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

(REVISION I)

(I - VI SEMESTER)

(For the students admitted from the Academic year 2023-2024 and 2024-2025 onwards)

Note: The regulations here under 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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REGULATIONS–2023

(REVISION I)

(I - VI SEMESTER)

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Estd : 2001

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Chairman - BoS

DEAN (ACADEMICS)
SENGUNTHAR ENGINEERING COLLEGE
TIRUCHENGODE-637 205

PRINCIPAL
SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
TIRUCHENGODE - 637 205

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B.Tech. INFORMATION TECHNOLOGY

(CHOICE BASED CREDIT SYSTEM)

REGULATIONS–2023

(REVISION I)

(I – IV SEMESTER)

(For the students admitted from the Academic year 2023-2024 and 2024-2025 onwards)

Estd : 2001

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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

VISION

- To be a pioneering centre in Information Technology by offering contemporary education that shapes professionals and entrepreneurs in advanced technologies.

MISSION

- To equip students with the skills and ethical responsibility needed to effectively tackle digital challenges as competent professionals.
- To provide industry-aligned curriculum and training while supporting interdisciplinary research in emerging IT fields.
- To establish a tech hub that encourages collaboration and outreach programs to solve real-world problems through innovation.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates can be

- Apply computing solutions and emerging technologies to analyze, design, develop, test, and validate IT-based solutions for real-world problems.
- Excel in various engineering roles within the global computational industry and contribute to organizations of international repute.
- Obtain additional qualifications that enhance their career prospects in IT industries and to support sustainable development of the society.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1	**Engineering knowledge**	Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
PO2	**Problem analysis**	Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
PO3	**Design/development of solutions**	Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5).

PO4	**Conduct investigations of complex problems**	Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8)
PO5	**Modern tool usage**	Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)
PO6	**The engineer and society**	Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
PO7	**Environment and sustainability**	Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
PO8	**Ethics**	Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
PO9	**Individual and team work**	Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences
PO10	**Communication**	Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.
PO11	**Project management and finance**	Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)
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)

Students can have the:

PSO1	Analyze, design, code and test complex engineering problems in areas like full-stack and machine learning.
PSO2	Demonstrate strong problem-solving skills, develop software applications, and implement IT solutions that address industry needs while adhering to ethical and professional standards.

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
I	I	23HST101 - Professional English	1	1	1.5	2	1	-	-	-	1.8	3	1.5	2	-	-
		23MAT101 - Matrices and calculus	3	3	2	-	-	-	-	-	-	-	-	2	-	-
		23HST102 - தமிழர்மரபு/ Heritage of Tamils	-	-	-	-	-	-	-	2	1	2	-	1	-	-
		23PHE102 - Applied Physics for Computer Engineering	3	3	1	1	-	-	-	-	-	-	-	-	-	-
		23CYE101 - Engineering Chemistry	2.3	2.2	2.5	1.6	1.7	1.8	1.8	1.4	1.5	1.4	1.3	1.3	-	-
		23GEE101 - Programming in C	3.0	2.8	2.6	2.4	2.8	2.0	1.0	1.3	1.2	1.17	2.0	2.3	3.0	2.8
		23EEC101 - Soft Skills & Life Skills	1.25	1.6	1	1	3	1.4	1.4	2	2.6	2.8	2.6	2	-	-
		23MDC101 - Induction Program (2 Weeks)	-	-	-	-	-	-	-	-	-	-		-	-	-
	II	23MAT203 - Mathematical Foundations of Computing	3	2.4	2	1.4	2	-	-	-	-	-	-	2	-	-
		23PHT202 - Advanced Physics for Computer Engineering	-	-	-	-	-	1.40	2.20	1.25	1.80	3.00	-	3.00	-	-
		23CYT201 - Environmental Science and Sustainability	2	1.4	3	2	2.8	3	3	3	2	2.7	2.4	2.2	-	-
		23HST202-தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	-	-	-	-	-	-	-	2	1	-	-	1	-	-
		23HSE201-English for Engineers: Theory and Practice	1	2	-	2	1	2	2	1.5	2.3	3	2	1.6	-	-
		23EEE202 - Basic Electrical And Electronics Engineering	1.6	1.6	2.4	1.25	1.8	1	2	-	-	-	-	1.5	-	-
		23CSE201 -PC Hardware Services and Networking	3.0	2.8	2.17	2.4	2.8	1.6	1.33	1.5	1.6	1.5	2.0	2.5	3.0	2.8
		23GEL201 - Engineering Practices Laboratory	3	2	-	-	1	1	1	-	-	-	-	2	2	1
		23EEC201 – Indian Language (Except Mother Tongue) / Foreign Language														
		Hindi	-	-	-	-	-	1.0	1.3	1.6	2.8		-	1.6	-	-
		German	-	-	-	-	-	1	1.5	1.7	3		-	1.6	-	-
		Japanese	-	-	-	-	1.4	1.6	1.6	1	0.2	2.6	-	1	-	-
		23MDC201 – Aptitude Skills	-	-	-	-	-	-	-	-	-		-	-	-	-
II	III	23MAT303 - Discrete Mathematics	3	3	2	1	-	-	-	-	-	1	-	-	-	-
		23ECT303–Analog and Digital Communication	2.8	2.4	2.8	2.4	1.8	-	-	-	-	-	-	-	2.4	2.0

		23ECT302- Digital Principles and Computer Architecture	3	2	2	2	2	2	-	-	-	-	2	2	3	3
		23CSE301-Object Oriented Programming	3.0	3.0	2.8	2.0	3.0	1.5	1.0	1.5	1.6	1.3	2.0	2.8	3.0	3.0
		23CSE302 - Data Structures and Algorithm	3.0	3.0	2.8	2.5	3.0	1.0	1.0	1.17	1.5	1.3	2.0	2.6	3.0	3.0
		23GEE301-Problem Solving and Python Programming	3.0	3.0	3.0	2.3	2.8	1.0	1.0	1.3	1.5	1.3	2.0	2.5	3.0	3.0
		23EEC301 - Professional Development	-	-	-	-	-	-	-	-	-		-	-	-	-
	IV	23ITT401-Object Oriented Software Design	2.0	2.4	2.2	1.4	2.2	1	-	-	-	1	1	1.2	2.8	2.8
		23CCT401- Operating Systems and security	3	2.8	2.6	2.4	2.8	2.2	2.2	1	0.1	0.1	1.6	2.8	2.4	2
		23CSE401-Artificial Intelligence and Machine Learning	3.0	3.0	3.0	2.5	3.0	1.2	1.2	1.5	1.8	1.3	1.5	2.6	3.0	3.0
		23CSE402-Database Management Systems	3.0	3.0	2.8	2.6	3.0	1.2	1.0	1.6	1.8	1.3	1.5	2.6	3.0	3.0
		23ECE404-Embedded Systems and IoT	2.5	2.3	2.5	2.3	2.2	1.5	1	1	-	-	-	-	2.3	2.0
		23EEC401-Online Certification Courses	-	-	-	-	-	-	-	-	-		-	-	-	-

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CURRICULUM

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	HS	3	0	0	3	40	60	100
23MAT101	Matrices and Calculus	BS	3	1	0	4	40	60	100
23PHT102	Applied Physics for Computer Engineering	BS	3	0	0	3	40	60	100
23CYT101	Engineering Chemistry	BS	3	0	0	3	40	60	100
23HST102	தமிழர்மரபு/Heritage of Tamils	HS	1	0	0	1	40	60	100
EMBEDDED COURSE									
23GEE101	Programming in C	ES	3	0	2	4	50	50	100
PRACTICALS									
23PHL101	Applied Physics for Computer Engineering Laboratory	BS	0	0	2	1	60	40	100
23CYL101	Engineering Chemistry Laboratory	BS	0	0	2	1	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC101	Soft Skills & Life 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
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

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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									
23MAT203	Mathematical Foundations of Computing	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
23CST201	PC Hardware Services and Networking	PC	3	0	0	3	40	60	100
23HST202	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HS	1	0	0	1	40	60	100
EMBEDDED COURSE									
23HSE201	English for Engineers: Theory and Practice	HS	3	0	2	4	50	50	100
23EEE202	Basic Electrical and Electronics Engineering	ES	3	0	2	4	50	50	100
23CSE201	PC Hardware Services and Networking	PC	3	0	2	4	50	50	100
PRACTICALS									
23GEL201	Engineering Practices Laboratory	ES	0	0	4	2	60	40	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC201	Indian Language (Except Mother Tongue) /Foreign Language	EEC	0	0	4	2	100	-	100
MANDATORY COURSE									
23MDC201	Aptitude Skills	MC	3	0	0	0	-	-	-
	TOTAL CREDITS IN SEMESTER - II		27						

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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
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ESE	:	End Semester Examination
TOT	:	Total

CURRICULUM
FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)

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
23ECT302	Digital Principles and Computer Architecture	ES	3	0	0	3	40	60	100
23ECT303	Analog and Digital Communication	ES	3	0	0	3	40	60	100
EMBEDDED COURSE									
23CSE301	Object Oriented Programming	PC	3	0	2	4	50	50	100
23CSE302	Data Structures and Algorithms	PC	3	0	2	4	50	50	100
23GEE301	Problem Solving and Python Programming	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						

HS : Humanities and Social Sciences
BS : Basic Sciences
ES : Engineering Sciences
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OE : Open Elective
GE : General Elective
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MC : Mandatory Courses
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T : Tutorial
P : Practical
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FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)
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
23CCT401	Operating System and Security	PC	3	1	0	4	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	ES	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC401	Online Certification Courses	EEC	3	0	0	3	100	-	100
TOTAL CREDITS IN SEMESTER - IV			22						

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
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FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)
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	Industrial Training	EEC	0	0	4	2	100	-	100
MANDATORY COURSE									
	Mandatory Course-I	MC	3	0	0	0	-	-	-
TOTAL CREDITS IN SEMESTER - V			23						

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

CURRICULUM
FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)

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 I 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									
23EEJ601	Project Work-Phase I	EEC	0	0	8	4	60	40	100
MANDATORY COURSE									
	Mandatory Course-II	MC	3	0	0	0	-	-	-
TOTAL CREDITS IN SEMESTER- VI			24						

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
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CURRICULUM
FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)
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
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									
23EEJ701	Project Work-Phase II	EEC	0	0	8	4	60	40	100
TOTAL CREDITS IN SEMESTER - VII			16						

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

CURRICULUM
FOR B.E. / B.Tech. DEGREE PROGRAMMES
(For the Students Admitted in the Academic Year 2023-2024 onwards)

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									
23EEJ801	Product Development	EEC	0	0	12	6	60	40	100
23EEC801	Internship	EEC	0	0	4	2	100	-	100
TOTAL CREDITS IN SEMESTER - VIII			8						

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	HS	3	0	0	3	40	60	100
23HST102	தமிழர்மரபு/Heritage of Tamils	HS	1	0	0	1	40	60	100
23HSE201	English for Engineers: Theory and Practice	HS	3	0	2	4	50	50	100
23CYT201	Environmental Science and Sustainability	HS	3	0	0	3	40	60	100
23HST202	தமிழரும்தொழில்நுட்பமும் / Tamils and Technology	HS	1	0	0	1	100	-	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	0	3	40	60	100
23CYE101	Engineering Chemistry	BS	3	0	0	3	40	60	100
23MAT203	Mathematical Foundations of Computing	BS	3	1	0	4	40	60	100
23PHT202	Advanced Physics for Computer Engineering	BS	3	0	0	3	40	60	100
23MAT301	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
23EEE202	Basic Electrical and Electronics Engineering	ES	3	0	2	4	50	50	100
23GEE301	Problem Solving and Python Programming	ES	3	0	2	4	50	50	100

23ECT302	Digital Principles and Computer Architecture	ES	3	0	0	3	40	60	100
23ECT303	Analog and Digital Communication	ES	3	0	0	3	40	60	100
23ECE404	Embedded Systems and IoT	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
23CSE201	PC Hardware Services and Networking	PC	3	0	0	3	50	50	100
23CSE301	Object Oriented Programming	PC	3	0	2	4	50	50	100
23CSE302	Data Structures and Algorithms	PC	3	0	0	3	50	50	100
23ITT401	Object Oriented Software Design	PC	3	0	0	3	40	60	100
23CCT401	Operating System and Security	PC	3	1	0	4	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
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
23ITP501	Image and Video Analytics	PE	3	0	0	3	40	60	100
23ITP502	Computer Vision	PE	3	0	0	3	40	60	100
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

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
23ADT501	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	Human Computer Interaction	PE	3	0	0	3	40	60	100
23ITP505	Storage Technologies	PE	3	0	0	3	40	60	100
23CSP513	Virtualization	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
23ITP601	Digital Forensics	PE	3	0	0	3	40	60	100
23ITP602	Information Security	PE	3	0	0	3	40	60	100
23CSP601	Hacking Techniques	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

Professional Elective – V

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
23ITP603	Game Development	PE	3	0	0	3	40	60	100
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
23CCP502	Computer Hardware and System Essentials	PE	3	0	0	3	40	60	100
23CCP602	Cyber Physical System	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
23ITP604	Information Assurance and Security	PE	3	0	0	3	40	60	100
23CSP610	Optimization Techniques	PE	3	0	0	3	40	60	100
23CST401	Distributed Computing	PE	3	0	0	3	40	60	100
23CSP612	Ethics And AI	PE	3	0	0	3	40	60	100
23ADP503	Knowledge Engineering	PE	3	0	0	3	40	60	100
23CSP608	Soft Computing	PE	3	0	0	3	40	60	100

LIST OF OPEN ELECTIVE COURSES

OPEN ELECTIVES – I

Offered by the Departments	Course Code / Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
CIVIL	23CEO607 / Environmental and Social Impact Assessment	OE	3	0	0	3	40	60	100
CSE	23CSO610 / Introduction to Drone Technologies	OE	3	0	0	3	40	60	100
ECE	23ECO602 / Fundamentals of Electronic Devices and Circuits	OE	3	0	0	3	40	60	100
EEE	23EEO603 / Electric Vehicle Technology	OE	3	0	0	3	40	60	100
	23EEO604 / Renewable Energy Systems	OE	3	0	0	3	40	60	100
MECHANICAL	23MEO601 / Introduction to Industrial Engineering	OE	3	0	0	3	40	60	100
	23MEO605 / CNC Machining Technology	OE	3	0	0	3	40	60	100
MEDICAL ELECTRONICS	23MDO611 / Hospital Management	OE	3	0	0	3	40	60	100
ROBOTICS AND AUTOMATION	23RAO609 / Fundamentals of Robotics	OE	3	0	0	3	40	60	100
CSE(Cyber Security)	23CSO612 / Cyber Forensics and Ethical Hacking	OE	3	0	0	3	40	60	100
PHARMACEUTICAL TECHNOLOGY	23PMO608 / Pharamaceutical Nanotechnology	OE	3	0	0	3	40	60	100
MATHEMATICS	23MAO606 / Graph Theory	OE	3	0	0	3	40	60	100

OPEN ELECTIVE - II

Offered by the Departments	Course Code / Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
CIVIL	23CEO704 / Remote Sensing Concepts	OE	3	0	0	3	40	60	100
ECE	23ECO708 / Energy Technology	OE	3	0	0	3	40	60	100
EEE	23EEO709 / Sensors, Actuators and its Application	OE	3	0	0	3	40	60	100
MECHANICAL	23MEO703 / Fundamentals of Mechatronics	OE	3	0	0	3	40	60	100
	23MEO704 / Nano Technology	OE	3	0	0	3	40	60	100

	23MEO712 / Smart Manufacturing	OE	3	0	0	3	40	60	100
MEDICAL ELECTRONICS	23MDO705 / Ultrasound Principles and its Medical Applications	OE	3	0	0	3	40	60	100
ROBOTICS AND AUTOMATION	23RAO707 / Mobile Robots	OE	3	0	0	3	40	60	100
CSE(Cyber Security)	23CSO711 / Introduction to Cyber Security	OE	3	0	0	3	40	60	100
PHARMACEUTICAL TECHNOLOGY	23PMO706 / Intellectual Property Rights for Pharma Industry	OE	3	0	0	3	40	60	100
MATHEMATICS	23MAO710 / Operations Research	OE	3	0	0	3	40	60	100

