



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.E.COMPUTER SCIENCE AND ENGINEERING

(CHOICE BASED CREDIT SYSTEM)

REGULATIONS – 2023

(I - IV SEMESTER)

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



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





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Chairman - BoS


DEAN (ACADEMICS)
SENGUNTHAR ENGINEERING COLLEGE
TIRUCHENGODE-637 205




PRINCIPAL
SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
TIRUCHENGODE - 637 205



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REGULATIONS 2023

CHOICE BASED CREDIT SYSTEM

B.E. COMPUTER SCIENCE AND ENGINEERING

VISION

- To be a pioneer in Computer Science and Engineering education by shaping students into knowledgeable professionals with skills in software development, research, and strong ethical values.

MISSION

- To provide a comprehensive education that shapes the students into professionals in software development, research, ethical conduct, and entrepreneurship.
- To foster industry-collaborative learning, by establishing a research centre of excellence to address local and global challenges.
- To engage the students in outreach programs to create easy, technology-driven solutions.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

Graduates can

- ✓ Apply their technical competence in various fields of Computer Science and Engineering for identifying, formulating and solving real world problems.
- ✓ Engage careers in cutting edge research techniques, develop solutions on problems of social relevance by applying new ideas and technologies and able to adapt the emerging technological changes.
- ✓ Work productively in multidisciplinary environment, nurture the leadership qualities and entrepreneurial skills for their career enhancement.



PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication:	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOME (PSOs)

Students can have the:

PSO1	Formulate, solve and analyze Computer Science and Engineering problems, design, develop and implement solutions using programming languages, development tools to meet the specific needs.
PSO2	Apply software engineering principles and practices, design software solutions in the areas related to algorithms, networking, cloud computing, web designing to create a successful career.

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	2	3	2	-	-	-	-	-	-	-	-	2	-	-
		23HST102 - தமிழ்மரபு/ 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	-	-	-	-
		23CST301-Operating Systems	3.0	2.6	2.2	1.7	2.8	1.0	1.0	1.0	1.0	1.2	-	2.6	3.0	2.8
		23ECT302- Digital Principles and Computer	3	2	2	2	2	2	-	-	-	-	2	2	3	3

IV	Architecture														
	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
	23EEEC301 - Professional Development	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	23CST401-Distributed Computing	3.0	2.8	2.6	2.2	2.8	1.3	1.3	1.6	1.6	1.4	1.5	2.8	3.0	3.0
	23CST402-Automata Theory	3.0	3.0	2.8	2.4	3.0	-	-	1.0	1.4	1.2	-	2.6	3.0	3.0
	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
	23ITE501-Full Stack Web Development	3.0	2.8	3.0	2.3	3.0	1.4	1.2	1.6	2.3	1.6	1.7	2.8	3.0	3.0
	23EEEC401-Online Certification Courses	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

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

B.E. - COMPUTER SCIENCE AND ENGINEERING - FIRST SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
THEORY									
23HST101	Professional English	HS	3	0	0	3	40	60	100
23MAT101	Matrices and Calculus	BS	3	1	0	4	40	60	100
23HST102	தமிழர்மரபு/Heritage of Tamils	HS	1	0	0	1	40	60	100
EMBEDDED COURSE									
23PHE102	Applied Physics for Computer Engineering	BS	3	0	2	4	50	50	100
23CYE101	Engineering Chemistry	BS	3	0	2	4	50	50	100
23GEE101	Programming in C	ES	3	0	2	4	50	50	100
EMPLOYABILITY ENHANCEMENT COURSE									
23EEC101	Soft Skills & 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

CURRICULUM

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

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

B.E. - COMPUTER SCIENCE AND ENGINEERING - SECOND SEMESTER

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

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

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

B.E. - COMPUTER SCIENCE AND ENGINEERING - THIRD SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
THEORY									
23MAT303	Discrete Mathematics	BS	3	1	0	4	40	60	100
23CST301	Operating Systems	PC	3	0	0	3	40	60	100
23ECT302	Digital Principles and Computer Architecture	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
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.E. - COMPUTER SCIENCE AND ENGINEERING - FOURTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
THEORY									
23CST401	Distributed Computing	PC	3	0	0	3	40	60	100
23CST402	Automata Theory	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
23ITE501	Full Stack Web Development	PC	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
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T	:	Tutorial
P	:	Practical
C	:	Credit Point
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ESE	:	End Semester Examination
TOT	:	Total



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

B.E. - COMPUTER SCIENCE AND ENGINEERING - FIFTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
THEORY									
23CST501	Cryptography and Network Security	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									
23CSE501	Computer Networks	PC	3	0	2	4	50	50	100
23CSE502	Object Oriented Software Engineering	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.E. - COMPUTER SCIENCE AND ENGINEERING -SIXTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
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									
23CSE601	Cloud Computing	PC	3	0	2	4	50	50	100
23ITE601	Mobile 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
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TOT	:	Total



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

B.E. - COMPUTER SCIENCE AND ENGINEERING - SEVENTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		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
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TOT	:	Total





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CURRICULUM

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

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

B.E. - COMPUTER SCIENCE AND ENGINEERING - EIGHTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
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		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		CIA	ESE	TOT
23MAT101	Matrices and Calculus	BS	3	1	0	4	40	60	100
23PHE102	Applied Physics for Computer Engineering	BS	3	0	2	4	50	50	100
23CYE101	Engineering Chemistry	BS	3	0	2	4	50	50	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		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	PC	3	1	0	4	40	60	100

LIST OF PROFESSIONAL CORE

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		CIA	ESE	TOT
23CSE201	PC Hardware Services and Networking	PC	3	0	2	4	50	50	100
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
23CST301	Operating Systems	PC	3	0	0	3	40	60	100
23CST401	Distributed Computing	PC	3	0	0	3	40	60	100
23CST402	Automata Theory	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
23ITE501	Full Stack Web Development	PC	3	0	2	4	50	50	100
23CST501	Cryptography and Network Security	PC	3	1	0	4	40	60	100
23CSE501	Computer Networks	PC	3	0	2	4	50	50	100
23CSE502	Object Oriented Software Engineering	PC	3	0	2	4	50	50	100
23CSE601	Cloud Computing	PC	3	0	2	4	50	50	100
23ITE601	Mobile 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		CIA	ESE	TOT
23CSP501	Data Warehousing and Mining	PE	3	0	0	3	40	60	100
23CSP502	Exploratory Data Analysis	PE	3	0	0	3	40	60	100
23CSP503	Recommender Systems	PE	3	0	0	3	40	60	100
23CSP504	Text and Speech Analysis	PE	3	0	0	3	40	60	100
23CSP505	Business Analytics	PE	3	0	0	3	40	60	100
23CSP506	Big Data Analytics	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		CIA	ESE	TOT
23CSP507	Adhoc and Sensor Networks	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		CIA	ESE	TOT
23ITP504	Human Computer Interaction	PE	3	0	0	3	40	60	100
23CSP513	Virtualization	PE	3	0	0	3	40	60	100
23ITP505	Storage Technologies	PE	3	0	0	3	40	60	100

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

Professional Elective – IV

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		CIA	ESE	TOT
23CSP601	Hacking Techniques	PE	3	0	0	3	40	60	100
23ITP601	Digital Forensics	PE	3	0	0	3	40	60	100
23CSP602	Social Network Security	PE	3	0	0	3	40	60	100
23CSP603	Engineering Secure Software Systems	PE	3	0	0	3	40	60	100
23CCP602	Cyber Physical Systems Security	PE	3	0	0	3	40	60	100
23ITP602	Information Security	PE	3	0	0	3	40	60	100

Professional Elective – V

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



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Professional Elective – VI

Course Code	Name of the Subject	Category	Periods / Week				Credit	Maximum Marks		
			L	T	P	C		CIA	ESE	TOT
23ADP503	Knowledge Engineering	PE	3	0	0	3		40	60	100
23CSP608	Soft Computing	PE	3	0	0	3		40	60	100
23CSP609	Cognitive Science	PE	3	0	0	3		40	60	100
23CSP610	Optimization Techniques	PE	3	0	0	3		40	60	100
23ITP502	Computer Vision	PE	3	0	0	3		40	60	100
23CSP612	Ethics and AI	PE	3	0	0	3		40	60	100



LIST OF OPEN ELECTIVE COURSES

OPEN ELECTIVES – I

Offered by the Departments	Course Code / Course Name	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		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		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		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		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		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		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		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		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.E. COMPUTER SCIENCE AND ENGINEERING

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	6	7	—	—	—	—	—	17
GE	—	—	—	—	—	—	3	—	3
PC	—	4	11	19	12	8	—	—	54
PE	—	—	—	—	9	9	—	—	18
OE	—	—	—	—	—	3	6	—	9
EEC	1	2	1	3	2	4	4	8	25
MC	—	—	—	—	—	—	—	—	—
Total	21	27	23	22	23	24	16	8	164



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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





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Mandatory activity: Record Submission for English Speaking Hour with Faculty Members

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

REFERENCES

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



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.



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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 PERIODS

TEXT BOOKS

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

REFERENCES

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





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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





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23HST102

HERITAGE OF TAMILS
(Common to all Branches)

L T P C
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 Thinaï 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, Yath 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



OUTCOMES

Upon the completion of the course, the 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 Thinaï concepts, trade and victory of Chozha dynasty.
- Interpret the contribution of Tamils in Indian freedom struggle, Self-esteem movement and siddha medicine.

TEXT BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்)
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருறை – 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 Civilization 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.



