design media)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	2	3	-	-	-	3	2	1	2	3	2	3
2	3	3	3	3	3	-	-	-	3	3	2	2	3	2	3
3	3	3	3	3	3	-	-	-	3	3	2	3	3	2	3
4	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
5	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	2.8	3	2.8	3	2.	-	-	3	2.8	2.2	2.6	3	2.4	3

1-Low 2-Medium 3-High '-' – No Correlation

SEMESTER IV

23ITMT02	MIXED REALITY	L T P C
		3 0 0 3

OBJECTIVES

- To understand the fundamental aspects and principles of AR/VR technologies.
- To learn the 3D models and viewing the 3D world.
- To understand about VR tool kit.
- To understand the various applications of virtual reality.
- To learn the augmented reality Methodology and Terminology.

UNIT I INTRODUCTION TO VIRTUAL REALITY AND AUGMENTED REALITY 9

Introduction to Virtual Reality and Augmented Reality – Definition – Introduction to Trajectories and Hybrid Space-Three I's of Virtual Reality – Virtual Reality Vs 3D Computer Graphics – Benefits of Virtual Reality – Components of VR System – Introduction to AR-AR Technologies- Input Devices – 3D Position Trackers – Types of Trackers – Navigation and Manipulation Interfaces – Gesture Interfaces – Types of Gesture Input Devices – Output Devices – Graphics Display – Human Visual System – Personal Graphics Displays – Large Volume Displays – Sound Displays – Human Auditory System.

UNIT II VR MODELING 9

Modeling – Geometric Modeling – Virtual Object Shape – Object Visual Appearance – Kinematics Modeling – Transformation Matrices – Object Position – Transformation Invariants –Object Hierarchies – Viewing the 3D World – Physical Modeling – Collision Detection – Surface Deformation – Force Computation – Force Smoothing and Mapping – Behavior Modeling – Model Management.

UNIT III VR PROGRAMMING 9

VR Programming – Toolkits and Scene Graphs – World ToolKit – Java 3D – Comparison of World ToolKit and Java 3D.

UNIT IV APPLICATIONS 9

Human Factors in VR – Methodology and Terminology – VR Health and Safety Issues – VR and Society-Medical Applications of VR – Education, Arts and Entertainment – Military VR Applications – Emerging Applications of VR – VR Applications in Manufacturing – Applications of VR in Robotics – Information Visualization – VR in Business – VR in Entertainment – VR in Education.

UNIT V AUGMENTED REALITY 9

Introduction to Augmented Reality (AR)- Computer vision for AR - Understanding the technology behind AR applications.- Interaction in Augmented Reality: Exploring methods of user interaction in AR environments.- Modelling and Annotation in AR: Creating virtual

objects and annotating the real world in AR.- Navigation in Augmented Reality: Techniques for guiding users within AR experiences- Wearable Devices in AR: Exploring the role of wearable devices in enhancing AR applications.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Student will be able to :

- Explain the fundamental concepts and principles of AR and VR.
- Describe 3D models and viewing the 3D world.
- Explain the VR tool kit
- Describe the various applications of virtual reality.
- Compare and contrast the AR/VR Methodology and Terminology.

TEXTBOOKS

1. Charles Palmer, John Williamson, "Virtual Reality Blueprints: Create compelling VR experiences for mobile", Packt Publisher, Third Edition, 2018.
2. Dieter Schmalstieg, Tobias Hollerer, "Augmented Reality: Principles & Practice", Addison Wesley, 2016.

REFERENCES

1. Steven M. LaValle, "Virtual Reality", Cambridge University Press, Fourth Edition, 2017.
2. Ramesh Raskar, Greg Welch, "Augmented Reality: Principles and Practice", A K Peters/CRC Press,Third Edition , 2017.