OPEN ELECTIVES- III

Offered by the Departments	Course Code / Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
CIVIL	23CEO717 / Geographical Information System	OE	3	0	0	3	40	60	100
CSE	23CSO715 / Fundamentals of Blockchain Technology	OE	3	0	0	3	40	60	100
ECE	23ECO718 / VLSI Design	OE	3	0	0	3	40	60	100
EEE	23EEO716 / Electrical, Electronic and Magnetic Materials	OE	3	0	0	3	40	60	100
MECHANICAL	23MEO720 / Marine Vehicles	OE	3	0	0	3	40	60	100
MEDICAL ELECTRONICS	23MDO719 / Wearable Technology	OE	3	0	0	3	40	60	100
	23MDO723 / Medical Waste Management								
	23MDO724 / Lifestyle Diseases								
ROBOTICS AND AUTOMATION	23RAO721 / Robotics Process Automation	OE	3	0	0	3	40	60	100
MATHEMATICS	23MAO714 / Advanced Numerical Methods	OE	3	0	0	3	40	60	100
MANAGEMENT	23MGO722 / Cost Management of Engineering Projects	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 WING LEVEL - 3	GE	3	0	0	3	40	60	100
23NCCL04	NCC ARMY WING 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	Supply Chain 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 & Life Skills	EEC	1	0	0	1	100	-	100
23EEC201	Indian Language (Except Mother Tongue) /Foreign Language	EEC	0	0	4	2	100	-	100
23EEC301	Professional Development	EEC	0	0	2	1	100	-	100
23EEC401	Online Certification Courses	EEC	0	0	4	2	100	-	100
23EEC501	Industrial Training	EEC	0	0	4	2	100	-	100
23EEJ601	Project Work- Phase I	EEC	0	0	8	4	60	40	100

23EEC701	Project Work- Phase II	EEC	0	0	8	4	60	40	100
23EEJ801	Product Development	EEC	0	0	12	6	60	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 2023-2024 onwards)

CREDIT SUMMARY

B.Tech. INFORMATION TECHNOLOGY

Category	Credits Per Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
HS	4	8	–	–	–	–	3	–	15
BS	12	7	4	–	–	–	–	–	23
ES	4	4	10	4	–	–	–	–	22
GE	–	–	–	–	–	–	3	–	3
PC	–	5	8	15	12	8	–	–	48
PE	–	–	–	–	9	9	–	–	18
OE	–	–	–	–	–	3	6	–	9
EEC	1	2	1	3	2	4	4	8	25
MC	–	–	–	–	–	–	–	–	–
Total	21	26	23	22	23	24	16	8	163

SEMESTER I

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

OBJECTIVES

- To build vocabulary proficiency and familiarity with varied lexical and contextual usages.
- To strengthen grammatical accuracy for effective sentence construction and language application.
- To develop clarity and coherence in written communication across academic and business contexts.
- To enhance oral fluency, confidence, and interactive communication skills.
- To promote efficient reading strategies for comprehension, analysis, and note-making.

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

OUTCOMES

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

- Use a wide range of vocabulary in oral and written communication
- Apply grammatically correct sentences for academic and professional purposes.
- 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", Orient Black Swan, Chennai, First Edition, 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
1	1	-	-	-	1	-	-	-	2	3	-	2	-	-
2	1	-	-	-	1	-	-	-	2	3	-	2	-	-
3	-	1	2	-	1	-	-	-	2	3	1	2	-	-
4	-	-	1	-	-	-	-	-	2	3	2	2	-	-
5	1	1	-	2	1	-	-	-	1	3	-	2	-	-
AVG	1	1	1.5	2	1	-	-	-	1.8	3	1.5	2	-	-

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

Chairman - BoS

23MAT101	MATRICES AND CALCULUS (Common to all B.E./ B.Tech. Branches)	L T P C 3 1 0 4

OBJECTIVES

- To develop the use of matrix algebra and its properties.
- To explore the techniques of differential and integral calculus.
- To categorize methods for functions of several variables.
- To introduce the use of multiple integrals and their applications.
- To provide knowledge of vector calculus.

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.

OUTCOMES

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

- Apply matrix algebra methods to solve practical problems.
- Apply the concepts of differential and integral calculus.
- Analyze the ideas of differential calculus for functions of several variables.
- Apply multiple integral ideas in solving areas and volumes.
- Solve the engineering problems using the concepts of vector calculus.

LIST OF EXPERIMENTS

1. Computation of Eigen values and Eigenvectors.
2. Matrix addition and multiplications.
3. Calculate differentiations of simple functions.
4. Calculate integrations of simple functions.
5. Determining Maxima and minima of functions for one variable.
6. Determining Maxima and minima of functions for two variables.
7. Evaluating double integral with constant limits.
8. Evaluating triple integral with constant limits.
9. Computing Gradient, divergence and curl of point functions
10. Evaluating line integral in vector calculus.

TOTAL: 45+15=60 PERIODS

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, Fourty Third Edition, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, New Delhi, Seventh Edition, 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, First Edition, 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
1	3	3	2	-	-	-	-	-	-	-	-	2	-	-
2	3	3	2	-	-	-	-	-	-	-	-	2	-	-
3	3	3	2	-	-	-	-	-	-	-	-	2	-	-
4	3	3	2	-	-	-	-	-	-	-	-	2	-	-
5	3	3	2	-	-	-	-	-	-	-	-	2	-	-
AVG	3	3	2	-	-	-	-	-	-	-	-	2	-	-

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

Chairman - BoS

23HST102	HERITAGE OF TAMILS	L T P C
	(Common to all Branches)	1 0 0 1

OBJECTIVES

- To familiarize the students on extensive literature of classical Tamil.
- To analyze rock art paintings to modern art.
- To acquire knowledge on folk and martial arts.
- To apply the concepts of Thinai in Tamils.
- To realize the contribution of Tamils in Indian freedom struggle.

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. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
5. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
7. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

REFERENCE BOOKS

1. Heritage of Tamils, Published by: Yes Dee Publishing Pvt Ltd, Chennai
2. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

OUTCOMES

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

- Analyze the extensive literature Tamil and classical nature.
- Understand the heritage of sculpture, painting and musical instruments.
- Classify the folk and martial arts of Tamil people.
- Examine Thinai concepts, trade and victory of Chozha dynasty.
- Interpret the contribution of Tamils in Indian freedom struggle, Self-esteem movement and siddha medicine.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

23HST102	தமிழர்மரபு	L T P C
	(அனைத்து துறைகளுக்கும் பொதுவானது)	1 0 0 1

நோக்கங்கள்

மாணவர்கள் கண்டிப்பாக அறியவேண்டுவன

- செம்மொழியான தமிழ்மொழியின்விரிவானஇலக்கியத்தைப்பற்றிஅறிதல்.
- பாறை ஓவியங்கள் முதல் நவீனஓவியங்கள்வரை உள்ளகலைகளைபகுப்பாய்வுசெய்தல்.
- நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகளைப் புரிந்து கொள்ளுதல்.
- தமிழர்களின் திணைக்கோட்பாடுகளைச் செயல்படுத்துதல்.
- இந்தியவிடுதலைப்போராட்டத்திற்கும் பண்பாட்டிற்கும் தமிழர்களின் பங்களிப்பை உணருதல்.

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 சமண பௌத்த 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, ஓயிலாட்டம், 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

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

முடிவுகள்

பாடத்தின் முடிவில், மாணவர்கள் அறிந்து கொள்வன:

- தமிழ்மொழியின் செம்மொழி தன்மையையும் சங்க இலக்கியத்தின் முக்கியத்துவத்தையும் உணர்வார்கள்.
- தமிழர்களின் சிற்ப, ஓவிய, இசை மரபுகளை புரிந்து கொள்வார்கள்.
- நாட்டுப்புறக் கலைகளையும் வீர விளையாட்டுகளையும் வகைப்படுத்துவார்கள்.
- தமிழர்களின் திணைக்கோட்பாடுகளும் சங்ககாலவர்த்தகமும்பு ரிந்துகொள்வார்கள்.
- இந்திய விடுதலைப் போராட்டம், சுயமரியாதை இயக்கம், சித்த மருத்துவம் ஆகியவற்றில் தமிழர்களின் பங்களிப்பை விளக்குவார்கள்.

உரை மற்றும் குறிப்புபுத்தகங்கள்

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.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

23PHE102	**APPLIED PHYSICS FOR COMPUTER ENGINEERING**	L T P C
	(Common to CSE, CSE-SC, IT, AI&DS and AI&ML)	3 0 0 3

OBJECTIVES

- To introduce the fundamental principles of lasers and their general scientific and engineering applications.
- To explain the fundamentals of quantum mechanics and Schrödinger's wave equation for understanding complex physical phenomena.
- To impart knowledge of the basic concepts of integrated circuits (ICs) and digital electronic components.
- To provide an understanding of the principles and operation of magnetic and optical storage devices.
- To familiarize students with the fundamentals of nanomaterials and their various synthesis methods.
- To understand and apply the fundamental principles of lasers, quantum mechanics, nanomaterials, digital circuits, and storage devices

UNIT I PHOTONICS 9

Spontaneous and Stimulated Emission- Population Inversion - Derivation of Einstein's A and B coefficients – Principle and working of 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.

UNIT II QUANTUM PHYSICS 9

Black Body Radiation – Planck's theory (derivation) – 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.

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

UNIT V INTRODUCTION TO NANO SCIENCE & NANOELECTRONICS 9

NANO SCIENCE: 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).

NANO-ELECTRONICS: Single electron transistors, Spintronics - Nanotechnology in Computer Science.

TOTAL: 45 PERIODS

LIST OF EXPERIMENTS

(Any Eight experiments to be conducted)

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 the course, the students will be able to:

- Explain the fundamental principles of lasers and their applications.
- Analyze the principles of quantum mechanics and Schrödinger's wave equation to identify complex physical phenomena.
- Apply the concept of digital electronics to design various logic gates.

- Analyze the working principles of different storage media and storage devices.
- Analyze the properties of nanomaterial's and various synthesis methods.
- Demonstrate an understanding of the principles of lasers, quantum mechanics, nanomaterials, digital circuits, and storage devices.

TEXT BOOKS

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

REFERENCES

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

Chairman - BoS

23CYE101 **ENGINEERING CHEMISTRY** **L T P C**

(Common to CSE, EEE, ECE, CSE (CS), MDE, AIDS, IT, PT& CSE(AIML)) **3 0 0 3**

OBJECTIVES

- To introduce the characteristics of water and water treatment methods for industrial applications.
- To familiarize students with the types, properties, and applications of polymers and related materials.
- To employ the principles of phase rule, alloy formation, and heat treatment methods.
- To discuss the synthesis, characterization, and applications of nanomaterials.
- To apply electrochemical principles to understand corrosion mechanisms and corrosion control methods.
- 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 Poly dispersity 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

- Explain the quality parameters of water and suitable methods for removing impurities for domestic and industrial applications.
- Compare various types of polymers based on their polymerization processes, properties, and engineering applications.
- Apply the principles of phase rule to explain alloy formation and its engineering applications.
- Employ the basic concepts of nano chemistry in engineering applications.
- Analyze the causes of corrosion and recommend suitable prevention and control methods
- Determine the water quality parameters and perform quantitative chemical analysis bypH metery, flame photometry, conductometry and potentiometry

TOTAL:45 PERIODS

TEXT BOOKS

1. Jain P.C and Monika Jain, "Engineering Chemistry", seventeenth 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.php

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	1	3	-	1	-	-	3	-	-	-	-	-	-
2	1	2	2	2	1	1	1	-	2	1	2	1	-	-
3	3	3	3	2	2	2	2	1	1	2	1	1	-	-
4	2	2	2	1	2	2	2	1	-	1	1	1	-	-
5	3	2	3	2	3	2	2	1	2	1	-	2	-	-
6	3	3	2	1	1	2	2	1	1	2	-	-	-	-
AVG	2.3	2.2	2.5	1.6	1.7	1.8	1.8	1.4	1.5	1.4	1.3	1.3	-	-

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

Chairman - BoS

23GEE101 **PROGRAMMING IN C** L T P C
(Common to all B.E. & B.Tech Branches) 3 0 2 4

OBJECTIVES

- To impart fundamental knowledge of C programming concepts, syntax, data types, operators, control structures, and program development.
- To develop students understanding of arrays, strings, searching, and sorting techniques for solving computational problems.
- To train students in designing modular programs using functions, recursion, pointers, and parameter passing mechanisms.
- To familiarize students with structures, unions, dynamic memory allocation, and their applications in software development.
- To enable students to perform file handling operations and develop efficient C programs using sequential and random file processing.
- To develop C programs to solve real-world programming problems.

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.

Coding practices :

1. Develop a program to find the largest of three numbers using nested if statements.
2. Develop a program to generate multiplication tables using loops.

Problem - solving assignments :

1. Write a program to calculate the area and perimeter of a rectangle, circle, and triangle.
2. Write a program to calculate simple interest and compound interest.

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.

Coding practices :

1. Develop a program to perform matrix addition and transpose using two-dimensional arrays.
2. Write a program to sort an array using Insertion Sort.

Problem - solving assignments :

1. Develop a program to perform matrix operations such as addition and transpose using two-dimensional arrays.
2. Write a program to search for an element in an array using Linear Search 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.

Coding practices :

1. Develop a recursive program to generate the Fibonacci series.
2. Develop a program to implement a scientific calculator using built-in mathematical functions.

Problem - solving assignments :

1. Write a program to perform arithmetic operations using user-defined functions.
2. Write a program to swap two numbers using pass-by-value and 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.

Coding practices :

1. Develop a program to generate an employee salary slip using structures and pointers.
2. Develop a program using nested structures to represent student academic details.

Problem - solving assignments :

1. Write a program to store and display employee details using an array of structures.
2. Develop a program to demonstrate dynamic memory allocation using structures.

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.

Coding practices :

1. Write a program to create, write, and read a text file.
2. Develop a program to copy the contents of one file to another.

Problem - solving assignments :

1. Write a program to create, write, and read student records using sequential file processing.
2. Write a program to implement command-line arguments for performing arithmetic operations or

file processing.

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,

- Explain the fundamental concepts of C programming and develop programs using data types, operators, expressions, and control structures.
- Develop C programs using arrays, strings, searching, and sorting techniques to solve computational problems.
- Construct modular C programs by applying functions, recursion, pointers, and parameter passing techniques.
- Develop applications using structures, unions, pointers, and dynamic memory allocation for efficient data organization and manipulation.
- Analyze file processing techniques using sequential and random access methods to perform data storage and retrieval operations.

- Develop reliable software solutions using C programming for real-world applications.

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, 2006.

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., First Edition, 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/ (File operations)

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2	–	2	–	–	1	–	1	–	2	3	2
2	3	3	3	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	2	3	–	–	1	1	1	–	2	3	3
4	3	3	3	2	3	–	–	1	1	1	–	2	3	3
5	3	3	2	3	3	–	–	2	1	1	–	3	3	3
6	3	3	3	3	3	2	1	2	2	2	2	3	3	3
AVG	3.0	2.8	2.6	2.4	2.8	2.0	1.0	1.3	1.2	1.17	2.0	2.3	3.0	2.8

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

Chairman - BoS

23EEC101 **SOFTSKILLS & LIFE SKILLS** L T P C
(Common to all First year / First Semester B.E., B.Tech., Branches) 1 0 0 1

OBJECTIVES

- To understand the Universal Human Values
- To have an overview on Life skills required in their profession
- To manage the behavior with emotional intelligent skills
- To learn professional Skills required for 21st century
- To formulate and implement effective leadership strategies.

UNITI UNIVERSAL HUMAN VALUES 3

Understanding harmony in the human being - understanding harmony in the family and society - understanding harmony in the nature and existence - understanding of harmony on professional ethics

UNIT II LIFE SKILLS 3

Soft Skills – Positive Attitude - Empathy - Effective Communication - Decision-Making Skills - Communication Skills - Problem Solving - Critical Thinking- Analytical thinking

UNIT III EMOTIONAL SKILLS 3

Self-Awareness - Interpersonal Relationship - Stress – Stress management - Focus and Self Control - Positive Thinking – Anger management

UNIT IV PROFESSIONAL SKILLS 3

21st century skills – Hard Skills - General computer skills - Spreadsheet proficiency - Career Skills - developing a long- term career plan – Team Work -- Time management

UNIT V LEADERSHIP SKILLS 3

Leadership, Levels of Leadership, Making of a leader, Types of leadership, describing a leadership style.

TOTAL: 15 PERIODS

OUTCOMES

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

- Treat and respect the human beings with harmony,
- Develop the capabilities needed to utilize their potential wherever required.
- Control their emotional feelings and manage the stress.
- Explore the career & professional skills.
- Become highly confident as a leader and find new ways of influencing the teams they lead.