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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

தமிழ்மரபு

L T P C

(அனைத்து துறைகளுக்கும் பொதுவானது)

1 0 0 1

நோக்கங்கள்

மாணவர்கள் கண்டிப்பாக அறிய வேண்டுவன

- செம்மொழியான தமிழ்மொழியின் விரிவான இலக்கியத்தைப்பற்றி அறிதல்.
- பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை உள்ள கலைகளை பகுப்பாய்வு செய்தல்.
- நாட்டுப்புறக்கலைகள் மற்றும் வீர விளையாட்டுகளைப்புரிந்துகொள்ளுதல்.
- தமிழர்களின் திணைக்கோட்பாடுகளைச்செயல்படுத்துதல்.
- இந்திய விடுதலைப்போராட்டத்திற்கும் 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

தமிழகத்தில் எழுத்தறிவும் கல்வியும்-சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாற்றிக்குத் தமிழர்களின் பங்களிப்பு 3

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

TOTAL: 15 PERIODS

முடிவுகள்

பாடத்தின்முடிவில், மாணவர்கள் அறிந்து கொள்வன:

- தமிழ்மொழியின்செம்மொழிதன்மையையும்சங்கஇலக்கியத்தின்முக்கியத்துவத்தையும் உணர்வார்கள்.
- தமிழர்களின்சிறப்ப, ஓவிய, இசை மரபுகளை புரிந்து கொள்வார்கள்.
- நாட்டுப்புறக் கலைகளையும் வீர விளையாட்டுகளையும் வகைப்படுத்துவார்கள்.
- தமிழர்களின்திணைக்கோட்பாடுகளும்சங்ககாலவர்த்தகமும்புரிந்துகொள்வார்கள்.
- இந்திய விடுதலைப் போராட்டம், சுயமரியாதை இயக்கம், சித்த மருத்துவம் ஆகியவற்றில் தமிழர்களின் பங்களிப்பை விளக்குவார்கள்.

உரைமற்றும்குறிப்புத்தகங்கள்

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

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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



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23PHE102

APPLIED PHYSICS FOR COMPUTER ENGINEERING

L T P C

(Common to CSE, CSE-SC, IT, AI&DS and AI&ML)

3 0 2 4

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 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 equations: Time Independent and Time Dependent Equation - 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 - 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 DVD & Blu-ray Disc - **OFF-LINE STORAGE :** USB Flash drive – Memory card – **FUTURE STORAGE DEVICES (Concept only) :** 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.

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 this 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 Text book 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, 2019

REFERENCES

1. Avadhanulu M.N & Kshirsagar P.G "Text Book of Engineering Physics". S.Chand, 2016
2. Hanson G.W. "Fundamentals of Nanoelectronics". Pearson Education, 2019
3. C.N.R. Rao, P.J. Thomas and G.U. Kulkarni, "Nanocrystals: Synthesis, Properties and Applications", Springer (2017)

E-RESOURCES

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
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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 2 4

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 (phosphate, calgon and carbonate conditioning methods) – External conditioning – Zeolite process, Demineralization process – Desalination of brackish water by reverse osmosis.

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, Property of polymer: Glass transition temperature, Preparation, properties and uses of PVC, Nylon 6,6, Polyethylene - Rubbers – Types – Vulcanization of rubber – Plastics – Moulding constituents of plastics – Moulding of plastics – Compression and injection - 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- 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 alloy – Brass.

UNIT IV CHEMISTRY OF NANO MATERIALS

9

Nano chemistry – Basics (Surface area to volume ratio - 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 -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, Corrosion – Types – Chemical Corrosion – Electrochemical Corrosion (galvanic and differential aeration) - Factors influencing corrosion – Material selection and design aspects-Control methods of corrosion –sacrificial anodic and impressed current cathodic protection.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

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

TOTAL: 45 + 15 = 60 PERIODS

OUTCOMES

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

- Explain the quality parameters of water and identify appropriate methods for removing impurities for both domestic and industrial applications.
- Describe various types of polymers, their polymerization processes, and discuss their special properties and engineering applications.
- Apply the phase rule to understand alloy formation and its relevance in engineering applications.

- Discuss the fundamentals of nanomaterials and apply the core concepts of nanochemistry to engineering problems.
- Analyze the causes of corrosion and propose effective prevention and control strategies.
- Determine the water quality parameters and perform quantitative chemical analysis by pH meter, flame photometry, conductometry and potentiometry.

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" First Edition, Alpha Science International Ltd, 2009.

REFERENCES

1. S. S. Dara and S. S. Umare, "A Textbook of Engineering Chemistry", Tenth Edition, S. Chand & Company Ltd, New Delhi, 2015.
2. Sivasankar B., "Engineering Chemistry", Second Edition, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.

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


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23GEE101

PROGRAMMING IN C
(Lab Embedded Theory Course)

L T P C

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.

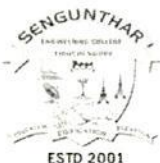
LIST OF EXPERIMENTS

(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





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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)





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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


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23EEEC101

SOFTSKILLS & LIFE SKILLS

L T P C
1 0 0 1

(Common to all First year / First Semester B.E., B.Tech., Branches)

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.

UNIT I 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 SKILL

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.





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- 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-RESOURCES

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

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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.





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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

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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 TRANSFORM

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' 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.





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OUTCOMES

Upon completion of the course, the 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, Fourty 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.





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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

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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

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23PHT202

ADVANCED PHYSICS FOR COMPUTER ENGINEERING

L T P C

(Common to CSE, CSE-SC, IT and AI&DS)

3 0 0 3

OBJECTIVES

- To 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 & CM)

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 (Qualitative)

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).



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. Sze S. M., Lee M. K., "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-fu>

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



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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

23CYT201

ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

L T P C

(Common to All B.E. /B.Tech. Branches)

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.





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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.





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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

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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





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23HST202

TAMILS AND TECHNOLOGY

LTPC
1001

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)-ThirumalaiNayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY

3

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

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

3

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

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

3

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

TOTAL: 15 PERIODS



OUTCOMES

Upon the completion of the course, the 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 - 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).
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.



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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



(அனைத்து துறைகளுக்கும் பொதுவானது)

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.
- அறிவியல்மற்றும்அறிவியல்தமிழ்மற்றும்தமிழ்கணிப்பொறிதொடர்பானஅறிவைநினைவில்கொள்ளுதல்.

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 - எலும்புத்தூண்டுகள் - 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.

உரைமற்றும்குறிப்புத்தகங்கள்

1. தமிழகவரலாறு - மக்களும்பண்பாடும் - கே. கே. பிள்ளை-
(வெளியீடு:தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்).
2. கணினித்தமிழ் - முனைவர்இல. சுந்தரம். (விகடன்பிரசுரம்).
3. கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம்
(தொல்லியல்துறைவெளியீடு)
4. பொருநை -ஆற்றங்கரைநாகரீகம். (தொல்லியல்துறைவெளியீடு).
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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.)





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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





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23HSE201

ENGLISH FOR ENGINEERS: THEORY AND PRACTICE

L T P C

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

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, "Technical English II", Maven Learning Private Limited, 2012.
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", Oxford University Press. UK, 2013.

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	PSO2
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	-	-
AVG	1	2	-	2	1	2	2	1.5	2.3	3	2	1.6	-	-

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


Chairman - BoS



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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

23EEE202

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to AIDS, CSE, CSE-CS, IT, Robotics, PT)

LT P 9
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 sources only (Steady state) – Thevenin's theorem – Maximum Power Transfer theorem. Laws - Independent and Dependent sources - Nodal analysis, Mesh analysis with Independent

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.





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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", Second Edition, McGraw Hill Education, 2020.
2. S. K. Bhattacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second Edition, 2019.

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.





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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



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.
- To provide practical exposure in computer hardware components, motherboard analysis, peripheral troubleshooting, network configuration, and operating system installation for effective computer maintenance.

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.



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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 softwares

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. Test Connectivity using the ping command.
9. Study about installation of RJ45, Crimping 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.
- Demonstrate functional PC hardware and networking solutions through computer assembly, operating system installation, network cabling, configuration, and diagnostic activities.

TEXT BOOKS

1. Scott Mueller, "Upgrading and Repairing PCs", Que Publishing (Pearson), Second Edition, 2011.
2. Behrouz A. Forouzan, "Data Communications and Networking", McGraw-Hill Education, Sixth Edition, 2022.

REFERENCES

1. T Stephen Rood, "Computer Hardware Maintenance", Elsevier, First Edition, 1996.
2. Christian Huitema, "Internet Routing Architectures", Prentice Hall, Second Edition, 2000.

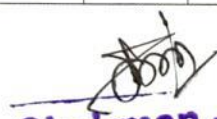
E – RESOURCES

1. <https://archive.nptel.ac.in/courses/106/106/106106144/> (PC Hardware fundamentals)
2. [https://onlinecourses.nptel.ac.in/noc22_cs19/\(Computer Networks and Internet Protocol\)](https://onlinecourses.nptel.ac.in/noc22_cs19/(Computer Networks and Internet Protocol))

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



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23GEL201

ENGINEERING PRACTICES LABORATORY

LT P C

(Lab Embedded Theory Course)

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:

- Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

- Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

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

TOTAL: 60 PERIODS

OUTCOMES

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

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

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

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

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

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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 वर्णमाला एवं मूलभूत व्याकरण (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 शब्दभंडार एवं व्याकरण (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 पठन एवं लेखन कौशल (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 दैनिक जीवन में हिंदी (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 साहित्य एवं पुनरावृत्ति (LITERATURE AND REVISION)

4

Simple Poems (कविताएँ)- Short Stories (लघुकथाएँ)- Proverbs and Idioms (मुहावरे एवं लोकोक्तियाँ- 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.

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23EEEC201

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

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Chairman - BoS



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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

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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 EQUATION 9

Polynomial introduction – Degree of a polynomial – Types of polynomial – Operations on polynomial – Remainder and factor theorem – Quadratic equation – Pure Quadratic equation – Discriminant – Roots





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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>

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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 PERIODS



OUTCOMES

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

- Analyze the concept of logic and proofs.
- Apply the concepts of generating functions, induction and counting techniques.
- Use the applications of graph theory.
- Identify the concepts and properties of algebraic structures.
- Compute the real-time applications using lattices.

TEXTBOOKS

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


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23CST301

OPERATING SYSTEMS

L T P C

3 0 0 3

OBJECTIVES

- To familiarize students with the basic concepts and functions of operating systems.
- To enhance knowledge on CPU scheduling algorithms and process synchronization mechanisms.
- To impart understanding of memory management concepts including segmentation.
- To inculcate knowledge of storage management systems and file organization.
- To foster awareness on the fundamentals of virtual machines and mobile operating systems.

