

K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215

(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(REGULATIONS 2020)

Vision of the Institution

IV We envision to achieve status as an excellent Educational Institution in the global knowledge hub, making self-learners, experts, ethical and responsible engineers, technologists, scientists, managers, administrators and entrepreneurs who will significantly contribute to research and environment friendly sustainable growth of the nation and the world.

Mission of the Institution

IM 1 To inculcate in the students self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, administrators and entrepreneurs by diligently imparting the best of education, nurturing environmental and social needs.

IM 2 To foster and maintain mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research and innovation.

Vision of the Department

DV To create ever green professionals for software industry, academicians for knowledge cultivation and researchers for contemporary society modernization.

Mission of the Department

DM 1 To produce proficient design, code and system engineers for software development.

DM 2 To keep updated contemporary technology and fore coming challenges for welfare of the society.

Programme Educational Objectives (PEOs)

The graduates of the programme will be able to


PEO 1 Rational Computing: Figure out, formulate, analyze typical problems and develop effective solutions by imparting the idea and principles of science, mathematics, engineering fundamentals and computing.

PEO 2 Professional Excellence: Competent professionally and successful in their chosen career through life-long learning.

PEO 3 Social and Ethical Technocrats: Excel individually or as member of a team in carrying out projects and exhibit social needs and follow professional ethics.


Programme Outcomes (POs)

Program Outcomes (POs)	
PO1	Engineering Graduates will be able to: 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 modelling 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 Outcomes (PSOs)	
PSO1	Technical competency: Develop and Implement computer solutions that accomplish goals to the industry, government or research by exploring new technologies.
PSO2	Professional awareness: Grow intellectually and professionally in the chosen field.


		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215					CURRICULUM UG R - 2020			
Department		Department of Computer Science and Engineering								
Programme		B.E - Computer Science and Engineering								
SEMESTER – I										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20EN151	Technical English – I (Common To All Branches)	HSMC	2	0	1	3	30	70	100
2.	20MA151	Engineering Mathematics – I (Common To All Branches)	BSC	3	1	0	4	30	70	100
3.	20CH051	Engineering Chemistry (Common To All Branches)	BSC	3	0	0	3	30	70	100
4.	20EE041	Basics of Electrical and Electronics Engineering (Common To AU,CE,CS,IT,ME & SF)	ESC	3	0	0	3	30	70	100
5.	20CS111	Problem Solving Techniques	ESC	3	0	0	3	30	70	100
MANDATORY COURSES										
6.	20MC151	Induction Program* (Common To All Branches)	MC	0	0	0	0	-	-	-
PRACTICAL										
7.	20CH028	Chemistry Laboratory (Common To All Branches)	BSC	0	0	3	1	50	50	100
8.	20CS121	Problem Solving Techniques Laboratory	ESC	0	0	3	1	50	50	100
9.	20AU127	Engineering Graphics Laboratory (Common To CE,CS,EC,EE &IT)	ESC	0	0	3	1	50	50	100
Total				17	1	10	19	800		

* Induction Program will be conducted for as per AICTE guidelines.


SEMESTER – II										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20EN251	Technical English – II (Common To All Branches)	HSMC	2	0	1	3	30	70	100
2.	20MA232	Discrete Mathematics (Common to CS & IT)	BSC	3	1	0	4	30	70	100
3.	20PH051	Engineering Physics (Common To All Branches)	BSC	3	0	0	3	30	70	100
4.	20EE231	Digital principles and Computer Design	ESC	3	0	0	3	30	70	100
5.	20CS211	C Programming	PCC	3	0	0	3	30	70	100
MANDATORY COURSES										
6.	20MC052	Environmental Science and Engineering (Common To All Branches)	MC	3	0	0	0	-	-	-
PRACTICAL										
7.	20PH028	Physics Laboratory (Common To All Branches)	BSC	0	0	3	1	50	50	100
8.	20EE225	Digital Systems Laboratory	ESC	0	0	3	1	50	50	100
9.	20CS221	C Programming Laboratory	PCC	0	0	3	1	50	50	100
10.	20GE028	Manufacturing Practices Laboratory (Common To All Branches)	ESC	0	0	3	1	50	50	100
Total				17	1	13	20	900		

		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215						CURRICULUM UG R - 2020		
Department		Department of Computer Science and Engineering								
Programme		B.E - Computer Science and Engineering								
SEMESTER – III										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit C	Maximum Marks		
				L	T	P		CA	ES	Total
THEORY										
1.	20MA343	Numerical Computational Techniques (Common to CS & IT)	BSC	3	1	0	4	30	70	100
2.	20CS311	Python Programming	PCC	3	0	0	3	30	70	100
3.	20CS312	Data Structures	PCC	3	0	0	3	30	70	100
4.	20CS313	Operating systems	PCC	3	0	0	3	30	70	100
5.	20CS314	Computer Organization and Architecture	PCC	3	0	0	3	30	70	100
6.	20CS315	Software Engineering	PCC	3	0	0	3	30	70	100
PRACTICAL										
7.	20CS321	Python Programming Laboratory	PCC	0	0	3	1	50	50	100
8.	20CS322	Data Structures Laboratory	PCC	0	0	3	1	50	50	100
9.	20CS323	Operating Systems Laboratory	PCC	0	0	3	1	50	50	100
10.	20HR351	Career Development Skills I (Common To All Branches)	EEC	0	2	0	0	50	50	100
Total				18	3	9	22	1000		