TEXT BOOKS

1. Life Skills for Engineers, McGraw Hill Education (India) Private Ltd., 2016
2. E. Suresh Kumar et al. Communication for Professional Success. Orient Blackswan: Hyderabad, 2015
3. Sydänmaanlakka Pentti. "Intelligent leadership and leadership competencies". Dissertation Series.

REFERENCES

1. Barun K. Mitra; (2011), "Personality Development & Soft Skills", First Edition; Oxford Publishers.
2. Kalyana; (2015) "Soft Skill for Managers"; First Edition; Wiley Publishing Ltd.

E-RESOURSES

1. https://uhv.org.in/
2. https://nptel.ac.in

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	1	1	-	-	-	2	2	2	3	2	1	-	-	-
2	1	3	1	1	-	1	1	-	2	3	3	1	-	-
3	-	1	-	-	-	1	1	-	3	3	3	1	-	-
4	2	2	1	1	3	1	1	-	2	3	3	3	-	-
5	1	1	1	-	-	2	2	-	3	3	3	3	-	-
AVG	1.25	1.6	1	1	3	1.4	1.4	2	2.6	2.8	2.6	2	-	-

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

Chairman - Boc

23MDC101 **INDUCTION PROGRAMME (2 Weeks)**

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have a broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed."

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character."

Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

Physical Activity

This would involve a daily routine of physical activity with games and sports etc.

Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, make decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and don'ts, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

Lectures by Eminent People

Motivational lectures by eminent people from all walks of life should be arranged to give the students

exposure to people who are socially active or in public life.

Proficiency Modules

This would address some lacunas that students might have, for example, English, computer familiarity etc.

Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the underprivileged.

Familiarization to Dept./Branch & Innovations

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

References: Guide to Induction program from AICTE

Chairman - BoS

SEMESTER II

23MAT203	**MATHEMATICAL FOUNDATIONS OF COMPUTING**	L T P C
	[Common to CSE, CSE (CS), CSE (AI&ML), IT, and AI&DS]	3 1 0 4

OBJECTIVES

- To explore techniques for solving ordinary differential equations and recurrence relations.
- To compose the purpose of using Laplace transforms to create a new domain in which problems can be handled more easily.
- To develop the concepts of solving algebraic, transcendental and system of linear equations.
- To introduce the numerical techniques of interpolation and integration.
- To provide the knowledge of congruences and classical theorems in number theory.

UNIT I ORDINARY DIFFERENTIAL EQUATIONS AND RECURRENCE RELATIONS 9+3

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Legendre's linear equations – Simultaneous linear equations with constant coefficients – Recurrence relations: Solving linear homogeneous recurrence relations with constant coefficients.

UNIT II LAPLACE TRANSFORMS 9+3

Definition – Conditions for existence – Transforms of elementary functions – Properties of Laplace transforms – Transform of Periodic functions – Transforms of derivatives and integrals – Multiplication by t^n and division by 't' – Evaluation of integrals by Laplace transforms – Inverse transforms – Convolution theorem – Application to solution of linear second order ordinary differential equations with constant coefficients.

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 with equal intervals: Newton's forward interpolation formula – Newton's backward interpolation formula – Interpolation with unequal intervals: Lagrange's interpolation formula – Divided differences – Newton's divided difference formula – Numerical integration: Trapezoidal rule – Simpson's one-third rule – Numerical double integration by Trapezoidal rule.

UNIT V CONGRUENCES AND CLASSICAL THEOREMS 9+3

Congruences – Linear Congruences – The Chinese Remainder Theorem – 2 x 2 Linear Systems – Wilson's Theorem – Fermat's Little Theorem – Euler's Theorem.

OUTCOMES

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

- Apply appropriate techniques to solve ordinary differential equations and recurrence relations.

- Solve engineering problems using the concept of Laplace transforms.
- Compute the numerical solution of algebraic, transcendental and system of linear equations.
- Apply the numerical techniques of interpolation and integration.
- Analyze the concepts of congruences and classical theorems in number theory.

LIST OF EXPERIMENTS

1. Solving ordinary differential equations.
2. Compute homogeneous recurrence relations.
3. Calculate Laplace Transform of simple functions.
4. Calculate Inverse Laplace transform of a given function.
5. Solution of simultaneous algebraic equations by Gauss Seidel method.
6. Find the Eigen values of a matrix by Power method.
7. Illustrate Lagrange's interpolation formula.
8. Evaluation of line integral by Simpson's one-third rule.
9. Determine congruence relations.
10. Solving problems in Chinese Remainder Theorem.

TOTAL: 45+15 PERIODS

TEXT BOOKS

1. Grewal B.S.,"Higher Engineering Mathematics", Khanna Publishers, Forty fourth Edition, 2022.
2. Grewal,B.S., "Numerical Methods in Engineering and Science", Khanna Publishers, Eleventh Edition, 2023.

REFERENCES

1. Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, Tenth Edition, 2016.
2. Thomas Koshy, "Elementary Number Theory with Applications", Elsevier Publishers, Second Edition, 2007.

E-RESOURCES

1. https://archive.nptel.ac.in/courses/111/102/111102129/ (Transforms)
2. https://nptel.ac.in/courses/111/107/111107105/ (Numerical Methods)
3. http://nitttrc.edu.in/nptel/courses/video/106108227/L58.html (Congruences)

Mapping of Cos-Pos & PSOs

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

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

Chairman - BoS

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

OBJECTIVES

- To provide knowledge on semiconductor physics and technologies used in Computer Engineering.
- To explain the working principles of magnetic devices and sensors applied in computer systems.
- To impart understanding of optical phenomena in display device fabrication and nanoelectronic devices.
- To teach the fundamentals of fiber optics and data transmission systems.
- To introduce emerging technologies in Computer Engineering.

UNIT I SEMICONDUCTORS & TECHNOLOGIES 9

Elemental and Compound Semiconductors – Intrinsic Semiconductor & Extrinsic Semiconductor – Intrinsic Carrier Concentration Derivation– Semiconductor Devices for Computer (Diodes and Transistors) - MOSFET- basic operation and fabrication - Latest developments in semiconductor technology – system on chip.

UNIT II MAGNETIC DEVICES & SENSORS 9

Ferromagnetism and their Properties - Domain Theory of Ferromagnetism – Hard and Soft magnetic Materials - Magnetic Storage Devices.- Modern Hard Disk Drive technologies. SENSORS – Classification of Sensors – Types of Sensors - Sensors in Internet of Things (IOT) – Image sensors (CCD & CMOS)

UNIT III DISPLAY DEVICES & NANOELECTRONIC DEVICES 9

Introduction - Electroluminescence Process - Liquid Crystal Display - TFT-LCD – LED Display - - Touch screen Display - Organic LED display – Micro LED display - Quantum Dots Display .

Nanoelectronic Devices : Nanoscale MOSFETs - Nano and Micro Opto -Electro-Mechanical Systems (NOEMS/MOEMS).

UNIT IV FIBER OPTICS & DATA TRANSMISSION SYSTEMS 9

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

UNIT V EMERGING TECHNOLOGIES 9

Quantum Computing - 3D Printing - 5G & 6G Cellular Communications - Explainable Artificial Intelligence(AI) - Biometrics - Cloud Computing - Quantum Cryptography - Robotic Process Automation - Wearable Computing Virtual Reality(VR) – Augmented Reality (AR) – Mixed Reality (MR)..

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the principles of semiconductors and their applications in computer engineering technologies.
- Describe the working of magnetic devices and sensors used in computer systems.
- Explain optical phenomena in display devices and the basics of nanoelectronic devices.
- Describe the fundamentals of fiber optic communication and data transmission systems.
- Identify and explain emerging technologies in Computer Engineering.

TEXT BOOKS

1. Rajendran V. "Engineering Physics". Tata McGraw Hill Publications, 2015.
2. S. M. Sze, M. K. Lee , :Semiconductor Physics and Devices" Wiley , 2021.
3. Brajesh Kumar Kaushik, "Nanoelectronics: Devices, Circuits and Systems (Micro and Nano Technologies)" , Elsevier, 2018.

REFERENCES

1. Simon M. Sze, Kwok K. Ng , "Physics of Semiconductor Devices", Wiley-Interscience, 2016.
2. Takao Kuroda , "Essential Principles of Image Sensors", CRC Press, 2021.
3. B.P. Pal , "Fundamentals of Fibre Optics in Telecommunication and Sensor Systems" New Age International Private Limited, 2023.

E – RESOURCES

1. https://novapublishers.com/shop/internet-of-everything-smart-sensing-technologies/
2. https://www.ukri.org/news/revealed-the-50-new-technologies-that-could-shape-the-future/

Mapping of COS- POS & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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

Chairman - BoS

23CYT201	ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (Common to All B.E /B.Tech Branches)	L T P C 3 0 0 3

OBJECTIVES

- To familiarize students with the concepts of environment, ecosystems, biodiversity, and their conservation.
- To create awareness about environmental pollution, individual responsibilities in pollution prevention, and basic disaster management.
- To impart knowledge about major social and environmental issues, environmental protection laws, and green chemistry principles.
- To analyze population-related issues, human health, social welfare, and the role of information technology in environmental and human health.
- To develop an understanding of sustainability concepts, climate change issues, and sustainable management practices for addressing environmental challenges

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 (d) aquatic ecosystems (oceans) – Introduction to biodiversity definition: genetic, species and ecosystem diversity –Value 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 – 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

Water conservation, rain water harvesting, watershed management – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – Green Chemistry and principles - Environment production act – Air (Prevention and Control of Pollution) act –Water (Prevention and control of Pollution) act

Activity: Creating environmental awareness.

UNIT IV HUMAN POPULATION AND 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- -Sustainable Development Goals-Targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-Case studies. Zero waste, Material Life cycle 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, the students will be able to:

- Explain the basics of environment, ecosystems, biodiversity, and conservation.
- Identify major sources of pollution and understand individual responsibilities in pollution prevention and disaster management.
- Describe key social and environmental issues, environmental laws, and green chemistry principles.
- Analyze population growth, human health, social welfare, and the role of IT in environmental and health management.
- Apply sustainability concepts, climate change mitigation, and sustainable management practices to environmental challenges.

TEXT BOOKS

1. Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill, 2019.
2. Gilbert M.Masters, "Introduction to Environmental Engineering and Science", Eighth Edition, Pearson Education, 2021.
3. Allen, D. T. and Shonnard, D. R., "Sustainability Engineering: Concepts, Design and Case Studies", Third Edition, Prentice Hall, 2018.

REFERENCES

1. Erach Bharucha, "Textbook of Environmental Studies", Universities Press (I) Pvt Ltd, 2016.
2. Dharmendra S. Sengar, "Environmental law", Prentice hall of India Pvt Ltd, 2018.
3. Rajagopalan, R, "Environmental Studies-From Crisis to Cure", Oxford University Press, 2019.

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
1	2	2	3	-	-	3	3	3	-	-	2	1	-	-
2	2	2	3	2	3	3	3	3	-	-	3	3	-	-
3	2	1	3	2	2	3	3	3	-	2	3	3	-	-
4	2	1	3	2	3	3	3	3	2	3	2	2	-	-
5	2	1	3	2	3	3	3	3	2	3	2	2	-	-
AVG	2	1.4	3	2	2.8	3	3	3	2	2.7	2.4	2.2	-	-

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

Chairman - BoS

23HST202 **TAMIL AND TECHNOLOGY** **L T P C**
1 0 0 1

OBJECTIVES

- To gain knowledge about weaving and ceramic Technology
- To create a design and construction Technology
- To analyze manufacturing Technology
- To apply agriculture and irrigation Technology
- To remember scientific and scientific Tamil and Tamil computing

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)- Thirumalai Nayakar 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 Kumizhi Thoompu 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

OUTCOMES

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

- Understand weaving under ceramic Technology.
- Develop new design and construction Technology.
- Identify the manufacturing Technology.
- Understand agriculture and irrigation.
- Knowledge of scientific Tamil and Tamil computing.

TEXT-CUM-REFERENCE BOOKS

1. தமிழகவரலாறு – மக்களும் பண்பாடும் – கே. கே. பிள்ளை– (வெளியீடு:தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன்பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல்துறைவெளியீடு)
4. பொருநை -ஆற்றங்கரை நாகரீகம். (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 Civilization on the banks of the river Vaigai' (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu.)
10. Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu.)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

23HST202	தமிழரும் தொழில்நுட்பமும்	L T P C 1 0 0 1

நோக்கம்

மாணவர்கள் கண்டிப்பாக அறியவேண்டுவன:

- நெசவு மற்றும் பீங்கான் தொழில்நுட்பம் பற்றிய அறிவைப் பெறுதல்.
- வடிவமைப்பு மற்றும் கட்டுமான தொழில்நுட்பத்தை உருவாக்குதல்.
- உற்பத்தி தொழில்நுட்பத்தைப் பகுப்பாய்வு செய்தல்.
- விவசாயம் மற்றும் நீர்ப்பாசனத் தொழில்நுட்பத்தைப் பயன்படுத்துதல்.
- அறிவியல்மற்றும்அறிவியல்தமிழ்மற்றும்தமிழ்கணிப்பொறிதொடர்பானஅறி வைநினைவில்கொள்ளுதல்.

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

முடிவுகள்

பாடத்தின் முடிவில், மாணவர்கள் அறிந்துகொள்வன

- பீங்கான் மற்றும் நெசவு தொழில்நுட்பத்தைப் புரிந்து கொள்ளுதல்.
- புதிய வடிவமைப்பு மற்றும் கட்டுமான தொழில்நுட்பத்தைஉருவாக்குதல்.
- உற்பத்தித் தொழில்நுட்பத்தை அடையாளம் காணுதல்.
- விவசாயம் மற்றும் நீர்ப்பாசனத்தைப் புரிந்து கொள்ளுதல்.
- அறிவியல் தமிழ் மற்றும் தமிழ் கணிப்பொறி தொடர்பான அறிவை பெறுதல்.

உரை மற்றும் குறிப்பு புத்தகங்கள்

1. தமிழகவரலாறு - மக்களும்பண்பாடும் – கே. கே. பிள்ளை– (வெளியீடு:தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).

2. கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).

3. கீழடி – வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம் (தொல்லியல்துறைவெளியீடு)

4. பொருநை -ஆற்றங்கரைநாகரீகம். (தொல்லியல்துறைவெளியீடு).

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).

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9. Keeladi – 'Sangam City Civilization on the banks of the river Vaigai' (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu.)

10. Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)

11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamilnadu Textbook and Educational Services Corporation, Tamilnadu.)

12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

23HSE201	ENGLISH FOR ENGINEERS:THEORY AND PRACTICE (Common to all B.E. & B.Tech. Branches)	L T P C 3 0 2 4

OBJECTIVES

- To strengthen grammatical accuracy for effective communication.
- To develop listening and reading comprehension skills.
- To improve writing proficiency for academic and formal purposes.
- To train in business and professional correspondence.
- To enhance speaking abilities for social and professional contexts.
- To provide practical exposure through interactive language activities.

UNIT I GRAMMAR 9

Articles - Prepositions - Conditionals - Subject verb agreement - Error Spotting - Active and Passive voice.

UNIT II LISTENING & READING 9

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

UNIT III WRITING 9

Checklist - Recommendations - Formal letters – inviting guests – acceptance/declining letters

UNIT IV BUSINESS WRITING 9

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

UNIT V SPEAKING 9

Collaborative task - Turn taking (initiating and responding appropriately) - Negotiating - Exchanging - Suggesting - Comparing and Contrasting - Situational Role-play.

TOTAL: 45 PERIODS

LIST OF EXERCISES

1. Stage Dynamics (Body Language and Paralanguage - Presentation)
2. Day today real time speaking exposures – Story narration, simple, general topics and incidents.
3. Group Discussion
4. Power Point Presentation (Corporate Skills & Public Speaking)
5. Loud Reading
6. Picture Description
7. Interview Skills (Mock Interview & Interview Etiquette)
8. Case Study Report

TOTAL: 15 PERIODS

OUTCOMES

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

- Use correct grammar in speech and writing.
- Understand and interpret information from various audio and reading sources.
- Write clear, structured, and formal documents.
- Prepare professional emails, résumés, and job-related letters.
- Communicate effectively in group discussions and presentations.
- Apply communication skills confidently in real-time situations.

TEXT BOOKS

1. S. Sumant, Maven Learning Private Limited, "Technical English II"
2. Joshi, Manmohan, Soft Skills, First Edition. Bookboon, 2017.