UNIT I INTRODUCTION

9

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

Problem-solving Assignments:

1. Design and implement an OS bootstrap loader that initializes system services and user interface.
2. Develop a program comparing different OS evolution stages (batch, multiprogramming, time-sharing).

UNIT II PROCESS MANAGEMENT

9

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

Problem-solving Assignments:

1. Design a deadlock detection and recovery system using Banker's algorithm for resource allocation.
2. Implement process synchronization for readers-writers problem with multiple readers allowed.

UNIT III MEMORY MANAGEMENT

9

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



Problem-solving Assignments:

1. Design a virtual memory manager handling demand paging, copy-on-write, and thrashing detection.
2. Implement segmentation with paging and demonstrate memory protection mechanisms.

UNIT IV STORAGE MANAGEMENT

9

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

Problem-solving Assignments:

1. Design a complete file system implementation with mounting, sharing, and protection mechanisms.
2. Implement I/O subsystem with buffering, caching, and disk I/O optimization strategies.

UNIT V VIRTUAL MACHINES AND MOBILE OS

9

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

Problem-solving Assignments:

1. Design a mobile OS power management system optimizing battery life with app scheduling.
2. Develop a containerization system using namespaces and cgroups for process isolation.

TOTAL: 45 PERIODS

OUTCOMES

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

- Understand the fundamental structure, objectives and evolution of operating systems.
- Analyze process management concepts including scheduling, synchronization and deadlock handling mechanisms.
- Apply memory management techniques to optimize system performance.
- Examine storage management concepts including file systems, disk scheduling and I/O systems.
- Describe the principles of virtualization and features of iOS and Android operating systems



TEXT BOOKS

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

REFERENCES

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

E-RESOURCES

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

Mapping of COs-POs& PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	1	–	2	–	–	–	–	1	–	2	3	2
2	3	3	2	2	3	–	–	1	1	1	–	2	3	3
3	3	3	3	2	3	–	–	1	1	1	–	3	3	3
4	3	3	3	2	3	–	–	1	1	1	–	3	3	3
5	3	2	2	1	3	1	1	1	1	2	–	3	3	3
6	–	–	–	–	–	–	–	–	–	–	–	–	–	–
AVG	3.0	2.6	2.2	1.7	2.8	1.0	1.0	1.0	1.0	1.2	–	2.6	3.0	2.8

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


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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





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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 R. Mano, Michael D. Ciletti, "Digital Design: With an Introduction to the VerilogHDL, VHDL, and System Verilog", Sixth Edition, Pearson Education, 2017.
2. David Harris, "Digital Design and Computer Architecture", Morgan Kaufmann, 2012.

REFERENCES

1. G. K. Kharate, "Digital Electronics", Oxford University Press, 2010.
2. John F. Wakerly, "Digital Design Principles and Practices", Fifth Edition, Pearson Education, 2017.

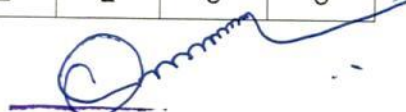
E-RESOURCES

1. <https://nptel.ac.in/courses/117/106/117106086/> (Digital Design)
2. <https://nptel.ac.in/courses/108/105/108105132/> (Integrated Circuits)
3. https://onlinecourses.nptel.ac.in/noc24_cs83/ (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


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23CSE301

OBJECT ORIENTED PROGRAMMING

LT 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 INTERFA

9

Overloading Methods – Objects as Parameters – Returning Objects –Static, Nested and Inner Classes. Inheritance: Basics– Types of Inheritance -Super keyword -Method Overriding – Dynamic Method





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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.





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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 JAVA FX 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





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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


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23CSE302

DATA STRUCTURES AND ALGORITHMS

L T P C

3 0 2 4

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.

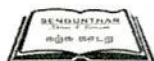
UNIT III TREES

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.





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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, the 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/>(Introduction to data structure)

Mapping of COs-POs & PSOs

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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



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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 blocks of algorithms(statements, state, control flow, 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

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,charactercount,replacingcharacters)



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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", Notion Press, First Edition, 2021.

E – RESOURCES

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



Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3	2	2	–	–	1	1	1	–	2	3	3
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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


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23EEEC301

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

Create and format a document

Working with tables

Working with Bullets and Lists

Working with styles, shapes, smart art, charts

Inserting objects, charts and importing objects from other office tools

Creating and Using document templates

Inserting equations, symbols and special characters

Working with Table of contents and References, citations

Insert and review comments

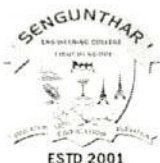
Create bookmarks, hyperlinks, endnotes footnote

Viewing document in different modes

Working with document protection and security

Inspect document for accessibility





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MS EXCEL:

10 Hours

Create worksheets, insert and format data
Work with different types of data: text, currency, date, numeric etc.
Split, validate, consolidate and Convert data
Sort and filter data
Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc.,)
Work with Lookup and reference formulae
Create and Work with different types of charts
Use pivot tables to summarize and analyze data
Perform data analysis using own formulae and functions
Combine data from multiple worksheets using own formulae and built-in functions to generate results
Export data and sheets to other file formats
Working with macros
Protecting data and Securing the workbook

MS POWERPOINT:

10 Hours

Select slide templates, layout and themes
Formatting slide content and using bullets and numbering
Insert and format images, smart art, tables, charts
Using Slide master, notes and handout master
Working with animation and transitions
Organize and Group slides
Import or create and use media objects: audio, video, animation
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.


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SEMESTER IV

23CST401

DISTRIBUTED COMPUTING

L T P C
3 0 0 3

OBJECTIVES

- To impart the knowledge on the computation and communication models of distributed systems.
- To familiarize the students about the issues of synchronization and collection of information in distributed systems.
- To equip the students in the distributed mutual exclusion and distributed deadlock detection techniques.
- To expose the agreement protocols and fault tolerance mechanisms in distributed systems.
- To explore the cloud computing models and the underlying concepts.

UNIT I INTRODUCTION

9

Introduction: Definition-Relation to Computer System Components – Motivation – Message -Passing Systems versus Shared Memory Systems – Primitives for Distributed Communication – Synchronous versus Asynchronous Executions – Design Issues and Challenges; A Model of Distributed Computations: A Distributed Program – A Model of Distributed Executions – Models of Communication Networks – Global State of a Distributed System.

Problem Solving Assignments :

1. Compare message-passing systems and shared memory systems.
2. Identify any two design issues or challenges in distributed systems and explain their impact.

UNIT II LOGICAL TIME AND GLOBAL STATE

9

Logical Time: Physical Clock Synchronization: NTP – A Framework for a System of Logical Clocks Scalar Time – Vector Time; Message Ordering and Group Communication: Message Ordering Paradigms – Asynchronous Execution with Synchronous Communication – Synchronous Program Order on Asynchronous System – Group Communication – Causal Order – Total Order; Global State and Snapshot Algorithms.

Problem Solving Assignments :

1. Discuss the need for clock synchronization and explain Physical Clock Synchronization using NTP.
2. Describe Message Ordering Paradigms and explain Asynchronous Execution with Synchronous Communication.



UNIT III DISTRIBUTED MUTEX AND DEADLOCK

9

Distributed Mutual exclusion Algorithms: Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala's Algorithm — Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm; Deadlock Detection in Distributed Systems: Introduction – System Model – Preliminaries – Models of Deadlocks – Chandy-Misra-Haas Algorithm.

Problem Solving Assignments :

1. Explain Lamport's Mutual Exclusion Algorithm with message types, working steps, and correctness properties.
2. Define deadlock and explain the system model and preliminaries used for deadlock detection in distributed environments.

UNIT IV CONSENSUS AND RECOVERY

9

Consensus and Agreement Algorithms: Problem Definition – Overview of Results – Agreement in a Failure-Free System (Synchronous and Asynchronous) – Agreement in Synchronous Systems with Failures; Checkpointing and Rollback Recovery: Introduction – Background and Definitions – Issues in Failure Recovery – Checkpoint-based Recovery.

Problem Solving Assignments :

1. Explain Agreement in a Failure-Free System under:
 - i) Synchronous systems
 - ii) Asynchronous systems
2. Discuss the issues in failure recovery, including the domino effect, orphan messages, and consistency.

UNIT V CLOUD COMPUTING

9

Definition of Cloud Computing – Characteristics of Cloud – Cloud Deployment Models – Cloud Service Models – Driving Factors and Challenges of Cloud – Virtualization – Load Balancing – Scalability and Elasticity – Replication – Monitoring – Cloud Services and Platforms.

Problem Solving Assignments :

1. Explain the Cloud Service Models with suitable examples.
2. Explain the role of Virtualization in cloud computing.

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the fundamental concepts and components of distributed systems.
- Analyze logical time, synchronization and global state in distributed systems.
- Apply algorithms for mutual exclusion, deadlock detection and fault tolerance in distributed environments.
- Analyze consensus algorithms and recovery mechanisms for fault tolerance in distributed systems.
- Analyze cloud computing models, architecture and apply virtualizations.

TEXT BOOKS

1. Kshemkalyani Ajay D, Mukesh Singhal, "Distributed Computing: Principles, Algorithms and Systems", Cambridge Press, First Edition 2011.
2. Mukesh Singhal, Niranjana G Shivaratri, "Advanced Concepts in Operating systems", Mc- Graw Hill Publishers First Edition 2017.

REFERENCES

1. George Coulouris, Jean Dollimore, Time Kindberg, "Distributed Systems Concepts and Design" Pearson Education, Fifth Edition, 2012.
2. Coulouris George, Dollimore Jean, "Distributed Operating Systems: Concepts and Design", Pearson Education, Fifth Edition, 2017.