E- RESOURCES

1. https://learn.unity.com/course/virtual-and-augmented-reality (Virtual and Augmented Reality Development)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	2	-	3	-	-	-	2	2	1	2	2	1	2
2	3	2	2	1	3	-	-	-	3	2	2	3	3	1	2
3	3	3	2	2	3	-	-	-	3	2	1	2	3	2	2
4	3	3	3	2	3	-	-	-	3	2	2	3	3	2	2
5	3	3	3	3	3	-	-	-	3	3	3	3	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	**3**	**2.6**	**2.4**	**2**	**3**	-	-	-	**2.8**	**2.2**	**1.8**	**2.6**	**2.8**	**1.8**	**2.2**

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER V

23ITMT03 DIGITAL MEDIA AND STORYTELLING L T P C
3 0 0 3

OBJECTIVES

- To understand the principles of digital media production and storytelling.
- To learn students with various digital media platforms and tools used for storytelling.
- To understand engaging narratives using animation, motion graphics, images, audio, and video in digital media.
- To know crafting interactive and immersive digital stories for different audiences and contexts.
- To learn the user-generated content and community engagement in digital storytelling.

UNIT I INTRODUCTION TO DIGITAL MEDIA AND STORYTELLING 9

Overview of Digital Media and its Evolution- Understanding the Art of Storytelling in Various Media Forms- Role of Digital Media in Storytelling and Communication- Exploring Different Digital Media Platforms and Tools- Ethical and Legal Considerations in Digital Storytelling

UNIT II CREATING NARRATIVES WITH ANIMATION AND MOTION GRAPHICS 9

Introduction to Animation and Motion Graphics- Principles of Visual Storytelling in Animation - Techniques for Creating Engaging Animated Narratives- Using Motion Graphics to Enhance Storytelling- Animation and Motion Graphics Software Tools and Applications

UNIT III DIGITAL STORYTELLING TOOLS AND TECHNIQUES 9

Exploring Digital Storytelling Platforms and Software- Incorporating Images, Audio, and Video in Digital Stories- Interactive Elements and Hypermedia in Digital Narratives- Crafting Engaging Narratives with Multimedia Elements- Enhancing Emotional Impact in Digital Storytelling

UNIT IV CREATING USER-GENERATED CONTENT AND COMMUNITY 9

Understanding User-Generated Content (UGC) in Digital Storytelling - Fostering Community Engagement through Digital Narratives - Social Media and its Role in Sharing Digital Stories - Collaborative Storytelling and Co-Creation in Digital Media - Strategies for Building and Sustaining an Online Storytelling Community

UNIT V DIGITAL STORYTELLING ACROSS PLATFORMS AND CONTEXTS 9

Digital Storytelling for Web and Mobile Platforms - Storytelling through Social Media and Micro content - Interactive and Immersive Storytelling in Virtual Reality (VR) and Augmented Reality (AR)- Adapting Stories for Different Audiences and Cultures- Future Trends in Digital Media and Storytelling

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, Student will be able to:

- Describe the fundamental concepts and theories of digital media and storytelling, gaining insights into the evolution of storytelling in the digital age.
- Explain compelling narratives in digital media.
- Use storytelling techniques to different digital media platforms, such as websites, social media, and virtual reality.
- Describe their stories for specific audiences and cultural contexts.
- Design collaborative and interactive digital storytelling, fostering a sense of community and participation among their audiences.

TEXT BOOKS

1. Liz Blazer, "Animated Storytelling: Simple Steps For Creating Animation & Motion Graphics", Peachpit Press, Second Edition , 2015.

2. Joe Lambert, "Digital Storytelling: Capturing Lives, Creating Community", Fifth Edition, Routledge, 2021.

REFERENCES

1. Jason Ohler, "Digital Storytelling in the Classroom: New Media Pathways to Literacy, Learning, and Creativity", Corwin Publication, Second Edition , 2018.