REFERENCES

1. Dr K Elango, Dr. Veena Selvam, Dr. Sujatha Priyadarshini, "Resonance English for Engineers and Technologists", Cambridge University Press, First Edition, 2013.
2. Seely, John. Oxford Guide to Effective Writing and Speaking. Indian ed. New Delhi: Oxford University Press. 2005.

E-RESOURCES

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

EXTENSIVE READING

1. Stephen R. Covey, " The 7 Habits of Highly Effective People", Simon & Schuster, 2019.

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO12
1	1	-	-	-	1	-	-	-	2	3	-	2	-	
2	1	2	-	2	-	-	-	-	-	3	-	1	-	
3	1	-	-	-	-	-	-	1	-	3	2	2	-	
4	-	-	-	-	1	-	-	2	-	3	2	2	-	
5	-	-	-	-	-	-	-	1	3	3	2	1	-	
6	-	-	-	-	-	2	2	2	2	3	-	2	-	
AV G	1	2	-	2	1	2	2	1.5	2.3	3	2	1.6	-	

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

Chairman - BoS

23CSE201	PC HARDWARE SERVICES AND NETWORKING (Lab Embedded Theory Course)	L T P C 3 0 2 4

OBJECTIVES

- To impart the students with fundamental components of a motherboard, memory devices and their functionalities.
- To enable students to understand operation of IO devices, interfaces and common troubleshooting techniques.
- To train the students in the BIOS setup functions, Power management, and necessary precautions of PC maintenance.
- To foster the students in troubleshooting techniques for diagnosing, and resolving hardware-related issues.
- To familiarize students with the fundamentals of data communication, computer networking concepts.

UNIT I MOTHERBOARD COMPONENTS AND MEMORY STORAGE DEVICES 9

Introduction: Hardware, Software and Firmware. Mother board, IO and memory expansion slots, SMPS-Processors: Architecture and block diagram of multicore Processor, Features of new processor-chipsets (Concepts only). Bus Standards: Overview and features of PCI, AGP, PCMCIA Primary Memory-Secondary Storage-Removable Storage.

Problem - Solving Assignments:

1. Identify the motherboard type.
2. Explain how you will verify chipset compatibility.

UNIT II I/O DEVICES AND INTERFACE 9

Keyboard: Signals –mechanical keyboards–troubleshooting - wireless Keyboard. Mouse: types, connectors, operation of Optical mouse and Troubleshooting. Printers: Types of printers-Dot Matrix, Inkjet Laser, MFP (Multi Function Printer) and Thermal printer-I/O Ports: Serial, Parallel, USB, Game Port and HDMI. Displays: Principles of LED, LCD and TFT Displays-Modem: Working principle. Power Supply: Servo Stabilizers, online and offline UPS - working principles.

Problem - Solving Assignments:

1. Keyboard Not Working Issue ,USB keyboard is not detected.List troubleshooting steps.
2. A system consumes 400W power.Suggest suitable UPS capacity.

UNIT III MAINTENANCE OF DESKTOP 9

Bios-setup: Standard CMOS setup, Advanced BIOS setup, Power management, advanced chipset features, PC Bios communication– upgrading BIOS, Flash BIOS -setup. POST: Definition – IPL hardware – POST Test sequence – beepcodes. Diagnostic Software and

Viruses: Computer Viruses – Precautions –Anti-virus Software – identifying the signature of viruses – Firewalls and latest diagnostic software's.

Problem - Solving Assignments:

1. A system shows unwanted pop-ups and slow performance.Suggest antivirus and firewall solutions.
2. A new processor is not detected.Explain BIOS update process.

UNIT IV TROUBLESHOOTING OF DESKTOP AND LAPTOPS 9

Laptop: Types of laptop –block diagram – working principles–configuring laptops and power settings -SMD components, ESD and precautions. Laptop components: Adapter – types, Battery – types, Laptop Mother Board - block diagram, Laptop Keyboard and Touchpad. Installation and Troubleshooting: Formatting, Partitioning and Installation of OS – Trouble Shooting Laptop Hardware problems - Preventive maintenance techniques for laptops.

Problem - Solving Assignments:

1. During Windows installation, hard disk not detected, Identify reasons.
2. Laptop Not ChargingCheck adapter, battery, charging port.

UNIT V COMPUTER NETWORK DEVICES 9

Data Communication: Components of a data communication. Data flow: simplex – half duplex – full duplex; Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology. Networks: Definition -Types of Networks: LAN – MAN – WAN –CAN – HAN – Internet –

Intranet –Extranet, Client-Server, Peer To Peer Networks. Network devices: Features and concepts of Switches –Routers(Wired and Wireless) – Gateways.

Problem - Solving Assignments:

1. Two systems cannot communicate.Check IP configuration.
2. Compare Star and Mesh topology for a bank network.

LIST OF EXPERIMENTS

(Any Eight Experiments to be completed)

1. Assembling a PC:Assembling the different components of a Computer (CPU, RAM, GPU, motherboard, storage devices, etc.).
2. BIOS/UEFI Settings:Explore the BIOS/UEFI interface.
3. Operating System /Application Software Installation:
   a. Install various operating systems (Windows, Linux, etc.) on your system.
   b. Learn about partitioning, formatting, and installing device drivers.
4. Troubleshooting Basics:
   a. Introduce common issues (e.g., loose connections, incompatible hardware) and

troubleshoot them.

b. Familiarize yourself with diagnostic tools and error messages.

5. Installation of Printer, Scanner and troubleshoot them
6. Memory Testing and System performance setting
7. Explore network configuration, set up a local network, and test file transfers.
8. Setting up a simple network:
   a. Setting up a local area network
   b. Assign static IP addresses to devices.
   c. TestConnectivity using the ping command.
9. Study about installation of RJ45, Crimming tool, Cabling-CAT5,CAT6.
10. Network monitoring and diagnosing.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

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

- Explain the functionalities of computer hardware components, motherboard, memory devices
- Demonstrate operation, configuration, and troubleshooting of input/output devices.
- Analyze BIOS setup functions and virus prevention techniques for system maintenance.
- Analyze hardware and software issues in desktop and laptop and use troubleshooting techniques to solve the issues.
- Explain the principles of data communication, network topologies, and networking devices.

TEXT BOOKS

1. David A. Patterson and John L. Hennessy ,"Computer Organization and Design", Fifth Edition, 2013.
2. Mike Meyers, "CompTIA A+ Certification All-in-One Exam Guide", Tenth Edition, 2019.

REFERENCES

1. Tanenbaum, A. S., & Van Steen, M. "Computer Networks", Pearson, Second Edition,2014.
2. Patterson, D. A., & Hennessy, J. L. (2017). "Computer Organization and Design: The Hardware/Software Interface". Morgan Kaufmann,2017

E – RESOURCES

1. https://www.netacad.com/
2. https://www.edx.org/learn/operating-systems/ibm-hardware-and-operating-systems

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	1	–	2	–	–	1	–	1	–	2	3	2
2	3	3	2	2	3	–	–	1	1	1	–	2	3	3
3	3	3	2	2	3	–	–	2	1	1	–	2	3	3
4	3	3	3	3	3	2	1	2	1	2	–	3	3	3
5	3	3	2	2	3	1	1	1	2	2	–	3	3	3
6	3	3	3	3	3	2	2	2	3	2	2	3	3	3
AVG	3.0	2.8	2.17	2.4	2.8	1.6	1.3	1.5	1.6	1.5	2.0	2.5	3.0	2.8

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

Chairman - BoS

23EEE202	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L T P C
	(Common to AIDS, CSE, CSE-CS, IT, Robotics, PT)	3 0 2 4

OBJECTIVES

- To enhance the basic concepts of DC and AC electrical circuits and fundamental circuit laws.
- To impart knowledge on the construction, working principles, and applications of basic electrical machines.
- To instruct the operation and characteristics of basic semiconductor devices.
- To familiarize the fundamentals of number systems and basic digital logic circuits in digital world.
- To instruct the principles of electrical measuring instruments and power measurement.
- To provide knowledge on basic electrical and electronic concepts through simple hands-on experiments.

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=60 PERIODS

OUTCOMES

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

- Apply the basic electrical laws and theorems to analyze simple DC and AC circuits.
- Explain the working principles and applications of DC machines, transformers and motors.
- Analyze the characteristics and applications of diodes and semiconductor devices.
- Apply the digital logic concepts to design and analyze simple combinational circuits.
- Examine the operation of electrical instruments and basic data acquisition systems.
- Analyze the basic electrical and electronics concepts by performing simple hands-on laboratory experiments and interpreting the results

TEXT BOOKS

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, Second Edition, 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", McGraw Hill Education,Fourth Edition,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
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.

Chairman - BoS

23GEL201	ENGINEERING PRACTICES LABORATORY (Lab Embedded Theory Course)	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; planning; making joints in wood materials used in common household 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 in household appliances.

WOOD WORK:

a) Sawing,
b) Planning 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 using Diac /Triac /quadric)

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:

a) Assembling a centrifugal pump.

b) Assembling a household mixer.

c) Assembling an air conditioner.

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:

a) Study an elements of smart phone..

b) Assembly and dismantle of LED TV.

c) 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
1	3	2	-	-	1	1	1	-	-	-	-	2	2	1
2	3	2	-	-	1	1	1	-	-	-	-	2	2	1
3	3	2	-	-	1	1	1	-	-	-	-	2	2	1
4	3	2	-	-	1	1	1	-	-	-	-	2	2	1
AVG	3	2	-	-	1	1	1	-	-	-	-	2	2	1

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

Chairman - BoS

23EEC201

INDIAN LANGUAGE (EXCEPT MOTHER TONGUE) / FOREIGN LANGUAGE

(Common to all B.E. & B.Tech. Branches)

L T P C
0 0 4 2

OBJECTIVES

- To learn the Hindi alphabet, pronunciation, and basic writing.
- To understand and use basic Hindi grammar correctly.
- To develop basic reading, writing, listening, and speaking skills in Hindi.
- To use Hindi for simple everyday communication.
- To prepare learners to successfully clear the Hindi Examination.

UNIT I वर्णमालाएवंमूलभूतव्याकरण (ALPHABET AND BASIC GRAMMAR) 5

Hindi Vowels (स्वर)- Hindi Consonants (व्यंजन) -Matras (मात्राएँ)- Barakhadi (बारहखड़ी)-Word Formation (शब्दनिर्माण)- Gender (लिंग)- Number (वचन)- Basic Sentence -Formation (सरलवाक्यरचना)

UNIT II शब्दभंडारएवंव्याकरण (VOCABULARY AND GRAMMAR) 7

Nouns (संज्ञा)- Pronouns (सर्वनाम) -Adjectives (विशेषण) -Verbs (क्रिया) -Tenses (काल– Present, Past, Future) - Opposite Words (विलोमशब्द) -Synonyms (पर्यायवाची) -One-word Substitutions (अनेकशब्दोंकेलिएएकशब्द)

UNIT III पठनएवंलेखनकौशल (READING AND WRITING SKILLS) 7

Reading Simple Hindi Passages -Comprehension (गद्यांश) -Paragraph Writing (अनुच्छेदलेखन)- Letter Writing (पत्रलेखन)- Dialogue Writing (संवादलेखन) -Picture Description (चित्रवर्णन) -Dictation Practice (श्रुतिलेख)

UNIT IV दैनिकजीवनमेंहिंदी (HINDI FOR EVERYDAY COMMUNICATION) 7

Greetings and Introductions -Family Members (परिवार)- Days, Months, Seasons -Numbers (१–१००) - Time and Date - Colours, Fruits, Vegetables - Shopping Conversations - School and Classroom Vocabulary -Common Everyday Conversations

UNIT V साहित्यएवंपुनरावृत्ति (LITERATURE AND REVISION) 4

Simple Poems (कविताएँ)- Short Stories (लघुकथाएँ)- Proverbs and Idioms (मुहावरेएवंलोकोक्तियाँ– basic) - Moral Stories - Translation (English/Tamil to Hindi – Simple Sentences) - Revision of Grammar - Model Question Papers and Practice Tests

TOTAL: 30 PERIODS

OUTCOMES

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

1. Write basic Hindi words and sentences.
2. Apply fundamental Hindi grammar in simple communication.

3. Develop basic reading, writing, listening, and speaking skills in Hindi.
4. Use Hindi confidently in day-to-day conversations.
5. Develop proficiency required to successfully clear the Hindi Examination.

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	-	-	-	-	-	-	-	-	-	3	-	1	-	-
2	-	-	-	-	-	-	-	1	1	3	-	1	-	-
3	-	-	-	-	-	-	-	1	2	3	-	2	-	-
4	-	-	-	-	-	1	1	2	2	3	-	1	-	-
5	-	-	-	-	-	-	-	-	-	2	-	3	-	-
AVG	-	-	-	-	-	1.0	1.0	1.3	1.6	2.8	-	1.6	-	-

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

P. Kavitha
Chairman - BoS

23EEC201 **INDIAN LANGUAGE**

(EXCEPT MOTHER TONGUE) / FOREIGN LANGUAGE L T P C

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

OBJECTIVES

- To learn the German alphabet, pronunciation, and basic communication.
- To understand and use basic German grammar and vocabulary.
- To communicate in German in simple everyday situations.
- To develop basic reading, writing, listening, and speaking skills in German.
- To apply basic German language skills confidently through practice and revision.

UNIT I INTRODUCTION TO GERMAN LANGUAGE 6

German alphabet and pronunciation – Greetings - Self-introduction (Name, age, nationality, profession) - Numbers (0–100) -Days, months, seasons, and dates - Basic classroom expressions - Personal pronouns -Verb **sein** (to be) -Simple sentence formation

UNIT II BASIC GRAMMAR AND VOCABULARY 7

Definite and indefinite articles (der, die, das; ein, eine) - Nouns and gender - Singular and plural forms - Verb conjugation (regular verbs) - Present tense - Question words (Wer, Was, Wo, Wann, Wie, Warum) - Negation (nicht, kein) - Vocabulary: Family, occupations, countries, languages, colors

UNIT III EVERYDAY COMMUNICATION 7

Daily routine - Time and clock reading - Food and beverages - Shopping conversations - Asking for and giving directions -Making simple requests -Modal verbs (möchten, können) -Vocabulary: Home, school, transportation, weather

UNIT IV READING, WRITING, LISTENING, AND SPEAKING SKILLS 5

Reading short dialogues - Listening to simple conversations - Writing short paragraphs - Describing people, places, and objects - Introducing family and friends

UNIT V PRACTICAL APPLICATIONS AND REVISION 5

Travel and tourism vocabulary - At the restaurant - At the railway station and airport - Revision of grammar topics - Translation of simple sentences (English to German and German to English)

TOTAL: 30 PERIODS

OUTCOMES

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

- Identify the German alphabet and pronounce basic German words correctly.
- Use basic German vocabulary and simple grammar in sentences.
- Practice in simple German for everyday situations.
- understand basic German texts and conversations.

- Apply basic German language skills confidently in simple real-life situations.

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	-	-	-	-	-	-	-	-	-	3	-	1	-	-
2	-	-	-	-	-	-	-	1	1	3	-	1	-	-
3	-	-	-	-	-	1	1	2	2	3	-	2	-	-
4	-	-	-	-	-	-	-	1	2	3	-	2	-	-
5	-	-	-	-	-	1	1	2	2	3	-	2	-	-
AVG	-	-	-	-	-	1	1	1.5	1.7	3	-	1.6	-	-

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

P. Kavitha
Chairman - BoS

23EEC201 **INDIAN LANGUAGE**

(EXCEPT MOTHER TONGUE) / FOREIGN LANGUAGE L T P C

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

OBJECTIVES

- To learn the Japanese writing system, pronunciation, and basic vocabulary.
- To understand and use basic Japanese grammar and sentence patterns.
- To communicate in Japanese in simple everyday situations.
- To develop basic reading, writing, listening, and speaking skills in Japanese.
- To apply basic Japanese language skills confidently through practice and real-life communication.

UNIT I WRITING SYSTEMS & PRONUNCIATION **5**

Hiragana chart reading and writing - Katakana chart reading and writing - Basic pronunciation rules (long vowels, double consonants) – Numbers - Colours, body parts, pets description

UNIT II KANJI & BASIC GRAMMAR **7**

First 50 Kanji (Numbers, Time & Days, Basic Directions & People) - Topic marker は (wa) - Identification sentences: Noun + です (desu) - Possession particle の (no) - Inclusion particle も (mo) - Subject marker が (ga) - Direction particles へ (he) and に (ni) - Self-introductions and greetings (Aisatsu) - Numbers, prices, shopping terms - Days, months, relative time - Family members and occupations

UNIT III KANJI & FUNCTIONAL GRAMMAR **8**

Next 50 Kanji (Nature, Core Verbs, Adjectives & Nouns) - Verb groups (Group 1, Group 2, Group 3) - Masu forms (Present, Past, Positive & Negative) - Te-form (~て): requests, connecting sentences, continuous actions (~ている) - Adjective conjugation (い & な adjectives) - Desires (~たい) and Invitations (~ましょう).