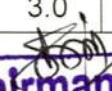
E-RESOURCES

1. [https://nptel.ac.in/courses/106106107/\(Distributed coordination\)](https://nptel.ac.in/courses/106106107/(Distributed%20coordination))
2. [https://nptel.ac.in/courses/106/106/106106168/ \(Basic distributed algorithm\)](https://nptel.ac.in/courses/106/106/106106168/(Basic%20distributed%20algorithm))

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	1	-	2	3	3
2	3	3	2	2	3	-	-	1	1	1	-	3	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	2	1	3	3	3
5	3	3	3	2	3	2	2	2	2	2	2	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3.0	2.8	2.6	2.2	2.8	1.3	1.3	1.6	1.6	1.4	1.5	2.8	3.0	3.0

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


Chairman - BoS



23CST402

AUTOMATA THEORY

L T P C

3 1 0 4

OBJECTIVES

- To enable students to understand the hierarchy of formal languages and their classifications.
- To train students to construct appropriate automata for given language patterns and derive their equivalent regular expressions.
- To guide students in formulating context-free grammars and related computational models for specified languages.
- To impart knowledge on the structure and functional phases of a compiler.
- To develop students' skills in applying various parsing and optimization techniques used in compiler design.

UNIT I AUTOMATA FUNDAMENTALS

9+3

Introduction to formal proof – Additional forms of Proof – Inductive Proofs – Memory required to recognize a Language – Finite Automata – Deterministic Finite Automata – Non-deterministic Finite Automata – Finite Automata with Epsilon Transitions – Minimal Finite Automata.

Problem-Solving Assignments:

1. Construct DFA and NFA for given languages and convert NFA to equivalent DFA.
2. Minimize a given DFA and analyze its state reduction.

UNIT II REGULAR EXPRESSION AND REGULAR LANGUAGES

9+3

Regular Languages and Regular Expressions – Kleene's Theorem – Pumping Lemma for Regular Languages – FA and Regular Expressions – Proving Languages not to be regular – Closure Properties of Regular Languages.

Problem-Solving Assignments:

1. Derive regular expressions for given finite automata and vice versa.
2. Apply the Pumping Lemma to prove that a given language is not regular.

UNIT III CONTEXT FREE GRAMMARS AND PUSH DOWN AUTOMATA

9+3

CFG – Parse Trees – Ambiguity in Grammars and Languages – Definition of the Pushdown Automata – Languages of a Pushdown Automata – Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata – Normal Forms- Turing Machines Programming Techniques for TM.

Problem-Solving Assignments:

1. Construct CFGs and PDAs for given languages and verify their equivalence.
2. Identify ambiguity in grammars and convert grammars into normal forms.



UNIT IV INTRODUCTION TO COMPILERS

9+3

The structure of compiler – Lexical analysis: Role of Lexical analyzer – Input buffering – Specification and recognition of tokens –The lexical analyzer generator Lex. Finite Automata – Regular Expressions to Automata – Minimizing DFA- Semantic Analysis- Intermediate Code Generation- Optimization- Code Generation.

Problem-Solving Assignments:

1. Design lexical analyzers for simple programming language constructs.
2. Analyze sample code to generate intermediate representations and optimized code.

UNIT V OPTIMIZATION TECHNIQUES

9+3

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers – LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator.

Problem-Solving Assignments:

1. Construct parsing tables (LL, SLR, LR, LALR) for given grammars.
2. Compare top-down and bottom-up parsing techniques for efficiency and ambiguity handling.

TOTAL:60 PERIODS

OUTCOMES

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

- Implementation of automata, regular expression for any pattern.
- Apply the context free grammar for any construct.
- Design Pushdown automata for any language.
- Understand the different phases of compiler.
- Design a lexical analyzer for a sample language.

TEXT BOOKS

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", Pearson Education, Second Edition ,2003.
2. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, "Compilers: Principles, Techniques and Tools", Dorling Kindersley(India) Pvt Ltd., 2011.



REFERENCES

3. H.R.Lewis and C.H.Papadimitriou, "Elements of the theory of Computation", Second Edition, PHI, 2003.
4. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence-based Approach", Morgan Kaufmann Publishers, 2002.

E – RESOURCES

1. <https://nptel.ac.in/courses/106/104/106104028/> (Automata Theory)
2. <https://nptel.ac.in/courses/106/108/106108052/> (Compiler Design)

Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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5	3	3	3	3	3	-	-	1	2	2	-	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3.0	3.0	2.8	2.4	3.0	-	-	1.0	1.4	1.2	-	2.6	3.0	3.0

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



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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU



23CSE401

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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 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 – Generative 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.

List of Experiments

1. Implementation of Uninformed search algorithms (BFS, DFS)
2. Implementation of Informed search algorithms (A*, memory-bounded A*)
3. Implement naïve Bayes models
4. Implement Bayesian Networks





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5. Build Regression models
6. Build decision trees and random forests
7. Build SVM models
8. Implement ensembling techniques
9. Implement clustering algorithms
10. Implement EM for Bayesian networks
11. Build simple NN models
12. Build deep learning NN models

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, the 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", Fourth Edition, 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)





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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 '—' – NoCorrelation


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.



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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

9

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

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.



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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

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


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23ITE501

FULL STACK WEB DEVELOPMENT

L T P C

3 0 2 4

OBJECTIVES

- To gain knowledge about the fundamental concept of HTML to structure web content.
- To explore the different CSS style sheets for designing web pages.
- To develop dynamic and interactive web applications using JavaScript.
- To foster the students with modern web development frameworks like REACT JS and NODE JS.
- To explore SQL, NoSQL and Mongo DB database techniques to develop web applications.
- To implement web application services using basic and advanced web development frameworks.

UNIT I HTML

9

Introduction to HTML-Browsers and HTML-Editor's Offline and Online-Tags, -Attribute and Elements-Doctype Element-Comments-Headings, Paragraphs, and Formatting Text-Lists and Links-Images and Tables.

Coding Exercises:

1. Develop a student registration form using input fields, radio buttons, checkboxes, and submit button.
2. Design a college profile webpage using headings, paragraphs, bold, italic, and underline tags.
3. Insert images with alt text and create a table to display student marks.

Problem-Solving Assignments:

1. Analyze a faulty HTML file and identify syntax, nesting, and attribute errors. Submit a corrected version with justification.
2. Convert a given unstructured text document into a properly structured HTML document using headings, lists, tables, and links.

UNIT II CSS

9

Introduction CSS-Appling CSS to HTML-Selectors, Properties and Values-CSS Colors and Backgrounds- CSS Box Model-CSS Margins, Padding, and Borders-CSS Text and Font Properties-CSS General Topics



Coding Exercises:

1. Design a webpage layout using CSS box model concepts (margin, padding, border) without using tables.
2. Develop a responsive webpage using CSS properties that adapts to desktop and mobile screens.
3. Create a styled navigation bar using CSS

Problem-Solving Assignments:

1. Refactor a given CSS file to remove redundancy, improve readability, and follow naming conventions.
2. Identify and fix layout breakage issues caused by incorrect CSS selector usage and box model calculations.

UNIT III JAVASCRIPT

9

Introduction to JavaScript-Appling JavaScript (internal and external)-Understanding JS Syntax-Introduction to Document and Window Object-Variables and Operators-Data Types and Num Type Conversion-Math and String Manipulation-Objects and Arrays-Date and Time-Conditional Statements-Switch Case -Looping in JS-Functions

Coding Exercises:

1. Develop a JavaScript-based interactive application (calculator / quiz / number game) using functions, loops, and conditions.
2. Create a dynamic webpage where elements are created, updated, and removed using JavaScript DOM methods.
3. Write a JavaScript program to display alert and prompt messages.

Problem-Solving Assignments:

1. Implement JavaScript-based form validation for login and registration pages without using libraries.
2. Debug a given JavaScript program containing logical, syntactical, and runtime errors and document the corrections.

UNIT IV ReactJS AND NodeJS

9

Introduction and Templating using JSX- Components, Lifecycle, State and Props-Rendering List and Portals- Error Handling and Routers-Redux and Redux Saga-Immutable.js-Service Side Rendering-Unit Testing-Webpack-Node js Overview and Basics-Node js Console and Command Utilities-Node js Modules and Concepts-Node js Events and Node js with Express js-Node js Database Access

Coding Exercises:

1. Write a Node.js program to print system information.
2. Build a to-do list app using React
3. Design a Node.js application using multiple modules for routing, logic, and database access.

Problem-Solving Assignments:

1. Implement a React application demonstrating state updates using user interaction (counter, voting system).
2. Connect a React frontend with a Node.js backend and exchange data using REST APIs.

UNIT V MongoDB and Applications

9

SQL and NoSql Concepts>Create and Manage MongoDB-Migration of Data into MongoDB-MongoDB with PHP-MongoDB with NodeJS-Services Offered by MongoDB-Developing a Python Application-Connect MongoDB with Python.

Coding Exercises:

1. Develop a Python application to connect MongoDB, retrieve data, and generate reports.
2. Design a MongoDB schema for a real-world application (student management / e-commerce / library system).
3. Connect MongoDB with Node.js and perform queries.

Problem-Solving Assignments:

1. Identify the CRUD Implementation Task to Create, Read, Update, and Delete operations using MongoDB.
2. Analyze how to Migrate relational data into MongoDB and justify the schema design choices.

LIST OF EXPERIMENTS

1. Write a program to create a simple webpage using HTML.
2. Write a program to create a website using HTML CSS and JavaScript
3. Write a program to build a Chat module using HTML CSS and JavaScript
4. Write a program to create a simple calculator Application using React JS
5. Write a program to create a voting application using React JS
6. Write a program to create and Build a Password Strength Check using JQuery
7. Write a program to create and Build a star rating system using JQuery
8. Create a Simple Login form using React JS
9. Using the CMS users must be able to design a web page using the drag and drop method.
10. Create a project on Grocery delivery application

TOTAL : 45+15 = 60 PERIODS





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OUTCOMES

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

- Apply the fundamental concept of HTML to structure web content effectively.
- Design web pages using CSS by incorporating layout and responsive design.
- Develop dynamic and interactive web applications using JavaScript.
- Develop modern web development frameworks like REACT JS and backend technologies using NODE JS.
- Apply Mongo DB database interaction techniques to develop applications leveraging SQL and NoSQL.
- Implement web application services using basic and advanced web development frameworks.