2. Carolyn Handler Miller, "Digital Storytelling: Capturing Lives, Creating Community", Routledge, Fourth Edition 2019.

E- RESOURCES

1. https://elearningindustry.com/18-free-digital-storytelling-tools-for-teachers-and-students (Digital Storytelling in the Classroom)

2. https://tlp-lpa.ca/digital-skills/digital-storytelling (Animated Storytelling)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	2	1	1	-	-	-	1	2	3	2	3	1	1
2	2	3	3	3	1	-	-	-	1	2	2	1	1	1	1
3	2	2	3	3	1	-	-	-	3	1	1	1	2	1	2
4	2	2	2	2	1	-	-	-	3	1	1	1	2	2	2
5	2	1	3	3	1	-	-	-	3	2	1	2	2	2	1
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.2	1.8	2.6	2.4	1	-	-	-	2.2	1.6	1.6	1.4	2	1.4	1.4

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER VI

23ITME04 MULTIMEDIA PRODUCTION L T P C 3 0 2 4

OBJECTIVES

- To understand the multimedia elements.
- To learn the Principles of Visual Design in Multimedia.
- To understand the Audio Production in Multimedia - Recording and Editing Audio.
- To learn the Video Production in Multimedia- Shooting and Capturing Video Footage- Video Editing Techniques.
- To understand the Animation Principles- Creating 2D and 3D Animations.
- To learn interactive multimedia presentation using presentation software.

UNIT I INTRODUCTION 9

Overview of Multimedia Production- Understanding Multimedia Elements (text, graphics, audio, video, animation) - Introduction to Multimedia Software and Tools- Fundamentals of Communication and Multimedia Messaging- OSI Security Architecture in Multimedia

UNIT II GRAPHICS AND VISUAL DESIGN 9

Principles of Visual Design in Multimedia- Image Editing and Manipulation- Creating Vector Graphics and Illustrations- Typography and Text Design in Multimedia- Color Theory and its Application in Multimedia

UNIT III AUDIO PRODUCTION AND EDITING 9

Introduction to Audio Production in Multimedia - Recording and Editing Audio - Audio Effects and Sound Enhancement Techniques - Working with Music and Voiceovers- Audio Compression and Formats

UNIT IV VIDEO PRODUCTION AND EDITING 9

Basics of Video Production in Multimedia- Shooting and Capturing Video Footage- Video Editing Techniques and Software- Adding Visual Effects and Transitions- Video Compression and Formats for Different Platforms

UNIT V ANIMATION AND INTERACTIVITY 9

Understanding Animation Principles- Creating 2D and 3D Animations- Interactive Multimedia Elements (Buttons, Menus, Navigation)- Incorporating Animation and Interactivity into Multimedia Projects- Multimedia Authoring and Interactive Development Tools

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Use image editing software to enhance and manipulate photographs.
2. Record and edit audio using digital audio workstations (DAWs). Remove background Create composite images and apply various artistic effects Image Editing and

Manipulation noise, add effects, and mix audio tracks. Create a short audio composition or podcast.

3. Video Editing and Post-Production, Edit video footage using video editing software.
4. Create a 2D animation or motion graphics sequence using animation software.
5. Develop an interactive multimedia presentation using presentation software.
6. Design a website using HTML, CSS, and JavaScript. Create responsive layouts for various screen sizes.
7. Create a 3D model using 3D modeling software.
8. Design and develop a simple virtual reality experience using VR development tools.
9. Create an AR application using AR development platforms.
10. Design a multimedia project from concept to completion.

TOTAL: 45 + 15 =60 PERIODS

OUTCOMES

Upon completion of the course, Student will be able to:

- Describe the multimedia elements.
- Explain the Principles of Visual Design in Multimedia.
- Demonstrate the Audio Production in Multimedia - Recording and Editing Audio.
- Explain the Video Production in Multimedia- Shooting and Capturing Video Footage- Video Editing Techniques.
- Develop the 2D and 3D Animations.
- Design interactive multimedia presentation using presentation software.