UNIT IV VOCABULARY & FUNCTIONAL COMMUNICATION **5**

Action verbs (daily routine, hobbies) - Adjectives for people, food, and places - Positional words (inside, outside, next to, between) - Transport, travel, and location vocabulary - Simple conversations in everyday situations

UNIT V READING & LISTENING COMPREHENSION **5**

Reading short sentences in Hiragana, Katakana, and basic Kanji - Understanding classroom instructions - Listening to slow, clear daily-life conversations - Understanding simple shopping dialogues

TOTAL: 30 PERIODS

OUTCOMES

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

- Identify the Japanese writing system and pronounce basic Japanese words correctly.

- Use basic Japanese vocabulary and simple grammar in sentences.
- Communicate in simple Japanese for everyday situations.
- Read, write, listen to, and understand basic Japanese texts and conversations.
- Apply basic Japanese language skills confidently in simple real-life situations.

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	-	-	-	-	1	1	1	-	1	2	-	-	-	-
2	-	-	-	-	1	2	2	-	2	2	-	-	-	-
3	-	-	-	-	2	2	2	1	2	3	-	1	-	-
4	-	-	-	-	2	2	2	1	3	3	-	1	-	-
5	-	-	-	-	1	1	1	1	2	3	-	1	-	-
AVG	-	-	-	-	1.4	1.6	1.6	1	0.2	2.6	-	1	-	-

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

P. Kavitha
Chairman - BoS

23MDC201	APTITUDE SKILLS (Common to all Branches)	L T P C 3 0 0 0

OBJECTIVES

- To introduce the basics concepts and techniques of numbers, Highest common factor and Least common multiple.
- To develop the use of decimal fraction and problems on ages.
- To introduce the basic concepts of time, work, distance, calendar and clock.
- To explain the student with the concept of simple and compound interest.
- To provide the knowledge of polynomial and quadratic equations.

UNIT I NUMBERS, HIGHEST COMMON FACTOR AND LEAST COMMON MULTIPLE 9

Numbers and their basic classification – Types of number – Basic operations of numbers – Progression – Tests of divisibility – Highest common factor – Least common multiple

UNIT II DECIMAL FRACTION AND PROBLEMS BASED ON AGES 9

Decimal fraction – Types of fraction – Comparison of fractions – Inserting fractions in between two given fractions – Relation between decimal fraction and normal fraction – Conversion of a decimal fraction into a vulgar fraction – Types of decimals – Conversion of mixed recurring decimal into a vulgar fraction – Standard form of decimal – Problems based on ages.

UNIT III TIME, WORK, DISTANCE, CALENDER AND CLOCK 9

General rule for time and work – General rule for work and wages – Speed – Unit of speed – Average speed – Some useful relations – Problems on Trains – Calendars and clocks – Odd days – Ordinary year – Leap year.

UNIT IV SIMPLE INTEREST, COMPOUND INTEREST AND ELEMENTARY ALGEBRA 9

Simple interest – Compound interest – Some useful relations – Difference between compound interest and simple interest – Short cut methods to solve special types of problems – Elementary Algebra and averages

UNIT V POLYNOMIAL AND QUADRATIC EQUATIONS 9

Polynomial introduction – Degree of a polynomial – Types of polynomial – Operations on polynomial – Remainder and factor theorem – Quadratic equation – Pure Quadratic equation – Discriminant – Roots of the Quadratic equations – Solution of Quadratic equation – Framing of a Quadratic equation – Special types of roots.

TOTAL: 45 PERIODS

OUTCOMES

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

- Apply basic concepts and techniques highest common factor and least common multiple on numbers.

- Apply the concept of decimal fraction and problems on ages.
- Apply the concept of time, work, distance, calendar and clock.
- Develop proficiency in simple interest, compound interest and basic algebraic skills.
- Explain the concepts and properties of polynomial and quadratic equations.

TEXT BOOKS

1. Agarwal R.S., "Quantitative Aptitude", S. Chand & Company Ltd, New Delhi, 2012.

2. Dinesh Khattar, "Quantitative Aptitude for competitive examinations ", Pearson India Education Services Pvt. Ltd., New Delhi, 2019.

REFERENCES

1. Praveen R.V., "Quantitative Aptitude and Reasoning", PHI Learning Private Limited, Delhi, 2013.

2. Gupta P, "A unique Approach to Quantitative Aptitude ", Unique Publishers (I) Pvt. Ltd, New Delhi, 2017.

E-RESOURCES

1. https://youtube.com/playlist?list=RDQM5XI256aOq24
2. https://youtu.be/KE7tQf9spPg

Chairman - Bo

SEMESTER III

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

OBJECTIVES

- To provide knowledge of logic and proofs.
- To explore generating functions, mathematical induction, and counting techniques.
- To introduce the basics of graph theory.
- To explain algebraic structures and their properties.
- To introduce the concepts 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, the 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.

TEXT BOOKS

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, Thirtieth 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
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

Chairman - BoS

23ECT302 DIGITAL PRINCIPLES AND COMPUTER ARCHITECTURE L T P C
3 0 0 3

OBJECTIVES

- To introduce the fundamentals of digital circuits and simplification methods.
- To discuss about various combinational digital circuits using logic gates.
- To examine the design procedures for synchronous and asynchronous sequential circuits.
- To gain knowledge on addressing modes, instructions and its operations.
- To summarize the memory hierarchies, cache memories and bus architecture

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.

TOTAL: 45 PERIODS

OUTCOMES

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

- Apply the different methods used for simplification of Boolean expressions.
- Design various combinational digital circuits using logic gates.
- Analyze synchronous and asynchronous sequential circuits.
- Examine the addressing modes and instructions used in computer.
- Develop the memory design and bus architectures.

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
1	3	2	2	2	2	2	-	-	-	-	3	3	3	3
2	3	2	2	3	2	2	-	-	-	-	2	1	2	3
3	3	3	3	2	1	2	-	-	-	-	2	2	3	2
4	3	2	2	3	2	2	-	-	-	-	3	2	2	3
5	3	2	3	2	2	1	-	-	-	-	2	2	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	2	2	2	2	2	-	-	-	-	2	2	3	3

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

Chairman - BoS

23ECT303	ANALOG AND DIGITAL COMMUNICATION	L T P C 3 0 0 3

OBJECTIVES

- To introduce the concepts of Analog Modulation.
- To gain knowledge on various pulse modulation techniques.
- To discuss about various digital communication techniques.
- To inculcate the concept of information theory and coding.
- To facilitate the sequence in 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, the students will be able to,

- Discuss the concepts of Analog Modulation.
- Develop the Pulse modulation and Multiplexing.
- Design the digital modulation and transmission techniques.
- Analyze Source and Error control coding.
- Examine the sequences along with 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
1	3	2	2	2	1	-	-	-	-	-	-	-	2	1
2	2	3	3	2	2	-	-	-	-	-	-	-	2	2
3	3	3	3	3	2	-	-	-	-	-	-	-	3	2
4	3	2	3	3	2	-	--	-	-	-	-	-	3	3
5	3	2	3	2	2	-	-	-	-	-	-	-	2	2
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.8	2.4	2.8	2.4	1.8	-	-	-	-	-	-	-	2.4	2.0

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

Chairman - BoS

23CSE301 **OBJECT ORIENTED PROGRAMMING** **L T P C**

3 0 2 4

OBJECTIVES

- To teach the fundamental concepts of Object-Oriented Programming and the basics of Java programming language for developing simple applications.
- To inculcate the knowledge on packages, inheritance, interfaces, method overloading, and method overriding to design reusable and modular Java programs.
- To train the student in developing Java applications using exception handling and multithreading techniques to create reliable and concurrent programs.
- To utilize Java I/O streams, file handling, generic classes, and generic methods for efficient data processing and type-safe programming.
- To explore interactive Graphical User Interface (GUI) applications using JavaFX controls, layouts, menus, and event handling mechanisms.
- To implement object-oriented programming concepts and Java technologies to develop complete software solutions for real-world problems.

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.

Problem Solving Assignments:

1. Differentiate between Procedural Programming and Object-Oriented Programming.
2. Explain the four major features of OOP with real-life examples.

Coding Exercises:

1. Write a program to display your personal details (Name, Roll No, Department).
2. Write a program to calculate the sum of two numbers entered by the user.
3. Write a program to swap two numbers without using a third variable.
4. Write a program to convert temperature from Celsius to Fahrenheit.

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.

Problem Solving Assignments:

1. Compare Method Overloading and Method Overriding.

2. Analyze advantages of interfaces in software development.

Coding Exercises:

1. Create a Calculator class with overloaded add() methods.
2. Return a Student object with highest marks.
3. Create Bank class with static interest rate.
4. Create a static nested class.
5. Invoke parent constructor using super().

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.

Problem Solving Assignments:

1. Explain the Exception Handling mechanism in Java with a flow diagram.
2. Why is exception handling preferred over normal error checking?

Coding Exercises:

1. Create student mark validation using multiple catch.
2. Handle division and array access in nested blocks.
3. Create a menu-driven exception handling program.
4. Create thread by extending Thread class.

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.

Problem Solving Assignments:

1. Analyze the advantages of Java Stream-based I/O.
2. Analyze the advantages and disadvantages of console-based applications.

Coding Exercises:

1. Read marks of five subjects and calculate average.
2. Store and retrieve employee records from a file.
3. Create a generic Queue class
4. Find maximum value using bounded types.
5. Generic method to find maximum of two values.

UNIT V JAVAFX EVENT HANDLING, CONTROLS AND COMPONENTS 9

JAVAFX Events and Controls: Event Basics – Handling Key and Mouse Events. Controls: Checkbox, Toggle Button – Radio Buttons – List View – Combo Box – Choice Box – Text Controls – ScrollPane.Layouts–FlowPane–HBoxandVBox–BorderPane–StackPane–GridPane.Menus–Basics – Menu–Menu bars– Menu Item.

Problem Solving Assignments:

1. What is an Event in JavaFX? Explain the Event-Driven Programming model.
2. Explain the purpose of ToggleGroup.

Coding Exercises:

1. Display a message when a button is clicked.
2. Display selected CheckBoxes.
3. Build Student Department Selector.
4. Create Login Form using TextField and PasswordField.

LIST OF EXPERIMENTS

1. Write a Java program to check whether the given string is palindrome or not.
2. Develop a Java application to generate Electricity bill.
3. Develop a java application to implement currency converter using packages.
4. Design a Java interface for ADT Stack. Implement this interface using array.
5. Write a program to perform string operations using ArrayList.
6. Write a Java program to implement user defined exception handling.
7. Write a java program that implements a multi–threaded application.
8. Write a java program to find the maximum value from the given type of elements using a generic function.
9. Develop a mini project for any application using Java concepts.

TOTAL : 45 +15=60 PERIODS

OUTCOMES

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

- Explain object-oriented concepts such as classes, objects, constructors, methods, and access specifiers to solve programming problems.
- Develop Java programs using inheritance, packages, interfaces, method overloading, and method overriding for software reusability.
- Implement exception handling mechanisms and multithreaded programming techniques to build reliable Java applications.
- Apply file handling, string manipulation, collections, and generic programming concepts in Java

applications.

- Design GUI applications using JavaFX controls, layouts, and event-driven programming techniques.
- Develop complete Java-based software solutions by integrating OOP concepts, exception handling, file processing, multithreading, and GUI components.

TEXTBOOKS

1. Herbert Schildt, "Java: The Complete Reference", Eleventh Edition, McGraw Hill Education, New Delhi, 2019
2. Herbert Schildt, "Introducing Java FX8 Programming", First Edition, McGraw Hill Education, New Delhi, 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/ (Programming methodology and data structure)
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
1	3	3	2	1	3	–	–	1	1	1	–	2	3	3
2	3	3	3	2	3	–	–	1	1	1	–	3	3	3
3	3	3	3	2	3	–	–	2	2	1	–	3	3	3
4	3	3	3	2	3	–	1	2	1	1	–	3	3	3
5	3	3	3	2	3	1	1	1	2	2	–	3	3	3
6	3	3	3	3	3	2	1	2	3	2	2	3	3	3
AVG	3.0	3.0	2.8	2.0	3.0	1.5	1.0	1.5	1.6	1.3	2.0	2.8	3.0	3.0

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

Chairman - BoS

23CSE302 **DATA STRUCTURES AND ALGORITHMS** L T P C
3 0 0 3

OBJECTIVES:

- To introduce the fundamental concepts of linear and non-linear data structures, Abstract Data Types (ADTs), and their implementation methodologies.
- To impart the knowledge on stack and queue concepts along with their applications .
- To foster the tree-based data structures and their applications in efficient data organization, searching, and storage.
- To familiarize about graph representations and algorithms for addressing connectivity, shortest path, and optimization problems.
- To familiarize learners with algorithm analysis techniques including complexity analysis, asymptotic notations, and recurrence relations.
- To develop programming skills through the implementation and analysis of data structures, searching, sorting, and graph algorithms.

UNIT I LIST 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.

PROBLEM SOLVING ASSIGNMENTS:

1. Design and implement a Student Record Management System using List ADT. The system should store, update, search, and delete student records using different list implementations.
2. Develop applications using Polynomial ADT, Radix Sort, and Multilists to solve mathematical and data processing problems.

CODING EXERCISES:

1. Write a program to implement a Singly Linked List with the following operations:

- Create a linked list
- Insert a node at the beginning
- Insert a node at the end
- Insert a node at a specific position
- Delete a node
- Search for an element
- Reverse the linked list
- Display the list

2. Write a program to implement a Doubly Linked List with the following operations:

- Insert a node at the beginning
- Insert a node at the end
- Delete a node
- Search for an element
- Display elements in forward direction
- Display elements in reverse direction

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.

PROBLEM SOLVING ASSIGNMENTS:

1. Develop a customer service management system using Queue to manage customer requests in a bank, hospital, or service center.
2. Develop an application that uses Stack ADT to implement undo operations and browser back navigation.

CODING EXERCISES:

1. Write a program to convert an infix expression into postfix expression using a stack.
2. Write a program to implement Queue ADT using an array and perform enqueue, dequeue, and display operations.

UNIT III TREES 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.

PROBLEM SOLVING ASSIGNMENTS:

1. Develop a database indexing system using B-Tree and B+ Tree structures to efficiently store and retrieve large amounts of data.
2. Design and implement an Employee Database Management System using a Binary Search Tree. The system should efficiently store and retrieve employee information.

CODING EXERCISES

1. Write a program to implement Tree ADT with the following operations:
    - Create a tree
    - Insert nodes
    - Delete nodes

- Search an element
- Display tree elements

2. Write a program to perform Heap Sort using Binary Heap.

UNIT IV GRAPHS 9

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.

PROBLEM SOLVING ASSIGNMENTS:

1. Design and implement a Network Routing System using graph data structures to find the shortest path between different network nodes.

2. Develop a City Road Map Optimization System using Minimum Spanning Tree algorithms to minimize the total construction cost while connecting all cities.

CODING EXERCISES:

1. Write a program to perform Depth First Traversal (DFS) of a graph using recursion.

2. Write a program to find the shortest route between two cities using Dijkstra's Algorithm.

UNIT V ALGORITHM ANALYSIS 9

Time and space complexity - Asymptotic Notations and its properties Best case, Worst case and average case analysis – Recurrence relation: substitution method – Mathematical analysis for Recursive and Non-recursive algorithms.

PROBLEM SOLVING ASSIGNMENTS:

1. Develop a system to analyze the performance of various searching and sorting algorithms using asymptotic notations.

2. Analyze recursive algorithms using recurrence relations and substitution method.

CODING EXERCISES:

1. Write a program to implement Binary Search and calculate the number of comparisons for different input sizes.

2. Write a program to compare the execution time of Bubble Sort and Selection Sort for different input sizes.

LIST OF EXPERIMENTS

1. a. Array implementation of Stack, Queue and Circular Queue ADTs array implementation of Stack.

   b. Array implementation of Queue.

   c. Array implementation of circular Queue.