TEXT BOOKS

1. Chris Northwood, "The Full stack developer: Your Essential guide to the everyday skills Expected of a Modern full Stack Developer", Apress, First Edition, 2022.
2. Riaz Ahmed, "Full Stack Web Development for Beginners: complete E-commerce project", First Edition, Independent publication, 2021.

REFERENCES

1. Flask, By Jack Chan, Ray Chung, Jack Huang" Python API Development Fundamentals: Develop a full-stack web application with Python", First Edition, 2019.
2. Edwin Ross Torres, "Full Stack Web Development: Round One – Begin!", Second Edition, 2020.

E-RESOURCES

1. <https://archive.nptel.ac.in/courses/106/106/106106156/> (Full Stack Web Development)
2. <https://www.digimat.in/nptel/courses/video/106106156/L01.html> (Introduction to modern Development)



Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	2	3	1	3	—	—	1	1	1	—	2	3	3
2	3	3	3	2	3	1	1	1	2	1	—	3	3	3
3	3	3	3	2	3	1	1	2	2	2	1	3	3	3
4	3	3	3	3	3	1	1	2	3	2	2	3	3	3
5	3	3	3	3	3	2	1	2	3	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	3.0	2.3	3.0	1.4	1.2	1.6	2.3	1.6	1.7	2.8	3.0	3.0

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


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23EEEC401

ONLINE CERTIFICATION COURSES

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


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Curriculum and Syllabi

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

(MINOR/HONOURS DEGREE- ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

B.E. – COMPUTER SCIENCE AND ENGINEERING

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P		C	CIA	ESE
THEORY									
23CSAT01	Intelligent Systems	PC	3	0	0	3	40	60	100
23CSAT02	Machine Learning Applications	PC	3	0	0	3	40	60	100
23CSAT03	AI and Robotics	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23CSAE01	Deep Learning	PC	3	0	2	4	50	50	100
23CSAP01	Project Work	EEC	0	0	10	6	60	40	100
EMBLOYABILITY ENHANCEMENT COURSE									
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





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SEMESTER III

23CSAT01

INTELLIGENT SYSTEMS

L T P C

3 0 0 3

OBJECTIVES

- To Introduce the fundamental concepts, problem-solving techniques, and search strategies, used in Artificial Intelligence.
- To Provide knowledge of logical and structured knowledge representation techniques for modeling intelligent systems
- To Develop understanding of knowledge inference mechanisms, and reasoning methods for intelligent decision-making.
- To Impart the principles, architectures, learning algorithms, and applications of Artificial Neural Networks.
- To Familiarize the students with the fundamentals of Machine Learning and commonly used machine learning algorithms for solving real-world problems.

UNIT I INTRODUCTION TO ARTIFICIAL INTELLIGENCE

9

Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.

UNIT II KNOWLEDGE REPRESENTATION

9

Knowledge representation, Knowledge representation using Predicate logic, Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

UNIT III KNOWLEDGE INFERENCE

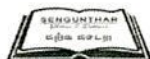
9

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

UNIT IV NEURAL NETWORKS

9

Introduction, Artificial Neural Network, Appropriate problems for neural network learning, Characteristics of the problems, Basic understanding of neural networks, A single neuron, Activation Functions, Architectures of neural networks, Feed forward neural network, Single-Layer





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feed forward architecture, Multiple-Layer feed forward architecture, Types of feed forward networks, Multi-layer perception, Training MLP: The back-propagation algorithm.

UNIT V MACHINE LEARNING BASICS AND METHODS

9

Introduction to Machine Learning (ML) - Essential concepts of ML – Types of learning – Machine learning methods based on Time – Dimensionality – Linearity and Non linearity – Early trends in Machine learning – Data Understanding Representation and visualization. Linear methods – Regression -Classification –Perceptron and Neural networks – Decision trees – Support vector machines – Probabilistic models —Unsupervised learning – Featurization

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the artificial intelligence problem-solving techniques, search strategies, and heuristic methods to solve computational problems.
- Apply logical and structured knowledge representation techniques to model intelligent systems effectively.
- Apply knowledge inference and reasoning techniques, including rule-based systems, and Bayesian reasoning, fuzzy logic to support intelligent decision-making.
- Analyze the Artificial Neural Network models, including feed-forward networks and backpropagation learning algorithms, for solving pattern recognition and classification problems.
- Analyze machine learning paradigms, and classification, regression, and clustering techniques for developing intelligent applications

TEXT BOOKS

1. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education, Fourth Edition, 2020.
2. Ameet V Joshi, "Machine Learning and Artificial Intelligence", Springer Publications, 2020.

REFERENCES

1. John Paul Muller, Luca Massaron, "Machine Learning Dummies", Wiley Publications, 2021.
2. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", McGraw Hill, Third Edition, 2010.

E-RESOURCES

1. https://onlinecourses.nptel.ac.in/noc22_cs56/preview (Introduction to Machine Learning Techniques)
2. https://onlinecourses.nptel.ac.in/noc20_cs29/preview.(Introduction to Artificial intelligences





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Mapping of COs-POs & PSOs

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3	3	3	3	3	3	1	1	2	2	2	1	3	3	3
4	3	3	3	3	3	1	1	2	2	2	1	3	3	3
5	3	3	3	3	3	2	2	2	2	2	2	3	3	3
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AVG	3.0	3.0	3.0	2.6	3.0	1.3	1.3	1.6	1.6	1.6	1.3	2.8	3.0	3.0

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SEMESTER IV

23CSAT02

MACHINE LEARNING APPLICATIONS

L T P C

3 0 0 3

OBJECTIVES

- To enable students to understand the role of machine learning in the banking sector and financial services..
- To train students to apply machine learning techniques in communication, media, and entertainment applications.
- To Develop students' ability in analyzing machine learning applications in the education sector using learning analytics and educational data mining.
- To impart knowledge on the use of machine learning models in insurance industries for risk prediction and claim analysis.
- To foster students' skills in applying machine learning techniques in transportation systems and intelligent mobility solutions.

UNIT I MACHINES LEARNING IN BANKING

9

Why machine learning in banking sector, Use of AI in banking and finance, Fraud detection, Tough competition in banking industry, Risk modeling and investment banks, Customer data management, Decreased customer experience and loyalty, Personalized marketing, Role of machine learning: Challenges of banking sector and securities, Widely used machine learning algorithms in banking and security.

Problem-Solving Assignments:

1. Design a simple fraud detection model using classification techniques.
2. Analyze a bank customer dataset using ML algorithms.

UNIT II MACHINE LEARNING IN COMMUNICATION AND MEDIA

9

Machine learning in communication, media and entertainment, Usage of machine learning in media and entertainment industry, Machine learning techniques for customer sentiment analysis, Word embedding's, Sentiment analysis with long short term memory networks, Real-time analytics in communication, media and entertainment industries, Real time analytics and social media, Deep learning for social media analytics, Recommendations engines, Collaborative filtering, Memory based collaborative filtering, Model based collaborative filtering, Content based filtering, Hybrid recommendation systems., Summary of recommendation systems, Deep learning techniques on recommender systems.

Problem-Solving Assignments:

1. Implement sentiment analysis using sample social media data.





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2. Build a collaborative filtering recommendation system.

UNIT III MACHINE LEARNING IN EDUCATION

9

Advantages of machine learning in education, learning analytics, Academic analytics, Action research, Educational data mining, Recommender system, Personalized adaptive learning, Learning analytics process, Data environment: What? Stakeholders: Who? Methods: How? Case study: Sentimental analysis for student's feedback using ML, Recommender systems in education, Domain model, Learner model, Students classification algorithm, Recommendation model, Case study: Application of ML in predicting students' performance, Proposed methodology, Data description, Sample data sets, Visualization, Selection of machine learning technique.

Problem-Solving Assignments:

1. Develop a student performance prediction model.
2. Perform visualization and analysis using educational datasets.

UNIT IV MACHINE LEARNING IN INSURANCE INDUSTRIES

9

Importance of machine learning in insurance, Potential use cases of machine learning in insurance industry, Case study on insurance claim analysis using machine learning algorithms, Case study on using machine learning for insurance pricing optimization, Personalized marketing in insurance industry, Predictive model for insurance underwriting, Case study: Risk prediction in life insurance industry.

Problem-Solving Assignments:

1. Build a predictive model for insurance risk analysis.
2. Analyze insurance claim datasets using ML techniques.

UNIT V MACHINE LEARNING IN TRANSPORTATION

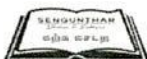
9

Introduction, Applications of ML and artificial intelligence in transportation, Applications of machine learning in transport, Incident detection, Predictive models, Application of AI in aviation and public transportation, Aviation, Shared mobility, Buses, Intelligent urban mobility, Autonomous vehicles, Autonomous transportation, Artificial intelligence use cases in logistics, Back office AI, Cognitive customs, Predictive logistics, Predictive risk management, Seeing thinking and speaking logistics operations, ML powered customer experience, Limitations of AI techniques in transportation, Computation complexity of AI algorithms.

Problem-Solving Assignments:

1. Develop a traffic prediction or incident detection model.
2. Analyze transportation datasets using predictive analytics.

TOTAL: 45 PERIODS





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OUTCOMES

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

- Apply machine learning concepts and their applications in the banking sector.
- Analyze the machine learning methods for real time data analytics in communication and media.
- Analyze machine learning applications in the education domain using learning analytics and educational data mining.
- Apply machine learning models for insurance data analysis, claim prediction, and risk assessment.
- Analyze machine learning-based solutions for transportation, logistics, and predictive decision-making applications.

TEXT BOOKS

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, "Machine Learning", Pearson Education, 2018.
2. S.Sridhar, M.Vijayalakshmi, "Machine Learning", Oxford University Press, 2018.

REFERENCES

1. Manaranjan Pradhan, U.Dinesh Kumar, "Machine Learning Using Python", Wiley, Publication, 2019.
2. Dr.R.Kumar, Mr.J.Jegan Amarnath, Dr.P.Visu, "Advanced Machine learning", Notion Press, 2020.