TEXT BOOKS

1. Tay Vaughan, "Multimedia: Making It Work", McGraw-Hill Education, Second Edition, 2021.
2. Ze-Nian Li, Mark S. Drew, Jiangchuan Liu, "Fundamentals of Multimedia", Pearson, Second Edition, 2014.

REFERENCES

1. Jennifer Burg, "Audio/Video Protocol Handbook: For Multimedia Communications", CRC Press, 2017.

E – RESOURCES

1. https://www.lemonlight.com/blog/7-resources-to-learn-the-basics-of-video-production-online/(Basics of video production)
2. http://ecoursesonline.iasri.res.in/course/resources.php?id=688(Multimedia Principles)

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	3	2	3	-	-	-	3	2	1	2	3	2	3
2	3	3	3	3	3	-	-	-	3	3	2	2	3	2	3
3	3	3	3	3	3	-	-	-	3	3	2	3	3	2	3
4	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
5	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
6	3	3	3	3	3	2	-	-	3	3	3	3	3	3	3
AVG	3	2.8	3	2.8	3	2.0	-	-	3	2.8	2.3	2.7	3	2.5	3

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER VII

23ITMP01	PROJECT WORK	L T P C 0 0 12 6

OBJECTIVES

- To understand the skills to formulate a technical project.
- To know the ability to solve specific problem.
- To study the new tools, algorithms and techniques required to carry out the projects.
- To learn guidance on the various procedures for validation of the product and cost effectiveness.
- To study the guidelines to prepare technical report of the project.

GUIDELINES

The students in a group of 3, works on a specific topic approved by the faculty member who is familiar in the area of interest. The student can select any topic which is revelent to his/her specialization of the programme. The topic may be experimental or analytical or case studies. At the end of the semester, after completing the work to the satisfaction of the supervisor and the review committee, a detailed report should be prepared and submitted to the head of the department. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 180 PERIODS

OUTCOMES

Upon Completion of the project work, Students will be able to:

- Discuss the requirement and develop the design solutions.
- Construct the strategies and methodologies..
- Illustrate the prototype and analysis the cost effectiveness.
- Analyze the oral presentations.
- Apply the practical problem in the field of engineering and find better solutions to it.

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	1	1	3	-	2	-	-	2	1	1	3	3	3	3
2	3	3	1	3	-	2	-	-	2	1	1	3	3	3	3
3	2	2	2	3	-	2	-	-	2	1	1	3	1	1	1
4	3	1	1	3	-	2	-	-	2	1	1	3	3	3	3
5	3	3	1	3	-	2	-	-	2	1	1	1	3	1	1
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.8	2.0	1.20	3.0	-	2.0	-	-	2.0	1.0	1.0	2.60	2.60	2.20	2.20

1-Low, 2-Medium, 3-High,'-'-No Correlation

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(MINOR DEGREE / HONOURS - MULTIMEDIA)

CREDIT SUMMARY

B.Tech. INFORMATION TECHNOLOGY

Category	Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
PC	-	-	3	3	3	4	-	-	13
EEC	-	-	-	-	-	-	6	-	6
Total	-	-	3	3	3	4	6	-	19

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(MINOR / HONOURS DEGREE – CLOUD COMPUTING)

B.Tech. – INFORMATION TECHNOLOGY

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
THEORY									
23ITCT01	Cloud Based Services	PC	3	0	0	3	40	60	100
23ITCT02	Cloud Security and Compliance	PC	3	0	0	3	40	60	100
23ITCT03	Cloud Infrastructure and Management	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23ITCE04	Cloud Application Development	PC	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23ITCP01	Project Work	EEC	0	0	12	6	40	60	100
Total Credits			**19**						

PC : Professional Core

EEC : Employability Enhancement Courses

L : Lecture

T : Tutorial

P : Practical

C : Credit Point

CIA : Continuous Internal Assessment

ESE : End Semester Examination

TOT : Total

SEMESTER III

23ITCT01	CLOUD BASED SERVICES	L T P C
		3 0 0 3

OBJECTIVES

- To understand the cloud computing concepts, principles, and technologies.
- To learn various cloud architecture and components.
- To study the cloud platforms and their services.
- To know how to Integrate the databases and the storage services
- To understand cloud security and compliance considerations.