2. Implementation of singly linked list.
3. a.Linked list implementation of Stack and Linear Queue ADTs Linked list implementation of Stack
   b. Linked list implementation of linear queue.
4. Implementation of Polynomial Manipulation using Linked list.
5. Implementation of Evaluating Postfix Expressions, Infix to Postfix conversion.
6. Implementation of Binary Search Trees.
7. Implementation of AVL Trees.
8. Implementation of Heaps using Priority Queues.
9. a. Implementation of Dijkstra's Algorithm.
   b. Implementation of Prim's Algorithm.
10. a. Implementation of Linear Search.
    b. Implementation of Binary Search.
11. a. Implementation of Insertion Sort.
    b. Implementation Selection Sort.

TOTAL: 45 + 15 = 60 PERIODS

OUTCOMES:

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

- Explain and implement Abstract Data Types, List ADT, linked lists, polynomial representation, radix sort, and multilists for solving data organization problems.
- Apply stack and queue data structures for expression conversion, expression evaluation, function call management, scheduling, and other computational applications.
- Design the tree-based data structures including binary trees, binary search trees, AVL trees, heaps, B-Trees, and B+ Trees for efficient searching and storage.
- Apply graph representations and algorithms such as BFS, DFS, Topological Sorting, Dijkstra's Algorithm, Prim's Algorithm, and Kruskal's Algorithm to solve network and optimization problems.
- Analyze algorithm performance using time complexity, space complexity, asymptotic analysis, best/worst/average case analysis, and recurrence relations for developing efficient algorithms.
- Implement and analyze the linear and non-linear data structures, searching, sorting, and graph algorithms using appropriate programming techniques to solve computational problems.

TEXT BOOKS

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

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.

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/(Introductionto data structure)

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	2	3	–	–	1	1	1	–	2	3	3
2	3	3	3	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	2	3	–	–	1	1	1	–	3	3	3
4	3	3	3	3	3	1	1	1	2	2	–	3	3	3
5	3	3	3	3	3	–	–	1	1	1	–	3	3	3
6	3	3	3	3	3	1	1	2	3	2	2	3	3	3
AVG	3.0	3.0	2.8	2.5	3.0	1.0	1.0	1.17	1.5	1.3	2.0	2.6	3.0	3.0

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

Chairman - BoS

23GEE301	PROBLEM SOLVING AND PYTHON PROGRAMMING	L T P C
	(Lab Embedded Theory Course)	3 0 2 4

OBJECTIVES

- To impart the fundamentals of computational thinking, algorithm design, and problem-solving techniques for developing efficient software solutions.
- To develop students proficiency in Python programming using data types, expressions, operators, statements, and debugging techniques.
- To enable students to apply control structures, functions, recursion, and string manipulation for solving computational problems.
- To train students to use lists, tuples, dictionaries, and advanced data processing techniques for structured programming.
- To inculcate the knowledge of file handling, exception handling, modules, packages, and data visualization for developing robust Python applications.
- To develop the students in analytical, programming, and computational skills through coding practices, and to solve real-world problems 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.

Coding practices:

1. Develop Algorithm and flowchart to find the greatest of three numbers.
2. Develop Algorithm and flowchart to find a minimum number in a List.

Problem-solving Assignments:

1. Develop Algorithm and Flowchart to solve Towers of Hanoi Problem.
2. Develop Algorithm, Pseudo code and flowchart for finding factorial of a given number using recursion.

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

Coding practices:

1. Develop python program to find area of a Circle
2. Develop python program to convert Fahrenheit to Celsius.

Problem-solving Assignments:

1. Develop Python program to find Quadratic Equation
2. Develop Python program to find Student mark statement based on 5 subjects.

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.

Coding practices:

1. Develop python program to find GCD of a given number.
2. Develop python program to find factorial of a number.
3. Develop Python program to find sum of array of given numbers.

Problem-solving Assignments:

1. Develop Python program to find whether an element is found in the List by using (A) Linear Search and (B) Binary Search method
2. Develop Python program to print Fibonacci Series

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 and methods; advanced list processing – list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation

Coding practices:

1. Develop python program for Insertion Sorting & Selection Sorting.
2. Develop python program for Histogram

Problem-solving Assignments:

1. Develop Python program for student mark statement using List
2. Develop Python program to print Retail bill statement

UNIT V FILES,MODULES,PACKAGES & DATAVISUALIZATION 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 – Histograms.

Coding practices:

1. Develop python program to append the contents of one file to another.
2. Develop python program to copy contents of one file to another file using command Line Arguments

Problem-solving Assignments:

1. Develop a python program for calculator using python packages.
2. Develop a suitable python program to demonstrate each case in Exceptional Handling.
3. Develop a suitable python program using Matplotlib for Visualizing Errors.

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. Implementing 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. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries)
6. Implementing programs using Functions. (Factorial, largest number In a list, area of shape)
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters)
8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy. Matplotlib, scipy)
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word)
10. Implementing 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, the students will be able to:

- Analyze computational problems to develop effective problem-solving strategies.

- Apply python constructs to develop programs for python applications.
- Apply control structures and functions to solve computational problems.
- Apply Python built-in data structures such as lists, tuples, and dictionaries to process and manipulate data efficiently.
- Analyze the operations of file handling, exception handling, modules, packages, and data visualization techniques for real-world applications.
- Implement python programs for solving various computational problems.

TEXTBOOKS

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", First Edition, Notion Press, 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
1	3	3	3	2	2	–	–	1	1	1	–	2	3	3
2	3	3	3	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	2	3	–	–	1	1	1	–	2	3	3
4	3	3	3	2	3	–	1	1	1	1	–	3	3	3
5	3	3	3	3	3	1	1	2	2	2	–	3	3	3
6	3	3	3	3	3	1	1	2	3	2	2	3	3	3
AVG	3.0	3.0	3.0	2.3	2.8	1.0	1.0	1.3	1.5	1.3	2.0	2.5	3.0	3.0

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

Chairman - BoS

23EEC301	PROFESSIONAL DEVELOPMENT	L T P C 0 0 2 1

OBJECTIVES

To be proficient in important Microsoft Office tools: MS WORD, EXCEL and POWERPOINT.

- To be proficient in using MS WORD to create quality technical documents, by using standard templates, widely acceptable styles and formats, variety of features to enhance the presentability and overall utility value of content.
- To be proficient in using MS EXCEL for all data manipulation tasks including the common statistical, logical, mathematical etc., operations, conversion, analytics, search and explore, visualize, interlink, and utilizing many more critical features offered.
- To be able to create and share quality presentations by using the features of MS PowerPoint, including: organization of content, presentability, aesthetics, using media elements and enhance the overall quality of presentations.

MS WORD: **10 Hours**

1. Create and format a document
2. Working with tables
3. Working with Bullets and Lists
4. Working with styles, shapes, smart art, charts
5. Inserting objects, charts and importing objects from other office tools
6. Creating and Using document templates
7. Inserting equations, symbols and special characters
8. Working with Table of contents and References, citations
9. Insert and review comments
10. Create bookmarks, hyperlinks, endnotes footnote
11. Viewing document in different modes
12. Working with document protection and security
13. Inspect document for accessibility

MS EXCEL: **10 Hours**

1. Create worksheets, insert and format data
2. Work with different types of data: text, currency, date, numeric etc.
3. Split, validate, consolidate and Convert data
4. Sort and filter data
5. Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc,)
6. Work with Lookup and reference formulae

7. Create and Work with different types of charts
8. Use pivot tables to summarize and analyze data
9. Perform data analysis using own formulae and functions.
10. Combine data from multiple worksheets using own formulae and built-in functions to generate results
11. Export data and sheets to other file formats
12. Working with macros
13. Protecting data and Securing the workbook

MS POWERPOINT: **10 Hours**

1. Select slide templates, layout and themes
2. Formatting slide content and using bullets and numbering
3. Insert and format images, smart art, tables, charts
4. Using Slide master, notes and handout master
5. Working with animation and transitions
6. Organize and Group slides
7. Import or create and use media objects: audio, video, animation
8. Perform slideshow recording and Record narration and create presentable videos

TOTAL: 30 PERIODS

OUTCOMES

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

- Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.
- Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.
- Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

Chairman - BoS

SEMESTER IV

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

OBJECTIVES

- To familiarize students with the concepts and life cycle models of software development.
- To train students in Software Requirement Specification and Use case model.
- To develop skills in software design, testing techniques, maintenance, and reengineering.
- To impart knowledge on Unified Process, use cases, and UML diagrams..
- To aquire knowledge on GRASP, software quality assurance, and object-oriented testing practices.

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

Coding Exercises:

1. Implement a Python program to simulate the Classical Waterfall model phases for a simple project.
2. Create a project scheduling tool using PERT/CPM algorithms to calculate critical path.
3. Write a configuration management system using Git commands to track software versions.

Problem-solving Assignments:

1. Develop a risk management tool that identifies, prioritizes, and tracks project risks with mitigation strategies.
2. Design an estimation model comparing COCOMO and Function Point Analysis for a sample project.

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 modeling using UML – Use case Model – Class diagrams – Interaction diagrams – Activity diagrams – State chart diagrams – Functional modeling – Data Flow Diagram.

Coding Exercises:

1. Create a Python program to generate UML Use Case diagrams from textual requirements.
2. Implement a Finite State Machine simulator for system behavior modeling.
3. Write a DFD (Data Flow Diagram) generator that parses process specifications into visual diagrams.

Problem-solving Assignments:

1. Develop a complete SRS document for a Library Management System using UML diagrams.
2. Design a Petri Net model for a banking transaction system and simulate its execution.

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.

Coding Exercises:

1. Implement unit testing framework using JUnit/Pytest for a sample banking application.
2. Create a code coverage tool that measures statement, branch, and path coverage.
3. Write a symbolic execution engine for simple arithmetic expressions.

Problem-solving Assignments:

1. Design and implement black box and white box test cases for an e-commerce checkout module.
2. Develop a reengineering tool that converts procedural code to object-oriented design using BPR model.

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 Modeling - Relating Use cases - include, extend and generalization - When to use Use-cases - Class Diagram- Aggregation and Composition - Relationship between sequence diagrams and use cases

Coding Exercises:

1. Implement a Use Case modeling tool supporting include, extend, and generalization relationships.
2. Create a sequence diagram generator from use case scenarios using PlantUML.
3. Write a class diagram validator checking aggregation, composition, and association rules.

Problem-solving Assignments:

1. Apply Unified Process to develop inception phase artifacts for NextGen POS system.
2. Design complete UML diagrams (use case, class, sequence) for an online booking system.

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

Coding Exercises:

1. Implement GRASP patterns (Creator, Information Expert, Low Coupling) in a sample inventory system.
2. Create Factory Method, Bridge, and Strategy design patterns for a graphics rendering application.
3. Develop Observer pattern for real-time stock price monitoring system.

Problem-solving Assignments:

1. Apply GoF design patterns to refactor a monolithic e-commerce system into modular architecture.
2. Create comprehensive test plans and test cases for an object-oriented banking application with 90% code coverage.

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain software engineering concepts, development activities, and software lifecycle models..
- Design Software Requirement Specifications and develop use case models.
- Apply software design, testing, maintenance, and reengineering techniques.
- Apply the concept of Unified Process, use cases, and UML diagrams for software development.
- Analysis design pattern and testing practices.

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
1	2	2	1	1	2	-	-	-	-	-	-	1	2	2
2	2	3	3	1	2	-	-	-	-	1	-	1	3	3
3	2	2	2	2	2	1	-	-	-	1	1	1	3	3
4	2	2	3	1	3	-	-	-	-	1	-	1	3	3
5	2	3	2	2	2	-	-	-	-	1	-	2	3	3
AVG	2.0	2.4	2.2	1.4	2.2	1	-	-	-	1	1	1.2	2.8	2.8

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

Chairman - BoS

23CCT401	OPERATING SYSTEMS AND SECURITY (Common to CSE-CS and IT)	L T P C 3 1 0 4

OBJECTIVES

- To familiarize students with the architecture and internal workings of operating systems
- To impart knowledge on process management concepts in operating systems including scheduling, synchronization, threads, and deadlock handling.
- To provide students with comprehensive knowledge of main memory and mass storage management in operating systems.
- To inculcate students with knowledge of secure systems and verifiable security goals.
- To familiarize students with security features, protection mechanisms, and vulnerabilities of UNIX and Windows operating systems.

UNIT I OPERATING SYSTEM OVERVIEW 9

Computer-System Organization—Architecture—Operating-System Operations—Resource Management – Security and Protection – Distributed Systems – Kernel Data Structures – Operating- System Services—System Calls—System Services—Why Applications Are Operating System Specific – Operating-System Design and Implementation - Operating-System Structure – Building and Booting an Operating System .

Problem Solving Assignments:

1. Analyze different operating system structures
2. Compare monolithic, layered, and micro kernel architectures

UNIT II PROCESS MANAGEMENT 9

Process Concept – Process Scheduling – Operation on Processes, Inter-process Communication – Threads—Overview—Multithreading models—Threading issues; CPU Scheduling—Scheduling criteria, Scheduling algorithms; Process Synchronization – critical- section problem, Synchronization hardware, Mutex locks, Semaphores, Critical regions, Monitors; Deadlock – System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Detection, Recovery.

Problem Solving Assignments:

1. Compare different CPU scheduling algorithms
2. Analyze deadlock handling techniques

UNIT III MEMORY MANAGEMENT AND FILE SYSTEMS 9

Main Memory—Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation— Virtual Memory—Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory. Mass Storage system - HDD Scheduling - File concept, Access methods, Directory Structure, Sharing and Protection; File System Structure,

Directory implementation, Allocation Methods, Free Space Management.

Problem Solving Assignments:

1. Evaluate performance of memory allocation techniques
2. Analyze file system allocation strategies

UNIT IV SECURE SYSTEMS AND VERIFIABLE SECURITY GOALS 9

Security Goals– Trustand Threat Model–Access Control Fundamentals–Protection System– Reference Monitor–Secure Operating System Definition–Assessment Criteria– Information Flow – Information Flow Secrecy Models – Denning's Lattice Model – Bell Lapadula Model – Information Flow Integrity Models – Biba Integrity Model – Low-Water Mark Integrity – Clark Wilson Integrity.

Problem Solving Assignments:

1. Analyze secrecy and integrity models
2. Compare different security assessment criteria

UNIT V SECURITY IN OPERATING SYSTEMS 9

UNIX Security–UNIX Protection System–UNIX Authorization–UNIX Security Analysis– UNIX Vulnerabilities–Windows Security–Windows Protection System–Windows Authorization– Windows Security Analysis – Windows Vulnerabilities – Address Space Layout Randomizations – Retrofitting Security into a Commercial Operating System – Introduction to Security Kernels.

Problem Solving Assignments:

1. Compare UNIX and Windows security mechanisms
2. Analyze common operating system vulnerabilities

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the architecture and internal workings of operating systems, including the structure, components, and services.
- Analyze process management in operating systems, including scheduling algorithms, synchronization mechanisms, multithreading, and deadlock handling.
- Demonstrate understanding of memory, file, and mass storage management in operating systems, including allocation, access methods, and I/O management.
- Apply principles of secure system design and evaluate verifiable security goals, including access control, protection mechanisms, and integrity models.
- Explain the security features, protection mechanisms, and vulnerabilities of UNIX and

Windows operating systems, including system hardening and mitigation techniques.

TEXTBOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", JohnWiley & Sons, Inc., Tenth Edition, 2021.
2. TrentJaeger,"Operating System Security",Morgan &Claypool Publishers series,2008.

REFERENCES

1. Morrie Gasser," Building A Secure Computer System",VanNostr and Reinhold,NewYork, Second Edition ,2008.
2. Charles Pfleeger, Shari Pfleeger,Jonathan Margulies, "Security in Computing", Prentice Hall, New Delhi, Fifth Edition 2015.

E – RESOURCES

1. https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs72/(AllocationMethod)
2. https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs74/(SystemSecurity)

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	2	1	2	1	1	-	-	-	-	2	2	1
2	3	3	3	2	3	2	2	-	-	-	-	3	2	2
3	3	3	2	3	3	2	2	1	-	-	1	3	2	1
4	3	3	3	3	3	3	3	2	-	-	2	3	3	3
5	3	3	3	3	3	3	3	2	1	1	2	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	2.8	2.6	2.4	2.8	2.2	2.2	1	0.1	0.1	1.6	2.8	2.4	2

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

Chairman - BoS

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

OBJECTIVES

- To familiarize the students on artificial intelligence concepts, problem-solving techniques and search algorithms.
- To impart inference techniques for reasoning under uncertainty.
- To enable students to understanding on genetic algorithms for solving optimization problems.
- To train the students on FOIL for knowledge acquisition and machine learning
- To develop the students understanding in graphical models of machine learning algorithms.
- To implement the AI and Machine learning Models to solve real-world computational problems.