E-RESOURCES

1. <https://nptel.ac.in/courses/106106139>. (Machine Learning)
2. https://onlinecourses.nptel.ac.in/noc20_cs29/preview. (A brief introduction to Machine Learning)





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Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	3	3	3	2	1	2	2	2	2	3	3	3
2	3	3	3	3	3	2	1	2	2	2	1	3	3	3
3	3	3	3	3	3	2	1	2	2	2	1	3	3	3
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AVG	3.0	3.0	3.0	3.0	3.0	2.2	1.2	2.2	2.2	2.0	1.6	3.0	3.0	3.0

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


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OUTCOMES

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

- Explain the fundamentals of Artificial Intelligence, robot locomotion mechanisms, and different types of mobile robots.
- Analyze mobile robot kinematic models, motion constraints, and motion control techniques for robotic systems.
- Apply robot perception techniques using sensors, computer vision, and image processing for environmental sensing and recognition.
- Analyze the localization and mapping techniques for mobile robot navigation.
- Analyze the robot path planning and navigation strategies to enable autonomous operation in dynamic environments.

TEXT BOOKS

1. R. Siegwart, I. R. Nourbaksh, and D. Scaramuzza, "Introduction to Autonomous Mobile Robots", MIT Press, Second Edition, 2011.
2. Stuart Russel and Peter Norvig, "Artificial Intelligence: A Modern Approach", Pearson Education, Fourth Edition, 2020.

REFERENCES

1. R.Mittle, I.Nagrath, "Robotics and Control", McGraw Hill Education, 2017.
2. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, "Robotics: Modelling, Planning and Control", Springer, 2010.

E-RESOURCES

1. <https://nptel.ac.in/courses/112105249>. (Introduction to Robotics)
2. https://onlinecourses.nptel.ac.in/noc19_me71/preview (Fundamentals of Artificial Intelligences)





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1	3	3	3	2	3	1	1	1	1	1	-	2	3	3
2	3	3	3	3	3	1	1	2	2	2	1	3	3	3
3	3	3	3	3	3	2	2	2	2	2	1	3	3	3
4	3	3	3	3	3	2	2	2	2	2	1	3	3	3
5	3	3	3	3	3	3	2	2	3	2	2	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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23CSAE01

SEMESTER VI
DEEP LEARNING

L T P C
3 0 2 4

OBJECTIVES

- To familiarize the students with the fundamental concepts of deep neural networks and their mathematical foundations
- To provide knowledge of Convolutional Neural Networks (CNNs), architectures, and optimization methods for image and pattern recognition tasks.
- To teach the students about principles and working of Artificial Neural Networks (ANN).
- To enable students to understand data science fundamentals, data preprocessing, feature engineering, visualization, and their integration with deep learning techniques.
- To develop students' ability to design, implement, and evaluate deep learning models for solving real-world problems in Artificial Intelligence
- To provide Practical exposure in designing, implementing, and evaluating deep learning models and data analytics techniques for solving real-world applications.

UNIT I INTRODUCTION

9

Linear Algebra: Scalars - Vectors -- Matrices and tensors; Probability Distributions – Gradient based Optimization - Machine Learning Basics: Capacity - Overfitting and underfitting -Hyper parameters and validation sets - Estimators - Bias and variance- Stochastic gradient descent - Challenges motivating deep learning; Deep Networks: Deep feed forward networks; Regularization - Optimization.

Coding Practices:

1. Develop a program to model a problem environment and compute a solution using systematic state-space exploration.
2. Design a program to solve constrained or competitive problems and evaluate solution quality.

Problem-Solving Assignments:

1. Analyze alternative search strategies and evaluate efficiency and optimality.
2. Solve a constrained or adversarial decision-making problem and justify correctness.

UNIT II CONVOLUTIONAL NEURAL NETWORKS

9

Convolution Operation - Sparse Interactions - Parameter Sharing - Equivariance - Pooling - Convolution Variants: Strided - Tiled - Transposed and dilated convolutions; CNN Learning: Nonlinearity Functions- Loss Functions- Regularization-Optimizers-Gradient Computation.

Coding Practices:

1. Implement a reasoning mechanism to infer new knowledge and evaluate confidence.
2. Design a system that handles uncertainty using probabilistic or belief-based reasoning.





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Problem-Solving Assignments:

1. Apply logical reasoning to derive conclusions from given facts.
2. Solve decision-making problems under uncertainty using belief measures.

UNIT III DEEP LEARNING ALGORITHMS FOR ANN

9

Artificial Neural Networks- Linear Associative Networks - Perceptrons -The Back propagation Algorithm - Hopfield Nets - Boltzmann Machines - Deep RBMs - Variational Auto encoders – Deep Backprop Networks- Auto encoders.

Coding Practices:

1. Develop an evolutionary algorithm for optimization and evaluate iterative performance.
2. Compare sequential and parallel execution of evolutionary models.

Problem-Solving Assignments:

1. Formulate evolutionary solutions for optimization or pattern recognition problems.
2. Analyze the effect of learning and parallelization on computational efficiency.

UNIT IV DATA SCIENCE AND DEEP LEARNING

9

Data science fundamentals and responsibilities of a data scientist - life cycle of data science – Data science tools - Data modeling, and featurization - How to work with data variables and data science tools - How to visualize the data - How to work with machine learning algorithms and Artificial Neural Networks.

Coding Practices:

1. Implement FOIL or similar algorithms to derive general rules.
2. Test and refine learned rule sets on unseen data.

Problem-Solving Assignments:

1. Infer general rules from specific instances and justify reasoning.
2. Evaluate rule accuracy, generalization ability, and limitations.

UNIT V APPLICATIONS

9

Detection in chest X-ray images -object detection and classification -RGB and depth image fusion - NLP tasks - dimensionality estimation - time series forecasting -building electric power grid for controllable energy resources - guiding charities in maximizing donations and robotic control in industrial environments.

Coding Practices:

1. Develop a sequential prediction model using HMM.
2. Perform probabilistic inference in graphical models.

Problem-Solving Assignments:

1. Design probabilistic models for uncertain domains.
2. Update beliefs based on observed evidence and analyze inference accuracy.





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LIST OF EXPERIMENTS

1. Solve XOR problem using Multilayer perceptron.
2. Implement character and Digit Recognition using ANN.
3. Implement the analysis of X-ray image using auto encoders
4. Implement Speech Recognition using NLP
5. Develop a code to design object detection and classification for traffic analysis using CNN
6. Implement online fraud detection of share market data using any one of the data analytics tools.
7. Implement image augmentation using deep RBM.
8. Implement Sentiment Analysis using LSTM.

TOTAL:45+15=60 PERIODS

OUTCOMES

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

- Explain the mathematical foundations and deep feed-forward neural network concepts required for developing deep learning models.
- Analyze the Convolutional Neural Network (CNN) architectures, convolution operations, and optimization algorithms for image-based learning applications.
- Design Artificial Neural Network (ANN) models, including backpropagation, Hopfield networks, Boltzmann Machines, and Autoencoders for solving complex learning problems.
- Apply data science methodologies, data preprocessing, feature engineering, visualization techniques to prepare data for deep learning applications.
- Analyze the deep learning models for real-world applications for intelligent decision-making systems.
- Implement and evaluate deep learning models using ANN, CNN, LSTM, NLP, and data analytics techniques for image processing, sentiment analysis and other real-world AI applications

TEXT BOOKS

1. Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press, 2016.
2. Stone, James, "Artificial Intelligence Engines: A Tutorial Introduction to the Mathematics of Deep Learning", Sebtel Press, 2019.

REFERENCES

1. Vance, William, "Data Science: A Comprehensive Beginners Guide to Learn the Realms of





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Data Science", Joining the dots tv Limited, 2019.

2. Wani, M.A., Raj, B., Luo, F., Dou, D. (Eds.), "Deep Learning Applications", Springer Publications, 2022.

E-RESOURCES

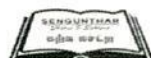
1. https://onlinecourses.nptel.ac.in/noc20_cs11/preview. (Deep Learning)
2. https://onlinecourses.nptel.ac.in/noc21_ge07/preview. (Neural Networks)

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	1	—	3	3	3
2	3	3	3	3	3	1	1	2	2	2	1	3	3	3
3	3	3	3	3	3	1	1	2	2	2	1	3	3	3
4	3	3	3	3	3	2	2	2	2	2	1	3	3	3
5	3	3	3	3	3	2	2	2	2	2	2	3	3	3
6	3	3	3	3	3	3	2	3	3	2	2	3	3	3
AVG	3.0	3.0	2.8	2.8	3.0	1.8	1.5	2.0	2.0	1.8	1.4	3.0	3.0	3.0

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


Chairman - BoS





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23CSAP01

**SEMESTER VII
PROJECT WORK**

**L T P C
0 0 12 6**

OBJECTIVES

- To train the students for gaining domain knowledge, and technical skills to solve potential business / research problems.
- To gather requirements and Design suitable software solutions and evaluate alternatives.
- To work in small teams and understand the processes and practices in the industry.
- To implement, test and deploy solutions for target platforms.
- To prepare project report and to face reviews and viva voce examination.

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 the project work , the students will be able to:

- Gain Domain knowledge and technical skill set required for solving industry /research problems
- Provide solution architecture, module level designs, algorithms.
- Implement, test and deploy the solution for the target platform Conduct an engineering project.
- Implement, test and deploy the solution for the target platform.
- Demonstrate the knowledge, skills and attitudes of a professional engineer.