UNIT I INTRODUCTION TO CLOUD COMPUTING 9

Overview of cloud computing and its characteristics- Evolution and adoption of cloud computing in the industry- Cloud service models: IaaS, PaaS, and SaaS- Cloud deployment models: public, private, hybrid, and community clouds.

UNIT II CLOUD INFRASTRUCTURE AND VIRTUALIZATION 9

Cloud architecture and components.- Virtualization technology and its role in cloud computing - Managing virtual machines and containers.- Scalability and elasticity in the cloud.

UNIT III CLOUD SERVICE PROVIDERS AND PLATFORMS 9

Major cloud service providers (e.g., Amazon Web Services, Microsoft Azure, Google Cloud) - Exploring cloud platforms and their services- Introduction to server less computing and micro services.

UNIT IV CLOUD APPLICATION DEVELOPMENT 9

Building and deploying applications on the cloud- Integration of databases and storage services - Cloud-native application design principles.

UNIT V CLOUD SECURITY AND COMPLIANCE 9

Cloud security challenges and best practices- Identity and access management in the cloud - Data privacy and compliance considerations- Disaster recovery and backup strategies.

TOTAL: 45 PERIODS

OUTCOMES

Upon completing the course, Students will be able to,

- Describe the cloud computing concepts, principles, and technologies.
- Explain various cloud architecture and components.
- Describe the cloud platforms and their services.
- Explain the Integration of databases and storage services

- Describe cloud security and compliance considerations.

TEXT BOOKS

1. Thomas Erl, Ricardo Puttini, Zaigham Mahmood, "Cloud Computing: Concepts, Technology & Architecture", Prentice Hall, Publications, Second Edition, 2019.
2. Mark Johnson and Jonathan Simon, "Google Cloud Platform in Action", Manning Publications,Third,Edition, 2018.

REFERENCES

1. Judith S. Hurwitz, Robin Bloor, Marcia Kaufman, and Fern Halper, "Cloud Computing for Dummies", John Wiley & Sons, Second Edition,2013.
2. Joe Baron, Hisham Baz, Tim Bixler, Biff Gaut, Kevin E. Kelly, and Sean Senior, "AWS Certified Solutions Architect Official Study Guide", Sybex, Fourth Edition, 2016.

E-RESOURCES

1. https://nptel.ac.in/courses/106/105/106105178/ (cloud computing services)
2. https://onlinecourses.nptel.ac.in/noc22_cs87/preview

Mapping of Cos-Pos & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	1	-	-	-	2	3	1	3	2	1	3
2	3	1	2	2	1	-	-	-	1	2	1	3	2	2	1
3	2	3	2	3	1	-	-	-	3	1	1	3	1	1	1
4	1	2	3	3	3	-	-	-	3	3	1	2	1	3	3
5	2	3	3	1	3	-	-	-	2	2	1	2	2	2	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.2	2.2	2.2	2	1.8	-	-	-	2.2	2.2	1	2.6	1.6	1.8	2.2

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER IV

23ITCT02	**CLOUD SECURITY AND COMPLIANCE**	**L T P C**
		3 0 0 3

OBJECTIVES

- To understand the cloud security concepts, threats, and challenges.
- To learn the data encryption and secure key management.
- To know the compliance regulations and frameworks relevant to cloud computing.
- To understand the Cloud-based backup and disaster recovery solutions.
- To learn the integration of security into the development process.

UNIT I INTRODUCTION TO CLOUD SECURITY **9**

Cloud security fundamentals and key concepts- Shared responsibility model in cloud computing.- Security risks and threats in the cloud- Security challenges of multi-tenancy and virtualization.

UNIT II CLOUD SECURITY MEASURES **9**

Identity and access management (IAM) in the cloud- Data encryption and secure key management- Network security in cloud environments- Application security best practices.