UNIT I INTRODUCTION 9

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

Coding practices:

1. Develop a program that models a problem environment and computes a solution by systematically exploring possible states until a goal condition is reached.
2. Implement a solution that uses knowledge-based guidance to improve search efficiency and compare its performance with a basic solution approach.
3. Create a program that simulates intelligent decision-making for solving constrained or competitive problems and evaluates the quality of the obtained solution.

Problem-solving Assignments:

1. Analyze alternative solution approaches for the same problem and evaluate their effectiveness based on efficiency and quality of results.
2. Solve a decision-making problem involving constraints or competitive situations and justify the correctness and optimality of the chosen solution.

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

Coding practices:

1. Develop a program to represent domain knowledge and apply reasoning to derive conclusions from the given facts.

2. Implement a reasoning mechanism that infers new information from available knowledge and evaluates the confidence of the derived results.

3. Create a program that handles uncertainty in decision-making and produces conclusions based on probabilistic or belief-based inputs.

Problem-solving Assignments:

1. Apply logical reasoning techniques to derive conclusions from the available knowledge and explain the inference process used to reach the results.
2. Solve a decision-making problem under uncertainty and justify the conclusions obtained based on confidence or belief measures.

UNIT III NEURAL NETWORKS AND DEEP LEARNING AND GENETIC ALGORITHMS 9

Illustrative Examples: Face Recognition Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning – Parallelizing Genetic Algorithms.

Coding practices:

1. Develop a program that applies an evolutionary approach to optimize a solution for a given problem and evaluates its performance over multiple iterations.
2. Implement a search-based program that explores a large solution space to identify high-quality solutions using adaptive improvement techniques.
3. Create a program that demonstrates learning through iterative evolution and compares the efficiency of sequential and parallel execution models.

Problem-solving Assignments:

1. Analyze a given pattern-recognition or optimization problem and formulate an evolutionary-based solution to improve accuracy or performance.

2. Examine the impact of learning and parallel execution on solution quality and computational efficiency in evolutionary problem solving.

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.

Coding practices:

1. Develop a program that learns logical rules from a given set of examples and represents the learned knowledge in a structured form.
2. Implement an algorithm that derives general rules from specific observations and evaluates the correctness of the learned rules.
3. Create a program that generates and refines rule sets through an inductive process and tests their effectiveness on unseen data.

Problem-solving Assignments:

1. Formulate a problem where general knowledge must be inferred from specific instances and justify the reasoning process used to obtain valid rules.
2. Evaluate the effectiveness of the learned rule set by testing it on unseen examples and discussing its accuracy and limitations.

UNIT V GRAPHICAL MODELS 9

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

Coding practices:

1. Implement an algorithm that updates beliefs based on observed evidence and analyzes how information flows through the model
2. Create a program that learns patterns from sequential data and predicts future states based on past observations.
3. Develop a program that represents probabilistic relationships among variables and performs inference to compute outcome probabilities.

Problem-solving Assignments:

1. Analyze a problem involving uncertain data and design a probabilistic model to represent the relationships between variables.
2. Apply reasoning techniques to update beliefs based on observed evidence and evaluate the accuracy of the inferred outcomes.

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.
- Analyze neural networks and genetic algorithms approaches to solve optimization problems.
- Apply set of rules for machine learning decisions.
- Design systems that use appropriate graph models of machine learning.
- Implement various models in Artificial Intelligence to solve real world problem

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence – A Modern Approach", FourthEdition, Prentice Hall,2020.

2. M.Tim Jones, "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
1	3	3	3	2	3	–	–	1	1	1	–	2	3	3
2	3	3	3	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	3	3	1	1	1	2	1	–	3	3	3
4	3	3	3	2	3	1	1	2	2	1	–	3	3	3
5	3	3	3	3	3	1	1	2	2	2	1	3	3	3
6	3	3	3	3	3	2	2	2	3	2	2	3	3	3
AVG	3.0	3.0	3.0	2.5	3.0	1.25	1.25	1.5	1.8	1.3	1.5	2.6	3.0	3.0

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

Chairman - BoS

23CSE402	DATABASE MANAGEMENT SYSTEMS	L T P C 3 0 2 4

OBJECTIVES

- To impart the fundamentals of data models, relational algebra and SQL.
- To familiarize the database system using ER diagrams and normalization techniques.
- To develop the comprehensive knowledge of transaction processing, concurrency control techniques and recovery procedures.
- To enable the student to understand the internal storage structures using different file and indexing techniques for database design.
- To foster the knowledge on different database structures and information retrieval techniques.
- To provide practical exposure in relational database design, SQL programming and database connectivity for real world application development.

UNIT I: RELATIONAL DATABASES 9

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

Coding Exercises:

1. Create SQL scripts using DDL commands to create and modify relational tables.
2. Write SQL queries using DML commands to insert, update, delete, and retrieve data.
3. Implement basic relational algebra operations using SQL queries.

Problem-Solving Assignments:

1. Analyze a real-world application and design its relational schema with appropriate keys.
2. Convert given relational algebra expressions into equivalent SQL queries.

UNIT II : DATABASE DESIGN 9

Entity-Relationship model – E-R Diagrams – Enhanced-ER 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

Coding Exercises:

1. Draw ER diagrams for given problem statements using database design tools.
2. Convert ER diagrams into relational schemas with constraints.
3. Normalize unnormalized tables up to 3NF and BCNF.

Problem-Solving Assignments:

1. Design a complete database schema for a real-world system (Library, Hospital, Banking).
2. Analyze functional dependencies and perform lossless decomposition.

UNIT III : TRANSACTIONS

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.

Coding Exercises:

1. Write SQL programs demonstrating COMMIT, ROLLBACK, and SAVEPOINT.
2. Simulate concurrent transactions and observe isolation issues.
3. Implement simple locking behavior using transaction blocks.

Problem-Solving Assignments:

1. Analyze given schedules and determine their serializability.
2. Identify deadlock scenarios and propose suitable prevention techniques.

UNIT IV : PHYSICAL STORAGE AND INDEXING 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.

Coding Exercises:

1. Create indexed tables and analyze query performance.
2. Implement SQL queries using indexed attributes and compare execution cost.
3. Simulate hashing techniques using simple programs.

Problem-Solving Assignments:

1. Compare different indexing techniques and justify their use in specific scenarios.
2. Estimate query execution costs for given query plans.

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.

Coding Exercises:

1. Write XML documents and query them using basic XML techniques.
2. Implement object-relational features using user-defined types.
3. Simulate distributed database queries using multiple schemas.

Problem-Solving Assignments:

1. Design a distributed database architecture for a multi-branch organization.
2. Compare relational, object-relational, and XML databases for specific applications.

LIST OF EXPERIMENTS

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements.
2. Implement Relational model to entitle ann 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, the students will be able to,

- Explain the fundamentals of data models, relational algebra and SQL.
- Apply ER diagrams and normalization techniques in database applications.
- Analyze transaction processing, concurrency control techniques and recovery procedures for database transactions.
- Analyze the internal storage structures and indexing techniques for improving the database design.
- Analyze the different database structures and information retrieval techniques for efficient data management.
- Implement SQL programming and database connectivity for real world application development.

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", 8th Edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, "Database Management Systems", 4th Edition, McGraw–Hill 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
1	3	3	2	2	3	–	–	1	1	1	–	2	3	3
2	3	3	3	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	3	3	1	1	2	2	1	–	3	3	3
4	3	3	3	3	3	1	1	2	2	1	–	3	3	3
5	3	3	3	3	3	1	1	2	2	2	1	3	3	3
6	3	3	3	3	3	2	1	2	3	2	2	3	3	3
AVG	3.0	3.0	2.8	2.6	3.0	1.25	1.0	1.6	1.8	1.3	1.5	2.6	3.0	3.0

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

Chairman - BoS

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

OBJECTIVES

- To introduce the Concepts of 8086 & 8085 addressing modes.
- To enhance the Assembly language programming and interfacing.
- To discuss the layers of IoT and specifications .
- To gain knowledge on electrostatic transducer and Ultrasonic Sensors.
- To impact knowledge on Raspberry pi 3 and IP address.
- To familiarize the concept 8086 programs and the Raspberry pi interfacing.

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- Serial Port Programming-Interrupts Programming-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, the students will be able to:

- Analyze the concepts of 8086 & 8085 architecture.
- Discuss the different interfacing peripheral devices.
- Describe the characteristics and standards relating to IoTs.
- Discuss the classification of sensors and Transducers.
- Analyze the Raspberry Pi 3 and its configuration.
- Design 8086 processors 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
1	3	2	2	2	1	-	-	-	-	-	-	-	2	1
2	3	3	2	2	2	-	--	--	-	-	-	-	2	2
3	2	2	3	3	3	2	1	1	-	-	-	-	3	2
4	2	2	2	2	2	1	1	1	-	-	-	-	2	2
5	2	2	3	2	3	-	-	-	-	-	-	-	2	2
6	3	3	3	3	2	-	-	-	-	-	-	-	3	3
AVG	2.5	2.3	2.5	2.3	2.2	1.5	1	1	-	-	-	-	2.3	2.0

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

Chairman - BoS

23EEC401 **ONLINE COURSE COMPLETION** **L T P C**
3 0 0 3

Students may be permitted to study online courses (NPTEL, SWAYAM or any Proctored Assessment Certification Courses) with 3 credits during the 4th semester curriculum for all B.E./B.Tech. Programmes. Such courses offered to students shall be recommended by the Department Academic Committee (DAC). The DAC shall ensure that the courses offered are not core courses in their respective curriculum.

The number of credits and transfer of credits are based on the procedure explained in following Table. The mapping of marks with grades is applicable only if the student passes the course as per the guidelines of NPTEL.

S.No.	No. of Weeks	Credits
1	4	1
2	8	2
3	12	3
4	16	4

Chairman - BoS

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	60	40	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 gain knowledge about the principles and techniques of visually appealing digital design.
- To explore hands-on experience with digital design software such as Adobe Creative Suite.
- To develop the ability to adapt visual content for diverse digital platforms by considering their unique requirements and user experiences.
- To enhance understanding creative thinking and problem-solving skills to address design challenges and develop innovative digital visual solutions.
- To develop engaging multimedia presentations for social media platforms.

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

Problem Solving Assignments :

1. Analyze the visual elements and principles of design used in a given digital poster and suggest improvements in balance, contrast, hierarchy, and color.
2. Design a simple digital illustration by applying appropriate typography, visual elements, and principles of graphic design.

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

Problem Solving Assignments :

1. Analyze the suitability of different image resolutions and file formats for print and digital media, and justify the appropriate format for a given application.
2. Apply photo editing, color correction, enhancement, and image manipulation techniques to improve a given digital image.

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

Problem Solving Assignments :

1. Design a scalable logo or vector illustration using Adobe Illustrator by applying Bezier curves, paths, layers, and effects.
2. Compare raster and vector graphics and determine the suitable graphics format for different

design requirements.

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

Problem Solving Assignments :

1. Design a brochure, flyer, or poster by applying grid systems, page composition, typography, and layout principles.
2. Analyze a given publication layout and recommend suitable improvements in alignment, spacing, hierarchy, and visual organization.

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

Problem Solving Assignments :

1. Develop a multimedia presentation by applying visual design principles, infographics, and visual storytelling techniques.
2. Design a social media or mobile visual campaign by adapting multimedia content to improve user engagement.

TOTAL: 45 PERIODS

OUTCOMES

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

- Describe the 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
1	2	2	2	1	2	1	1	1	3	1	1	2	2	2
2	2	1	3	1	3	1	1	1	2	2	2	3	3	3
3	2	2	1	2	3	1	1	1	1	1	1	2	2	3
4	2	2	3	1	3	1	1	2	2	1	1	2	2	3
5	2	1	3	1	3	2	1	2	3	2	1	3	3	3
AVG	2.0	1.6	2.4	1.2	2.8	1.2	1.0	1.4	2.2	1.4	1.2	2.4	2.4	2.8

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

Chairman - BoS

SEMESTER IV

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

OBJECTIVES

- To gain knowledge about the fundamental concepts and principles of AR/VR technologies.
- To explore the concepts of 3D modelling and viewing the 3D world.
- To develop knowledge about VR toolkits and their applications.
- To examine the various applications of Virtual Reality.
- To understand the methodology and terminology of Augmented Reality.

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.

Problem Solving Assignments :

1. Analyze the components of a VR system and determine suitable input, tracking, display, and interaction devices for a given VR application.
2. Compare Virtual Reality, Augmented Reality, and 3D Computer Graphics based on interaction, display, tracking, and application requirements.

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.

Problem Solving Assignments :

1. Develop a simple 3D virtual object by applying geometric modeling, transformation matrices, object positioning, and viewing techniques.
2. Analyze a virtual environment and determine suitable techniques for collision detection, surface deformation, force computation, and behavior modeling.

UNIT III VR PROGRAMMING 9

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

Problem Solving Assignments :

1. Compare World Toolkit and Java 3D based on their features, scene graph structure, programming support, and suitability for VR applications.
2. Develop a simple VR scene using a suitable VR toolkit and apply scene graph concepts to organize virtual objects. 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.

Problem Solving Assignments :

1. Analyze the applications of VR in healthcare, education, manufacturing, robotics, business, and entertainment, and identify suitable applications for a given problem.
2. Evaluate the health, safety, social, and human factors associated with the use of Virtual Reality in a selected application.

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.

Problem Solving Assignments :

1. Design a simple AR application by applying computer vision, user interaction, modelling, annotation, and navigation techniques.
2. Analyze the role of wearable devices in AR and propose a suitable wearable-based AR solution for a real-world application.

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the fundamental concepts and principles of AR and VR.
- Describe 3D models and techniques for viewing the 3D world.
- Illustrate the features and applications of VR toolkits.

- Analyze the various applications of Virtual Reality.
- Compare AR/VR methodologies 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)

2. http://kcl.digimat.in/nptel/courses/video/106106138/L64.html

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	1	1	2	–	–	1	1	2	–	2	2	2
2	3	2	2	1	3	–	–	1	1	2	–	2	3	2
3	2	2	2	2	3	1	1	1	2	2	1	2	3	3
4	2	3	3	3	3	1	1	1	2	2	1	3	3	3
5	3	3	2	2	3	1	1	1	2	2	1	3	3	3
AVG	2.6	2.4	2.0	1.8	2.8	1.0	1.0	1.0	1.6	2.0	1.0	2.4	2.8	2.6

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

Chairman - BoS

SEMESTER V

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

OBJECTIVES

- To gain knowledge about the fundamental principles of digital media production and storytelling.
- To explore various digital media platforms and tools used for digital storytelling.
- To develop narratives using animation, motion graphics, images, audio, and video.
- To design interactive and immersive digital stories for different audiences and contexts.
- To explore 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

Problem-Solving Assignments:

1.Analyze the evolution of digital media and explain how it has changed storytelling and communication.

2.Evaluate a digital storytelling platform and identify the ethical and legal issues involved in creating and sharing digital content

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

Problem-Solving Assignments:

1. Analyze an animated story and identify how visual storytelling principles, animation, and motion graphics are used to communicate the narrative.

2. Design a suitable animation and motion graphics workflow for developing an engaging digital story using appropriate software tools.

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

Problem-Solving Assignments:

1. Analyze an existing digital story and identify how images, audio, video, interactive elements, and hypermedia contribute to its effectiveness.

2. Redesign a given digital story by incorporating suitable multimedia elements and techniques to improve its emotional and narrative impact.

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

Problem-Solving Assignments:

1. Analyze a social media storytelling campaign and evaluate how user-generated content contributes to community engagement.
2. Develop strategies to encourage collaboration, co-creation, and sustained participation within 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

Problem-Solving Assignments:

1. Analyze a digital story designed for one platform and propose suitable modifications for web, mobile, and social media platforms.
2. Evaluate the use of VR and AR in digital storytelling and recommend suitable applications for creating interactive and immersive experiences.