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Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO
Mapping outcome	3	3	3	3	3	3	3	3	3	3	3	3	3

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


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CURRICULUM AND SYLLABI

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

MINOR DEGREE/HONOURS-ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CREDIT SUMMARY

B.E. COMPUTER SCIENCE AND ENGINEERING

Category	Credits Per Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
HS	–	–	–	–	–	–	–	–	–
BS	–	–	–	–	–	–	–	–	–
ES	–	–	–	–	–	–	–	–	–
PC	–	–	3	3	3	4	–	–	13
PE	–	–	–	–	–	–	–	–	–
OE	–	–	–	–	–	–	–	–	–
EEC	–	–	–	–	–	–	6	–	6
MC	–	–	–	–	–	–	–	–	–
Total	–	–	3	3	3	4	6	–	19





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CURRICULUM

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

(MINOR/HONOURS DEGREE- CYBER SECURITY)

Curriculum and Syllabi

B.E. – COMPUTER SCIENCE AND ENGINEERING

Course Code	Name of the Subject	Category	Periods / Week			Credit C	Maximum Marks		
			L	T	P		CIA	ESE	TOT
THEORY									
23CSCT01	Essentials of Information Security	PC	3	0	0	3	40	60	100
23CSCT02	Modern Crypto Systems	PC	3	0	0	3	40	60	100
23CSCT03	Cryptocurrency and Blockchain Technologies	PC	3	0	0	3	40	60	100
EMBEDDED COURSE									
23CSCE01	Cyber Crypto Systems	PC	3	0	2	4	50	50	100
EMBLOYABILITY ENHANCEMENT COURSE									
23CSCP01	Project Work	EEC	0	0	10	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





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23CSCT01

SEMESTER III ESSENTIALS OF INFORMATION SECURITY

L T P C
3 0 0 3

OBJECTIVES

- To Introduce the fundamental principles of information security, and the CIA triad.
- To Provide knowledge of modern cryptographic techniques and operational security practices for protecting information in various states.
- To Familiarize the students with physical security controls, network security mechanisms, and security tools used to safeguard information systems.
- To Enable students to understand operating system hardening, application security, and secure software development practices.
- To Develop students' understanding of information security auditing, governance, compliance frameworks for organizational security.

UNIT I THE CIA TRIAD

9

Confidentiality - Integrity & Availability - what is Information Security? Identification and Authentication- Authorization and Access Control - Auditing and Accountability.

UNIT II CRYPTOGRAPHY, OPERATIONS SECURITY

9

Modern Cryptography Tools- Protecting Data at rest-In motion- And In Use- Origins Of Operations Security- The Operations Security Process- Laws Of Operations Security-Operations Security in our Personal Lives.

UNIT III PHYSICAL SECURITY AND NETWORK SECURITY

9

Introduction- Physical Security Controls- Protecting People- Data and Equipment. Protecting Networks- Protecting Network Traffic- Network Security Tools.

UNIT IV OPERATING SYSTEM AND APPLICATION SECURITY

9

Operating System Hardening- Protecting Against Malware-Software Firewalls and Host Intrusion Detection - Operating System Security Tools - Software Development Vulnerabilities- Web Security- Database Security- Application Security Tools.

UNIT V INFORMATION SECURITY AUDIT AND GOVERNANCE

9

Change and Security Implications - System Models- Targets and Methods- Log Management- Data Aggregation and Reduction - Notifications and Reporting- Monitoring and Control Challenges- Auditing Standards- SAS 70 Audits- Sarbanes - Oxley - Addressing Multiple Regulations for Information Security Technical Frameworks for IT Audits - Intelligence and Compliance-Management and Governance.

TOTAL : 45 PERIODS





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OUTCOMES

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

- Explain the fundamental principles of information security, including the CIA triad, authentication, authorization, access control, auditing, and accountability.
- Apply cryptographic techniques and operational security principles to protect information during storage, transmission, and processing.
- Analyze physical and network security mechanisms, security controls, and protection tools to secure organizational infrastructure.
- Analyze operating system security, application security, malware protection, web security, and security tools to mitigate cyber threats.
- Analyze information security auditing, governance, compliance standards, monitoring techniques for maintaining secure information systems.

TEXT BOOKS

1. "Information Security Fundamentals" by IBM ICE Publications, 2016.
2. B.B.Gupta, D.P.Agrawal, Haoxiang Wang, "Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives", CRC Press, 2018.

REFERENCES

1. James Graham, Richard Howard and Ryan Otson, "Cyber Security Essentials, CRC Press.
2. Chwan- Hwa(john) Wu, J. David Irwin, "Introduction to Cyber Security", CRC Press T&F Group.

E- RESOURCES

1. <https://www.classcentral.com/course/swayam-introduction-to-cyber-security-14116> (Cyber Security)
2. <https://www.futurelearn.com/courses/introduction-to-cyber-security> (Introduction to Cyber Security)

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	2	1	3	2	2	2	3	3	3
2	3	3	3	3	3	2	1	3	2	2	2	3	3	3
3	3	3	3	3	3	3	2	3	2	2	2	3	3	3
4	3	3	3	3	3	3	2	3	2	2	2	3	3	3
5	3	3	3	3	3	3	2	3	2	3	3	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3.0	3.0	2.8	2.8	3.0	2.6	1.6	3.0	2.0	2.2	2.2	3.0	3.0	3.0

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





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SEMESTER IV

23CSCT02

MODERN CRYPTO SYSTEMS

L T P C
3 0 0 3

OBJECTIVES

- To Impart the fundamental concepts and principles of modern cryptography and cryptanalysis techniques
- To Provide knowledge of symmetric-key cryptographic algorithms, block and stream ciphers, and encryption techniques for ensuring data confidentiality.
- To Foster asymmetric cryptographic algorithms and secure key exchange mechanisms for secure communication.
- To Enable students to understand cryptographic hash functions, message authentication codes, and mechanisms for ensuring data integrity and authenticity.
- To Develop students' ability to understand secure hash algorithms, digital signature techniques, authentication protocols, and their applications in modern information security.

UNIT I INTRODUCTION TO CRYPTOGRAPHY

9

Overview Of Cryptography-Historical development-Basic terminology and concepts-Classical cryptosystems- Cryptanalysis techniques.

UNIT II SYMMETRIC-KEY CRYPTOGRAPHY

9

Definition – Substitution ciphers – Transposition ciphers - Stream and block ciphers - A5, RC4 - Characteristics of good ciphers - Data Encryption Standard (DES) – International Data Encryption Algorithm – Advanced Encryption Standard – Block cipher modes of operation – Confidentiality using symmetric encryption.

UNIT III ASYMMETRIC CRYPTOGRAPHY

9

Introduction to Public-Key Cryptography-RSA Cryptosystem-Diffie-Hellman Key Exchange-Elliptic Curve Cryptography (ECC)-Digital Signatures-Public-Key Infrastructure (PKI)-Applications of Asymmetric Cryptography.

UNIT IV HASH FUNCTIONS AND MESSAGE AUTHENTICATION CODES

9

Hash Functions and their Properties-Cryptographic Hash Functions-Applications of Hash Functions-HMAC (Hash-Based Message Authentication Code)-Security Properties of MACs-Applications of MACs in Network Security.





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UNIT V HASH AND DIGITAL SIGNATURES

9

MD5 Message Digest Algorithm – Secure Hash Algorithm (SHA) –RIPMED160 - HMAC - Digital Signatures – Authentication Protocols – Digital Signature Standard (DSS).

TOTAL : 45 PERIODS

OUTCOMES

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

- Explain the fundamental concepts, historical development, classical cryptosystems and cryptanalysis techniques in modern cryptography.
- Apply Symmetric-key cryptographic techniques, including DES, IDEA, AES, stream and block ciphers and block cipher modes of operation for ensuring confidentiality.
- Apply Asymmetric cryptographic algorithms such as RSA, Diffie–Hellman and Elliptic Curve Cryptography for secure communication and key management.
- Analyze Cryptographic hash functions and message authentication codes (MACs), including HMAC, for data integrity and authentication in network security.
- Analyze properties of cryptographic hash functions and digital signatures to ensure data security.

TEXT BOOKS

1. Wenbo Mao, "Modern Cryptography – Theory and Practice", Pearson Education, New Delhi, 2006.
2. William Stallings, "Cryptography and Network Security", Prentice Hall, New Delhi, 2006.

REFERENCES

1. Bernard Menezes, "Network Security and Cryptography", Cengage Learning, New Delhi, 2020.
2. Jonathan Katz, Yehuda Lindell, "Introduction to Modern Cryptography", Chapman & Hall/CRC, New York, 2017.

E – RESOURCES

1. [https://onlinecourses.nptel.ac.in/noc20_cs21/preview\(Introduction\)](https://onlinecourses.nptel.ac.in/noc20_cs21/preview(Introduction))
2. <http://nptel/cryptography-and-network-security.html>(Cipher Text)





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Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	3	3	2	3	3	1	1	3	2	2	1	3	3	3
2	3	3	3	3	3	2	1	3	2	2	2	3	3	3
3	3	3	3	3	3	2	1	3	2	2	2	3	3	3
4	3	3	3	3	3	2	2	3	2	2	2	3	3	3
5	3	3	3	3	3	2	2	3	2	3	2	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3.0	3.0	2.8	3.0	3.0	1.8	1.4	3.0	2.0	2.2	1.8	3.0	3.0	3.0

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


Chairman - BoS





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SEMESTER V

23CSCT03	CRYPTOCURRENCY AND BLOCKCHAIN TECHNOLOGIES	L T P C 3 0 0 3
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OBJECTIVES

- To Introduce the fundamental concepts, architecture, cryptographic principles, and data structures underlying in Blockchain technology.
- To Provide knowledge of cryptocurrencies, Bitcoin architecture, blockchain protocols, and consensus mechanisms used in decentralized systems.
- To Foster various blockchain models, permissioned and permissionless networks, and distributed ledger technologies.
- To Enable students to understand the architecture, components, and smart contract development of Hyperledger Fabric and Ethereum platforms.
- To Develop students' ability to analyze and apply blockchain technologies for developing secure decentralized applications.

UNIT I INTRODUCTION TO BLOCKCHAIN 9

Blockchain- Public Ledgers, Blockchain as Public Ledgers - Block in a Blockchain, Transactions- The Chain and the Longest Chain - Permissioned Model of Blockchain, Cryptographic -Hash Function, Properties of a hash function-Hash pointer and Merkle tree.

UNIT II BITCOIN AND CRYPTOCURRENCY 9

A basic crypto currency, Creation of coins, Payments and double spending, FORTH – the precursor for Bitcoin scripting, Bitcoin Scripts , Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay.