SEMESTER – IV										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit C	Maximum Marks		
				L	T	P		CA	ES	Total
THEORY										
1.	20MA441	Probability and Decision Models (Common to CS & IT)	BSC	3	1	0	4	30	70	100
2.	20CS411	Theory of Computation	PCC	3	1	0	4	30	70	100
3.	20CS412	Java programming	PCC	3	0	0	3	30	70	100
4.	20CS413	Database Management Systems	PCC	3	0	0	3	30	70	100
5.	20CS414	Design and Analysis of Algorithms	PCC	3	1	0	4	30	70	100
6.	20EE431	Microprocessors and Microcontrollers	ESC	3	0	0	3	30	70	100
PRACTICAL										
7.	20CS421	Java programming Laboratory	PCC	0	0	3	1	50	50	100
8.	20CS422	Database Management Systems Laboratory	PCC	0	0	3	1	50	50	100
9.	20EE425	Microprocessors and Microcontrollers Laboratory	ESC	0	0	3	1	50	50	100
10.	20HR532	Career Development Skills II	EEC	0	2	0	0	50	50	100
Total				18	5	9	24	1000		

		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215					CURRICULUM UG R - 2020			
Department		Department of Computer Science and Engineering								
Programme		B.E - Computer Science and Engineering								
SEMESTER – V										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20CS511	Principles of Compiler Design	PCC	3	1	0	4	30	70	100
2.	20CS512	Web Programming	PCC	3	0	0	3	30	70	100
3.	20CS513	Object Oriented Analysis and Design	PCC	3	0	0	3	30	70	100
4.	20CS514	Computer Networks	PCC	3	0	0	3	30	70	100
5.	20CS515	Entrepreneurship Development	HSMC	3	0	0	3	30	70	100
6.		Professional Elective – I	PEC	3	0	0	3	30	70	100
PRACTICAL										
7.	20CS521	Web Programming Laboratory	PCC	0	0	3	1	50	50	100
8.	20CS522	Computer Networks Laboratory	PCC	0	0	3	1	50	50	100
9.	20HR533	Career Development Skills III	EEC	0	2	0	0	50	50	100
Total				18	3	6	21	900		

SEMESTER – VI										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20HS051	Universal human values and understanding harmonics (Common To All Branches)	HSMC	3	0	0	3	30	70	100
2.	20CS601	.Net Framework Technologies (Common To CS & EC)	PCC	3	0	0	3	30	70	100
3.	20CS611	Cryptography and Network Security	PCC	3	0	0	3	30	70	100
4.	20CS612	Software testing	PCC	3	0	0	3	30	70	100
5.		Professional Elective – II	PEC	3	0	0	3	30	70	100
6.		Open Elective – I	OEC	3	0	0	3	30	70	100
PRACTICAL										
7.	20CS621	.Net Framework Technologies Laboratory	PCC	0	0	3	1	50	50	100
8.	20CS622	Mini project	PROJ	0	0	6	3	50	50	100
9.	20HR634	Career Development Skills IV	EEC	0	2	0	0	50	50	100
Total				18	2	9	22	900		

		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215						CURRICULUM UG R - 2020		
Department		Department of Computer Science and Engineering								
Programme		B.E - Computer Science and Engineering								
SEMESTER - VII										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20CS711	Mobile Computing	PCC	3	0	0	3	30	70	100
2.	20CS712	Graphics and Multimedia	PCC	3	0	0	3	30	70	100
3.	20CS713	Cloud and Big Data Analytics	PCC	3	0	0	3	30	70	100
4.		Professional Elective – III	PEC	3	0	0	3	30	70	100
5.		Professional Elective – IV	PEC	3	0	0	3	30	70	100
6.		Open Elective – II	OEC	3	0	0	3	30	70	100
PRACTICAL										
7.	20CS721	Graphics and Multimedia Laboratory	PCC	0	0	3	1	50	50	100
8.	20CS722	Cloud and Big Data Laboratory	PCC	0	0	3	1	50	50	100
Total				18	0	6	20	800		

SEMESTER - VIII										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.		Professional Elective – V	PEC	3	0	0	3	30	70	100
2.		Open Elective – III	OEC	3	0	0	3	30	70	100
PRACTICAL										
3.	20CS821	Project Work	PROJ	0	0	12	6	50	50	100
Total				6	0	12	12	300		