UNIT III CLOUD COMPLIANCE AND REGULATIONS **9**

Overview of cloud compliance frameworks (e.g., GDPR, HIPAA, PCI DSS) - Cloud security certifications and audits- Compliance challenges and strategies in the cloud.

UNIT IV INCIDENT RESPONSE AND DISASTER RECOVERY **9**

Developing incident response plans for cloud-based systems- Cloud-based backup and disaster recovery solutions- Business continuity in the cloud.

UNIT V EMERGING TRENDS IN CLOUD SECURITY **9**

Serverless security and challenges - DevSecOps and integrating security into the development process- Cloud-native security tools and technologies.

TOTAL: 45 PERIODS

OUTCOMES

Upon completing the course, Students will be able to:

- Explain the cloud security concepts, threats, and challenges.
- Describe the data encryption and secure key management.
- Explain the compliance regulations and frameworks relevant to cloud computing.
- Describe the Cloud-based backup and disaster recovery solutions.
- Design the integration of security into the development process.

TEXTBOOKS

1. Tim Mather, Subra Kumaraswamy, and Shahed Latif, "Cloud Security and Governance: Who's on your cloud?", O'Reilly Media, Third Edition, 2019.
2. Chris Dotson and Bill Patterson, "Cloud Native DevOps with Kubernetes: Building, Deploying, and Scaling Modern Applications in the Cloud," O'Reilly Media, Fourth Edition, 2019.

REFERENCES

1. Ronald L. Krutz and Russell Dean Vines, "Cloud Security: A Comprehensive Guide to Secure Cloud Computing," Wiley, Fifth Edition, 2020.
2. Vic (J.R.) Winkler, "Securing the Cloud: Cloud Computer Security Techniques and Tactics," Syngress, , Sixth Edition, 2021.

E- RESOURCES

1. https://archive.nptel.ac.in/courses/106/105/106105167/

Mapping of Cos-Pos & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	1	-	-	-	2	3	1	3	2	1	3
2	3	1	2	2	1	-	-	-	1	2	1	3	2	2	1
3	2	3	2	3	1	-	-	-	3	2	2	3	1	1	1
4	3	3	3	3	3	-	-	-	3	3	2	2	1	3	3
5	2	3	3	1	3	-	-	-	2	2	2	2	2	2	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.6	2.4	2.2	2	1.8	-	-	-	2.2	2.4	1.6	2.6	1.6	1.8	2.2

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER V

23ITCT03 CLOUD INFRASTRUCTURE AND MANAGEMENT L T P C
3 0 0 3

OBJECTIVES

- To understand of cloud infrastructure components and their management.
- To learn the architecture and design principles of cloud environments.
- To learn to manage the cloud-based storage and databases.
- To know the best practices for monitoring, scaling, and optimizing cloud infrastructure.
- To understand the strategies for ensuring high availability and disaster recovery in the cloud.

UNIT I INTRODUCTION TO CLOUD INFRASTRUCTURE 9

Overview of cloud computing and its benefits.- Cloud service models (IaaS, PaaS, SaaS) and deployment models (public, private, hybrid).- Cloud infrastructure components: compute, storage, and networking.

UNIT II CLOUD ARCHITECTURE AND DESIGN 9

Cloud architecture patterns (e.g., multi-tier, micro services).- Scalability and elasticity in cloud environments.- Designing for fault tolerance and high availability.- Security considerations in cloud infrastructure.

UNIT III CLOUD RESOURCE MANAGEMENT 9

Deploying and configuring virtual machines and containers.- Automating cloud infrastructure with Infrastructure as Code (IaC) tools (e.g., Terraform, Cloud Formation).- Managing cloud-based storage and databases.- Network configuration and security groups in the cloud.

UNIT IV CLOUD PERFORMANCE OPTIMIZATION 9

Monitoring cloud performance and resource utilization.- Load balancing and auto-scaling strategies.- Performance tuning and optimizing cloud-based applications.