UNIT III BITCOIN CONSENSUS 9

Bitcoin Consensus, Proof of Work (PoW)- Hashcash PoW , Bitcoin PoW, Attacks on PoW, monopolyproblem- Proof of Stake- Proof of Burn - Proof of Elapsed Time - Bitcoin Miner, Mining Difficulty, Mining Pool-Permissioned model and use cases.

UNIT IV HYPERLEDGER FABRIC & ETHEREUM 9

Architecture of Hyperledger fabric v1.1- chain code- Ethereum: Ethereum network, EVM, Transaction fee, Mist Browser, Ether, Gas, Solidity.





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UNIT V BLOCKCHAIN APPLICATIONS

9

Smart contracts, Truffle Design and issue- DApps- NFT. Blockchain Applications in Supply Chain Management, Logistics, Smart Cities, Finance and Banking, Insurance, etc- Case Study.

TOTAL: 45 PERIODS

OUTCOMES

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

- Explain the architecture, cryptographic foundations, and data structures of Blockchain technology.
- Analyze the Bitcoin architecture, cryptocurrency concepts, blockchain protocols, and consensus algorithms for secure decentralized transactions.
- Analyze different blockchain consensus mechanisms, mining techniques, permissioned blockchain models, and their applications in distributed systems.
- Analyze Hyperledger Fabric, Ethereum, and smart contracts to implement blockchain solutions for decentralized application development.
- Design blockchain-based solutions for real-world applications such as supply chain management, finance, banking, insurance, logistics, smart cities, and other decentralized systems.

TEXT BOOKS

1. Bashir and Imran, "Mastering Blockchain", Second Edition, 2017.
2. Andreas Antonopoulos, "Mastering Bitcoin: Unlocking Digital Cryptocurrencies", O'Reilly, 2019.

REFERENCES

1. Daniel Drescher, "Blockchain Basics", Apress, First Edition, 2017.
2. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. "Bitcoin and cryptocurrency technologies: a comprehensive introduction", Princeton University Press, 2016.

E- RESOURCES

1. [https://onlinecourses.nptel.ac.in/noc22_cs44/preview\(Blockchain and its applications\)](https://onlinecourses.nptel.ac.in/noc22_cs44/preview(Blockchain%20and%20its%20applications))
2. <https://archive.nptel.ac.in/courses/106/105/106105184> (Blockchain architecture and use)





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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	2	2	2	1	3	3	3
2	3	3	3	3	3	2	1	3	2	2	2	3	3	3
3	3	3	3	3	3	2	2	3	2	2	2	3	3	3
4	3	3	3	3	3	2	1	3	3	2	2	3	3	3
5	3	3	3	3	3	3	2	3	3	3	3	3	3	3
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3.0	3.0	2.8	2.8	3.0	2.0	1.4	2.8	2.4	2.2	2.0	3.0	3.0	3.0

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


Chairman - BoS





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23CSCE01

SEMESTER VI CYBER CRYPTO SYSTEMS

L T P C
3 0 2 4

OBJECTIVES

- To Introduce the fundamentals of cyber space, cybercrime, digital forensics for investigating digital incidents.
- To Provide knowledge of digital forensic investigation methodologies, evidence acquisition techniques, file systems, and forensic analysis procedures.
- To Foster the knowledge of digital evidence collection, preservation, forensic standards, chain of custody, and the use of forensic tools for cybercrime investigations.
- To Enable students to understand cyber laws, ethical practices, legal frameworks, and reporting standards applicable to digital investigations.
- To Develop students' skills in using digital forensic tools, forensic imaging techniques to investigate cyber incidents
- To provide practical exposure on digital forensic investigation, evidence acquisition, cybercrime analysis, forensic tools and techniques for investigating and validating real-world cyber incidents.

UNIT I INTRODUCTION TO FORENSICS

9

Classifications of Cyber Crimes against individuals - property and nation - Need for Digital forensics and steps in digital forensics (scientific methods) - Number System: Binary - Decimal- Hexadecimal - ASCII and Unicode representation of data - Arenas for digital forensics: disk-network- wireless - database- mobile - e-mail - GPS and memory - Incident handling and response with forensic triage - Ethical Hacking and future of cyber crime.

UNIT II INVESTIGATION

9

Locard's exchange principle and digital forensic investigation models - types: artifacts - identifying raw and proprietary forensic storage formats - identification of potential evidence: slack space - swap space - steganography - recovery of hidden - deleted and corrupt data - standard file formats with their headers and forensic file carving - planning your investigation - order of volatility and forensic triage - overview of file systems.

UNIT III EVIDENCE COLLECTION AND FORENSIC TOOLS

9

Rules of collecting Digital Evidence - Standard collection procedures: seizure - write blockers - bit-stream imaging - hashing - Chain of Custody (COC) - evidence bags and SOP for collecting





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evidences - Source and Location of Digital Evidences - Duplicating and Preserving Digital Evidences - Importance of MAC timings -Types of System logs and Windows Registry

UNIT IV CYBER LAWS

9

Forensic laboratory requirements: setting up of lab - evaluating lab staff - selection of appropriate forensic workstations - backup and recovery plans - generating forensically sound reports. - IPR and Cyber Laws in India - IT Act 2000 and 2008 Amendment and like - minded IPC sections, Code of Ethics - Expert Witness and analyzing sample forensic reports.

UNIT V ANALYSIS AND VALIDATION

9

Validating and gathering evidence using DOS Commands and Unix/Linux Commands - Forensic imaging using DD commands - Software tools - Open Source and proprietary digital forensic frameworks - Hardware tools - write blockers - images and evidence protection containers/bags - NIST tools - CFReDS - CTFF and NSRL and analyzing e-mail headers and network packets.

LIST OF EXPERIMENTS

1. Recovering Graphics Files
2. Digital Forensics Analysis and Validation
3. Virtual Machine Forensics
4. Live Acquisitions, and Network Forensics
5. Email/Social Media Investigations
6. Mobile Device Forensics
7. Disk Forensics and Data Recovery
8. Steganography
9. Key loggers
10. Network monitors

TOTAL : 45+15=60 PERIODS

OUTCOMES

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

- Implementation of various computer forensic tools in real time applications.
- Explain the concepts of cybercrime, digital forensics, cyber forensics and forensic investigation techniques.
- Analyze and perform digital forensic investigations, and examining digital evidence using standard forensic methodologies.
- Apply forensic tools, evidence collection procedures, chain of custody practices, and forensic analysis techniques to investigate cybercrime incidents.





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- Analyze cyber laws, ethical guidelines, legal procedures, and reporting standards related to digital forensic investigations.
- Examine the digital forensic tools and frameworks to perform disk, memory, mobile, email, network, and malware investigations for real-world cyber security applications.
- Implement cyber forensics techniques to analyze, validate digital evidences for investigating computer, network, mobile, email, and cybercrime incidents in real-world environments.

TEXT BOOKS

1. E. Casey, "Handbook of Digital Forensics and Investigation", Academic Press, 2010.
2. David Cowen, "Computer Forensics: A Beginners Guide", McGraw Hill Education, 2013.

REFERENCES

1. Bill Nelson, Amelia Phillips, Christopher Steuart, "Guide to Computer Forensics and Investigations", Fourth Edition, 2014.
2. Brian Carrier, "File System Forensic Analysis", Pearson, 2016.
3. Marjorie T. Britz, "Computer Forensics and Cyber Crime", Pearson, 2018.

E- RESOURCES

1. https://onlinecourses.swayam2.ac.in/cec21_ge10/preview (Digital Forensics)
2. https://onlinecourses.swayam2.ac.in/cec22_lw07/preview/ (Cyber Crime Administration)

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	3	1	1	2	2	2	1	3	3	3
2	3	3	2	2	2	2	1	3	2	2	1	3	3	3
3	3	3	3	3	3	3	1	3	2	2	2	3	3	3
4	3	3	3	3	3	3	2	3	3	2	2	3	3	3
5	3	3	2	3	3	3	1	3	2	3	3	3	3	3
6	3	3	3	3	3	3	2	3	3	2	2	3	3	3
AVG	3.0	2.8	2.5	2.7	2.8	2.5	1.3	2.8	2.3	2.2	1.8	3.0	3.0	3.0

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

Chairman - BoS





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TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU



23CSCP01

SEMESTER VII PROJECT WORK

LT PC
0 0 12 6

OBJECTIVES

- To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
- To utilize new tools, algorithms and mechanisms that contribute to obtain the solution.
- To test and validate the results obtained through conformance.
- To prepare project report and to face reviews and viva voce examination.
- To develop the ability to take up the challenging practical problems.

GUIDELINES

The students in a group of 3 to 4 works on a topic approved by the Head of the Department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor. The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester. The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 180 PERIODS

OUTCOMES

On Completion of the project work, the students will be able to:

- Develop the ability to solve a specific problem till the successful solution of the same.
- Utilize new tools, algorithms and mechanisms that contribute to obtain the solution.
- Test and validate the results obtained through conformance.
- Prepare project report and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.





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Mapping of COs-POs & PSOs

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
Mapping outcome	3	3	3	3	3	3	3	3	3	3	3	3	3

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


Chairman - BoS





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CURRICULUM AND SYLLABI FOR B.E. / B.Tech. DEGREE PROGRAMMES MINOR DEGREE/HONOURS-CYBER SECURITY CREDIT SUMMARY

B.E. COMPUTER SCIENCE AND ENGINEERING

Category	Credits Per Semester								Credit Total
	I	II	III	IV	V	VI	VII	VIII	
HS	-	-	-	-	-	-	-	-	-
BS	-	-	-	-	-	-	-	-	-
ES	-	-	-	-	-	-	-	-	-
PC	-	-	3	3	3	4	-	-	13
PE	-	-	-	-	-	-	-	-	-
OE	-	-	-	-	-	-	-	-	-
EEC	-	-	-	-	-	-	6	-	6
MC	-	-	-	-	-	-	-	-	-
Total	-	-	3	3	3	4	6	-	19