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the fundamental concepts and theories of digital media and storytelling, gaining insights into the evolution of storytelling in the digital age.
- Develop the compelling narratives in digital media.
- Describe the storytelling techniques to different digital media platforms, such as websites, social media, and virtual reality.
- Develop 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, 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
1	2	2	1	1	2	1	1	2	1	3	1	2	2	2
2	2	2	3	1	3	1	1	1	2	3	1	2	3	3
3	2	2	2	1	3	1	1	1	2	3	1	2	3	3
4	2	2	3	1	2	3	2	3	2	3	1	2	3	3
5	2	2	3	2	3	2	2	3	3	3	2	3	3	3
AVG	2.0	2.0	2.4	1.2	2.6	1.6	1.4	2.0	2.0	3.0	1.2	2.2	2.8	2.8

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

Chairman - BoS

SEMESTER VI

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

OBJECTIVES

- To gain knowledge about the fundamental concepts and elements of multimedia.
- To explore the principles of visual design in multimedia.
- To develop skills in audio production, including recording and editing audio.
- To foster the students with video production techniques, including shooting, capturing, and editing video footage.
- To explore the principles of animation and develop 2D and 3D animations.
- To implement interactive multimedia presentations 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

Coding Exercises:

1. Create a multimedia presentation incorporating text, graphics, audio, video, and animation elements.
2. Develop multimedia project using appropriate multimedia software and tools.
3. Design a multimedia message combining text, images, audio, and video elements.

Problem-Solving Assignments:

1. Analyze a given multimedia project and identify the different multimedia elements used, explaining their purpose and effectiveness.
2. Examine a multimedia communication scenario and recommend suitable security measures based on the OSI Security Architecture.

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

Coding Exercises:

1. Create and edit digital images using image editing software with cropping, resizing, layering, and enhancement techniques.
2. Design a multimedia poster or illustration using vector graphics and appropriate typography.
3. Develop a multimedia design applying color theory, contrast, alignment, balance, and visual

hierarchy.

Problem-Solving Assignments:

1. Analyze a poorly designed multimedia poster and identify issues related to typography, color, alignment, and visual hierarchy. Propose suitable improvements.
2. Redesign a given multimedia graphic by applying appropriate principles of visual design, typography, and color theory.

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

Coding Exercises:

1. Record and edit an audio clip using suitable audio production software by applying trimming, cutting, and noise-reduction techniques.
2. Create a multimedia audio track by combining background music, sound effects, and voiceover.
3. Develop an audio project using suitable audio effects such as fade-in, fade-out, equalization, and volume adjustment.

Problem-Solving Assignments:

1. Analyze a recorded audio file containing background noise and distortion and apply suitable sound enhancement techniques to improve its quality.
2. Compare different audio compression techniques and formats and select an appropriate format for web, mobile, and multimedia applications.

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

Coding Exercises:

1. Capture video footage using suitable recording equipment and organize the clips for editing.
2. Create a short video by applying cutting, trimming, sequencing, transitions, and audio synchronization techniques.
3. Develop a multimedia video incorporating visual effects, titles, transitions, and background music.

Problem-Solving Assignments:

1. Analyze a poorly edited video and identify issues related to sequencing, transitions, audio synchronization, and visual quality. Suggest suitable corrections.
2. Select appropriate video compression techniques and formats for publishing a given video on web, mobile, and social media 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

Coding Exercises:

1. Create a 2D animation using keyframes, motion, timing, and basic animation principles.
2. Develop a simple 3D animation incorporating objects, movement, lighting, and camera effects.
3. Design an interactive multimedia presentation containing buttons, menus, navigation controls, animation, and multimedia elements.

Problem-Solving Assignments:

1. Analyze an interactive multimedia application and identify how animation, buttons, menus, and navigation improve user interaction.
2. Design and develop an interactive multimedia project using suitable multimedia authoring and interactive development tools.

LIST OF EXPERIMENTS
(Any Eight Experiments to be conducted)

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

2. Ralf Steinmetz, Klara Nahrstedt, "Multimedia Systems", Springer, Second Edition, 2014.

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
1	2	2	1	1	2	–	–	1	1	2	–	2	2	2
2	2	2	2	1	3	–	1	1	1	2	–	2	3	2
3	2	2	2	2	3	–	1	1	1	2	–	2	3	2
4	2	2	3	2	3	1	1	1	2	2	1	2	3	3
5	2	2	3	2	3	1	1	1	2	2	1	3	3	3
6	2	2	3	1	3	1	1	2	3	3	2	3	3	3
AVG	**2.0**	**2.0**	**2.3**	**1.5**	**2.8**	**1.0**	**1.0**	**1.2**	**1.7**	**2.2**	**1.3**	**2.3**	**2.8**	**2.5**

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

Chairman - BoS

SEMESTER VII

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

GUIDELINES

The student can select any topic which is relevant to his/her specialization of the programme. The student should continue the work on the selected topic as per the formulated methodology. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work, results and discussion, conclusion and references should be prepared as per the format prescribed by the University and submitted to the Head of the department. The students will be evaluated based on the report and viva-voce examination by a panel of examiners as per the Regulations.

TOTAL: 180 PERIODS

OUTCOMES

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

- Describe the sound technical knowledge of their selected project topic.
- Develop problem-solving skills as they analyze issues, design solutions, and implement them in their projects.
- Develop their communication and presentation abilities.
- Identify the successful collaboration and teamwork will be evident in the project's executionand outcomes
- Explain new knowledge or insights to the relevant field, making it a valuable addition to the academic community.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

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	60	40	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

1.To introduce the fundamental concepts, principles, and technologies of cloud computing.

2. To focus on various cloud architectures and their components.

3. To provide an understanding of different cloud platforms and their services.

4. To inculcate the integration of databases with cloud storage services.

5.To develop an understanding of 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.

Problem-Solving Assignments:

1. Analyze a given business scenario and select a suitable cloud service model (IaaS, PaaS, or SaaS) with justification.

2. Evaluate different cloud deployment models and recommend the most appropriate model for an organization based on scalability, cost, security, and accessibility requirements.

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.

Problem-Solving Assignments:

1. Analyze a cloud infrastructure scenario and identify the appropriate virtualization technology, virtual machines, or containers required to meet the application requirements.

2. Evaluate a given workload and propose suitable scalability and elasticity strategies to maintain application performance during varying demand.

UNITIII 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 serverless computing and micro services.

Problem-Solving Assignments:

1. Compare the services offered by major cloud service providers such as AWS, Microsoft Azure, and Google Cloud for a given application requirement and recommend a suitable platform.

2. Analyze a given application scenario and determine whether serverless computing or microservices architecture would be more appropriate, with justification.

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.

Problem-Solving Assignments:

1. Design a suitable cloud deployment strategy for a web application by selecting appropriate compute, database, and storage services.
2. Analyze a cloud-native application scenario and recommend suitable database, storage, and application design principles to achieve scalability and reliability.

UNIT IV CLOUD APPLICATION DEVELOPMENT 9

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

Problem-Solving Assignments:

1. Analyze a given cloud security scenario and identify potential security vulnerabilities related to identity, access control, and data protection. Recommend suitable security measures.
2. Develop a disaster recovery and backup strategy for a cloud-based application considering data availability, recovery requirements, security, and business continuity.

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, the students will be able to,

- Describe the fundamental concepts, principles, and technologies of cloud computing.
- Explain various cloud architectures and their components.
- Describe different cloud platforms and their services.
- Explain the integration of databases with cloud 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

2. Dummies", John Wiley & Sons, Second Edition,2013.
3. 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. http://www.digimat.in/nptel/courses/video/106105167/L16.html

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	1	1	2	-	-	-	-	-	-	1	2	2
2	2	2	2	1	2	1	-	-	-	-	-	1	2	2
3	2	1	1	-	2	-	-	-	-	1	-	1	2	2
4	1	2	1	2	2	1	-	-	-	1	-	1	2	2
5	1	1	1	1	2	2	1	1	-	1	1	2	2	2
AVG	1.6	1.6	1.2	1.25	2.0	1.3	1	1	-	1	1	1.2	2.0	2.0

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

Chairman - BoS

SEMESTER IV

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

OBJECTIVES

- To gain knowledge on cloud security concepts, threats, and challenges.
- To familiarize the data encryption and secure key management.
- To train the students incompliance regulations and frameworks relevant to cloud computing.
- To expose students with Cloud-based backup and disaster recovery solutions.
- To impart 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.

Problem-Solving Assignments:

1. Identify major security threats such as data breaches, insecure APIs, account hijacking, and privilege escalation in a multi-tenant cloud environment.
2. Analyze the shared responsibility model and determine the security responsibilities of the cloud service provider and customer.

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.

Problem-Solving Assignments:

1. Design an IAM strategy using authentication, authorization, role-based access control, and least-privilege principles.
2. Select suitable encryption and key-management mechanisms to protect data at rest and data in transit.

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.

Problem-Solving Assignments:

1. Analyze the security and privacy requirements of GDPR, HIPAA, and PCI DSS for a cloud-based organization.
2. Identify potential compliance gaps in areas such as data protection, access control, auditing, and data storage.

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.

Problem-Solving Assignments:

1. Analyze a hypothetical cloud data breach or ransomware attack and identify the stages of incident response.
2. Design a backup and disaster recovery strategy using appropriate recovery objectives such as RTO and RPO.

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.

Problem-Solving Assignments:

1. Identify security challenges in serverless computing, including insecure functions, excessive permissions, and vulnerable dependencies.
2. Integrate security into a DevSecOps pipeline using automated code scanning, dependency checking, vulnerability assessment, and security testing.

TOTAL: 45 PERIODS

OUTCOMES

Upon completing the course, the students will be able to:

- Use the concepts of cloud security, threats, and challenges.
- Discuss the data encryption and secure key management.
- Analyze the compliance regulations and frameworks relevant to cloud computing.
- Apply 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, Third Fourth, 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/

2. https://onlinecourses.nptel.ac.in/noc21_cs14/preview

Mapping of COs-POs & PSOs:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	2	2	1	1	2	2	1	1	-	-	-	1	2	2
2	1	2	1	2	2	1	-	-	-	-	-	1	2	2
3	1	2	1	2	1	2	2	1	-	1	-	2	2	2
4	2	2	2	1	2	1	1	-	-	1	1	1	2	2
5	2	2	3	2	2	1	1	1	1	1	1	2	3	3
AVG	1.6	2.0	1.6	1.6	1.8	1.4	1.0	1	1	1	1	1.4	2.2	2.2

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

Chairman - BoS

SEMESTER V

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

OBJECTIVES

- To gain knowledge on cloud security concepts, threats, and challenges.
- To familiarize the data encryption and secure key management.
- To train the students i n compliance regulations and frameworks relevant to cloud computing.
- To expose students with Cloud-based backup and disaster recovery solutions.
- To impart the integration of security into the development process.

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.

Problem-Solving Assignments:

1. Identify major security threats such as data breaches, insecure APIs, account hijacking, and privilege escalation in a multi-tenant cloud environment.
2. Analyze the shared responsibility model and determine the security responsibilities of the cloud service provider and customer.

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.

Problem-Solving Assignments:

1. Design an IAM strategy using authentication, authorization, role-based access control, and least-privilege principles.
2. Select suitable encryption and key-management mechanisms to protect data at rest and data in transit.

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.

Problem-Solving Assignments:

1. Analyze the security and privacy requirements of GDPR, HIPAA, and PCI DSS for a cloud-based organizatio

2. Identify potential compliance gaps in areas such as data protection, access control, auditing, and data storage

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.

Problem-Solving Assignments:

1. Analyze a hypothetical cloud data breach or ransomware attack and identify the stages of incident response.
2. Design a backup and disaster recovery strategy using appropriate recovery objectives such as RTO and RPO.

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.

Problem-Solving Assignments:

1. Identify security challenges in serverless computing, including insecure functions, excessive permissions, and vulnerable dependencies.
2. Integrate security into a DevSecOps pipeline using automated code scanning, dependency checking, vulnerability assessment, and security testing.

TOTAL: 45 PERIODS

OUTCOMES

Upon completing the course, the students will be able to:

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

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)
2. 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
1	2	2	1	1	2	2	1	1	-	-	-	1	2	2
2	1	2	1	2	2	1	-	-	-	-	-	1	2	2
3	1	2	1	2	1	2	2	1	-	1	-	2	2	2
4	2	2	2	1	2	1	1	-	-	1	1	1	2	2
5	2	2	3	2	2	1	1	1	1	1	1	2	3	3
AVG	1.6	2.0	1.6	1.6	1.8	1.4	1.0	1	1	1	1	1.4	2.2	2.2

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

Chairman - BoS

SEMESTER VI

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

OBJECTIVES

- To gain knowledge in cloud computing platforms and services used for application development.
- To acquire knowledge about the cloud-native principles and architectures
- To equip students in Data caching and synchronization in cloud applications
- To impart knowledge of security considerations in cloud application development.
- To expose students in continuous deployment of cloud applications.
- To implement the real-world scenarios and challenges in cloud application development

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.

Coding Practices

1. Develop a simple cloud-based web application using a suitable programming language and deploy it on a cloud platform.
2. Create a basic application that uses a cloud service/API to perform data storage or retrieval.

Problem-Solving Assignment

1. Identify a real-world problem that can be solved using a cloud application.
2. Design and implement the application using suitable cloud platforms, services, and programming technologies.

UNIT II CLOUD NATIVE DEVELOPMENT 9

Cloud-native principles and architectures- Micro services and server- less computing.

- Containerization and orchestration with Docker and Kubernetes.

Coding Practices:

1. Develop a simple microservices application with separate services for user management and data processing.
2. Create and run a Docker container for a cloud application using a Dockerfile.

Problem-Solving Assignment:

1. Divide a monolithic application into appropriate microservices based on functional requirements.
2. Containerize the services using Docker and configure communication between the services.

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.

Coding Practices:

1. Develop CRUD operations using a cloud-based relational database.
2. Implement CRUD operations using a NoSQL cloud database such as a document-based database.

Problem-Solving Assignment:

1. Select an appropriate relational or NoSQL database based on the application's data and transaction requirements.
2. Implement cloud storage for large files and configure appropriate data access and storage policies.

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.

Coding Practices:

1. Implement user registration and login using secure authentication techniques.
2. Develop role-based authorization to restrict access to application resources.

Problem-Solving Assignment:

1. Identify potential security vulnerabilities in a cloud application, including unauthorized access, insecure APIs, and data exposure.
2. Implement authentication and role-based authorization to protect application resources.

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.

Coding Practices:

1. Create a Git-based version-control repository and practice branching, merging, and collaborative development.
2. Develop a CI pipeline that automatically builds and tests the application whenever code is committed.

Problem-Solving Assignment:

1. Develop a cloud application and maintain its source code using Git and version control practices.
2. Design a CI/CD pipeline that automatically performs build, testing, security checks, and deployment.

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 PERIODS

OUTCOMES

Upon completing the course, the 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 real-world scenarios and challenges in cloud application development.

TEXTBOOKS

1. John Arundel, Justin Domingus, "Cloud Native Development with Kubernetes", O'Reilly Media, Fourth Edition, 2021.
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)
2. http://kcl.digimat.in/nptel/courses/video/106106222/L04.html

Mapping of COs-POs & PSOs

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3	1	2	1	2	2	-	-	-	-	-	-	1	2	2
4	1	2	1	1	2	2	1	1	-	1	-	1	2	2
5	1	1	1	1	2	1	-	-	-	1	1	2	2	2
6	2	2	2	2	2	1	1	1	1	1	1	2	2	3
AVG	**1.5**	**1.67**	**1.33**	**1.17**	**2.0**	**0.83**	**1**	**1**	**1**	**1**	**1**	**1.33**	**2.0**	**2.17**

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

Chairman - BoS

SEMESTER VII

23ADBP01	**PROJECT WORK**	L T P C 0 0 12 6

OBJECTIVES

- To develop the student's learning and skill development in a specific area of interest
- To provide students with an opportunity to apply the theoretical knowledge gained from their minor courses to a practical real-world scenario or problem
- To learn and conduct research and investigate various aspects, fostering critical thinking and problem-solving skills.
- To promote collaboration and teamwork among students, enabling them to work effectively in a team environment
- To prepare project report and to face reviews and viva voce examination.

GUIDELINES FOR REVIEW AND EVALUATION

The student can select any topic which is relevant to his/her specialization of the programme. The student should continue the work on the selected topic as per the formulated methodology. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work, results and discussion, conclusion and references should be prepared as per the format prescribed by the University and submitted to the Head of the department. The students will be evaluated based on the report and viva- voce examination by a panel of examiners as per the Regulations.

TOTAL: 180 PERIODS

OUTCOMES

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

- Demonstrate a sound technical knowledge of their selected project topic.
- Develop problem-solving skills as they analyze issues, design solutions, and implement them in their projects.
- Improve their communication and presentation abilities.
- Build successful collaboration and teamwork will be evident in the project's execution and outcomes
- Explain new knowledge or insights to the relevant field, making it a valuable addition to the academic community.

Mapping of COs-POs & PSOs

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

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

Chairman - BoS

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