UNIT V CLOUD AVAILABILITY AND DISASTER RECOVERY 9

Implementing high availability and fault tolerance in the cloud- Backup and disaster recovery strategies for cloud-based systems- Business continuity planning in cloud environments.

TOTAL: 45 PERIODS

OUTCOMES

Upon completing the course, Students will be able to:

- Explain the fundamental concepts of cloud infrastructure and its role in modern IT environments.

- Design and implement scalable and reliable cloud architectures.
- Describe the cloud-based resources using Infrastructure as Code (IaC) tools.
- Explain the cloud performance and resource utilization.
- Design the high availability and disaster recovery solutions for cloud-based systems.

TEXT BOOKS

1. E. F. Volk, "Cloud Computing Infrastructure and Services," CRC Press, Second Edition, 2019.
2. Rajkumar Buyya, James Broberg, and Andrzej M. Goscinski, "Cloud Computing: Principles and Paradigms," Wiley, Sixth Edition, 2021.

REFERENCES

1. K. R. Subramanian, "Cloud Computing: Concepts, Technology, and Architecture," Cambridge University Press, Fourth Edition, 2019.
2. Jamsheer K., Nithin V. George, and Binu A., "Cloud Infrastructure and Services: Hands-On with Amazon Web Services (AWS)," Apress, Third Edition ,2020.

E-RESOURCES

1. https://aws.amazon.com/documentation/ (Amazon Web Services (AWS) Documentation)
2. https://onlinecourses.nptel.ac.in/noc22_cs87/preview

Mapping of Cos-Pos & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	2	1	1	1	-	-	-	2	3	1	3	2	1	3
2	3	1	2	2	1	-	-	-	1	2	1	3	2	2	1
3	2	3	2	3	1	-	-	-	3	2	2	3	1	1	1
4	3	3	3	3	3	-	-	-	3	3	2	2	1	3	3
5	3	3	3	3	3	-	-	-	3	3	2	2	1	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.8	2.4	2.2	2.4	1.8	-	-	-	2.4	2.6	1.6	2.6	1.4	2	2.2

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER VI

23ITCE04 CLOUD APPLICATION DEVELOPMENT L T P C
3 0 2 4

OBJECTIVES

- To understand the cloud computing platforms and services used for application development.
- To learn the cloud-native principles and architectures
- To know the Data caching and synchronization in cloud applications
- To understand the security considerations in cloud application development
- To learn the continuous deployment of cloud applications.
- To implement the real-world application using cloud services.

UNIT I INTRODUCTION TO CLOUD APPLICATION DEVELOPMENT 9

Cloud application development overview-Cloud platforms and services for application development- Setting up development environments for the cloud.

UNIT II CLOUD NATIVE DEVELOPMENT 9

Cloud-native principles and architectures- Micro services and server- less computing.
- Containerization and orchestration with Docker and Kubernetes.

UNIT III CLOUD DATABASES AND STORAGE 9

Relational and NoSQL databases on the cloud- Cloud storage solutions and best practices.
- Data caching and synchronization in cloud applications.

UNIT IV CLOUD APPLICATION SECURITY 9

Security considerations in cloud application development - Implementing authentication and authorization in cloud applications- Securing data and communications in the cloud.

UNIT V DEVOPS AND CONTINUOUS DEPLOYMENT 9

DevOps principles and practices - Continuous integration and continuous deployment (CI/CD) pipelines - Monitoring and performance optimization in cloud applications.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Setting Up Cloud Development Environment
2. Deploying a Static Website on the Cloud
3. Building a Cloud-Native API
4. Data Storage and Retrieval in the Cloud
5. Cloud Authentication and Authorization
6. Containerization and Orchestration
7. Continuous Integration and Continuous Deployment (CI/CD)

8. Implementing Event-Driven Architecture
9. Load Testing and Scaling in the Cloud
10. Implementing Cloud Monitoring and Logging

TOTAL: 45 + 15 =60 PERIODS

OUTCOMES

Upon completing the course, students will be able to,

- Explain the cloud computing platforms and services used for application development.
- Describe the cloud-native principles and architectures
- Describe the Data caching and synchronization in cloud applications
- Apply the security considerations in cloud application development
- Describe the continuous deployment of cloud applications.
- Design and implementation of real world application using cloud services.

TEXTBOOKS

1. John Arundel, Justin Domingus, "Cloud Native Development with Kubernetes", O'Reilly Media, Fourth Edition, 2021.s
2. Gene Kim, Jez Humble, Patrick Debois, John Willis, "The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security in Technology Organizations", Second Edition,2016.

REFERENCES

1. Lee Atchison, "Architecting for Scale: High Availability for Your Growing Applications", Second Edition,2019.
2. Peter Sbarski, "Serverless Architectures on AWS: With Examples Using AWS Lambda", Fourth Edition, 2017.

E-RESOURCES

1. https://docs.microsoft.com/en-us/azure/ (Microsoft Azure Documentation)

Mapping of Cos-Pos & PSOs:

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1	3	2	1	1	1	-	-	-	2	3	1	3	2	1	3
2	3	1	2	2	1	-	-	-	1	2	1	3	2	2	1
3	2	3	2	3	1	-	-	-	3	1	1	3	1	1	1
4	1	2	3	3	3	-	-	-	3	3	1	2	1	3	3
5	2	3	3	1	3	-	-	-	2	2	1	2	2	2	3
6	2	3	2	3	1	-	-	-	3	1	1	2	1	3	3
AVG	2.2	2.2	2.2	2	1.8	-	-	-	2.2	2.2	1	2.6	1.6	1.8	2.2

1-Low 2-Medium 3-High '-' - No Correlation

SEMESTER VII

23ITCP01	PROJECT WORK	L T P C 0 0 12 6

OBJECTIVES

- To understand the skills to formulate a technical project.
- To know the ability to solve specific problem.
- To study the new tools, algorithms and techniques required to carry out the projects.
- To learn guidance on the various procedures for validation of the product and cost effectiveness.
- To study the guidelines to prepare technical report of the project.

GUIDELINES

The students in a group of 3, works on a specific topic approved by the faculty member who is familiar in the area of interest. The student can select any topic which is revelent to his/her specialization of the programme. The topic may be experimental or analytical or case studies. At the end of the semester, after completing the work to the satisfaction of the supervisor and the review committee, a detailed report should be prepared and submitted to the head of the department. The students will be evaluated through a viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 180 PERIODS

OUTCOMES

Upon Completion of the project work, Students will be able to:

- Discuss the requirement and develop the design solutions.
- Construct the strategies and methodologies..
- Illustrate the prototype and analysis the cost effectiveness.
- Analyze the oral presentations.
- Apply the practical problem in the field of engineering and find better solutions to it.

Mapping of COs-POs & PSOs

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1	3	1	1	3	-	2	-	-	2	1	1	3	3	3	3
2	3	3	1	3	-	2	-	-	2	1	1	3	3	3	3
3	2	2	2	3	-	2	-	-	2	1	1	3	1	1	1
4	3	1	1	3	-	2	-	-	2	1	1	3	3	3	3
5	3	3	1	3	-	2	-	-	2	1	1	1	3	1	1
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.8	2.0	1.20	3.0	-	2.0	-	-	2.0	1.0	1.0	2.60	2.60	2.20	2.20

1-Low, 2-Medium, 3-High,'-'-No Correlation

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(MINOR DEGREE / HONOURS – CLOUD COMPUTING)

CREDIT SUMMARY

B.Tech. INFORMATION TECHNOLOGY

Category	Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
PC	-	-	3	3	3	4	-	-	13
EEC	-	-	-	-	-	-	6	-	6
Total	-	-	3	3	3	4	6	-	19