		K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215							CURRICULUM UG R - 2020		
Department		Department of Computer Science and Engineering									
Programme		B.E -Computer Science and Engineering									
List of Electives											
PROFESSIONAL ELECTIVE - I (SEMESTER - V)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20CS561	Distributed Systems	S4	PEC	3	0	0	3	30	70	100
2.	20IE591	Augmented Intelligence led Managed Services – I (Industry Elective)	S1	PEC	3	0	0	3	30	70	100
3.	20CS563	Data Warehousing and Data Mining	S2	PEC	3	0	0	3	30	70	100
4.	20CS564	Open Source Technologies	S1	PEC	3	0	0	3	30	70	100
5.	20CS565	Advanced Database Technology	S2	PEC	3	0	0	3	30	70	100
6.	20CS566	Artificial Intelligence and Expert Systems	S4	PEC	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVE - II (SEMESTER - VI)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20CS661	Green computing	S4	PEC	3	0	0	3	30	70	100
2.		Augmented Intelligence led Managed Services – II (Industry Elective)	S1	PEC	3	0	0	3	30	70	100
3.	20CS663	Internet of Things	S2	PEC	3	0	0	3	30	70	100
4.	20CS664	Mobile Application Development	S2	PEC	3	0	0	3	30	70	100
5.	20CS665	Application Frameworks	S1	PEC	3	0	0	3	30	70	100
6.	20CS666	High Speed Networks	S3	PEC	3	0	3	3	30	70	100

PROFESSIONAL ELECTIVE – III (SEMESTER - VII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20CS761	Information Security	S3	PEC	3	0	0	3	30	70	100
2.	20CS762	Social network analysis	S3	PEC	3	0	0	3	30	70	100
3.	20CS763	Agile Software Development	S4	PEC	3	0	0	3	30	70	100
4.	20CS764	User Interface Design	S2	PEC	3	0	0	3	30	70	100
5.	20CS765	Business Intelligence	S2	PEC	3	0	0	3	30	70	100
6.	20CS766	Soft Computing	S1	PEC	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVE – IV (SEMESTER – VII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20CS767	Service Oriented Architecture	S4	PEC	3	0	0	3	30	70	100
2.	20CS768	Cyber Security	S3	PEC	3	0	0	3	30	70	100
3.	20CS769	Software Defined Networks	S3	PEC	3	0	0	3	30	70	100
4.	20CS771	Information storage management	S2	PEC	3	0	0	3	30	70	100
5.	20CS772	Machine Learning Techniques	S4	PEC	3	0	0	3	30	70	100
6.	20CS773	Data science	S2	PEC	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVE – V (SEMESTER – VIII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20CS861	Blockchain Technologies	S1	PEC	3	0	0	3	30	70	100
2.	20CS862	Ethical Hacking	S3	PEC	3	0	0	3	30	70	100
3.	20CS863	Software Project Management	S5	PEC	3	0	0	3	30	70	100
4.	20CS864	Knowledge Based Decision Support System	S5	PEC	3	0	0	3	30	70	100
5.	20CS865	Pervasive Computing	S1	PEC	3	0	0	3	30	70	100
6.	20CS866	Ad hoc and Sensor Networks	S3	PEC	3	0	0	3	30	70	100

OPEN ELECTIVE COURSES

Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
Automobile Engineering											
1.	20AU901	Basics of Automobile Engineering	AE	OEC	3	0	0	3	30	70	100
2.	20AU902	Automotive Engine Technology	AE	OEC	3	0	0	3	30	70	100
3.	20AU903	Automotive Vehicle Technology	AE	OEC	3	0	0	3	30	70	100
4.	20AU904	Automotive Safety	AE	OEC	3	0	0	3	30	70	100
5.	20AU905	Hybrid Vehicles	AE	OEC	3	0	0	3	30	70	100
6.	20AU906	Off Highway Vehicles	AE	OEC	3	0	0	3	30	70	100
7.	20AU907	Modern and Intelligent Vehicle System	AE	OEC	3	0	0	3	30	70	100
8.	20AU908	Vehicle Maintenance	AE	OEC	3	0	0	3	30	70	100
CIVIL ENGINEERING											
9.	20CE901	Architectural Heritage of India	CE	OEC	3	0	0	3	30	70	100
10.	20CE902	Building Planning and Construction	CE	OEC	3	0	0	3	30	70	100
11.	20CE903	Elementary Civil Engineering	CE	OEC	3	0	0	3	30	70	100
12.	20CE904	Energy and Environment	CE	OEC	3	0	0	3	30	70	100
13.	20CE905	Environmental Laws and Policies	CE	OEC	3	0	0	3	30	70	100
14.	20CE906	Global Warming and Climate Change	CE	OEC	3	0	0	3	30	70	100
15.	20CE907	Introduction to Disaster Management and Mitigation	CE	OEC	3	0	0	3	30	70	100
16.	20CE908	Introduction to Earthquake Engineering	CE	OEC	3	0	0	3	30	70	100
17.	20CE909	Solid Waste Management	CE	OEC	3	0	0	3	30	70	100
18.	20CE910	Water and Air Pollution Management	CE	OEC	3	0	0	3	30	70	100
Computer Science and Engineering											
19.	20CS901	Programming in Java	CSE	OEC	3	0	0	3	30	70	100

Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
20.	20CS902	Basic concepts of Data Structure	CSE	OEC	3	0	0	3	30	70	100
21.	20CS903	Fundamentals of Database Concepts	CSE	OEC	3	0	0	3	30	70	100
22.	20CS904	Internet Programming	CSE	OEC	3	0	0	3	30	70	100
23.	20CS905	Fundamentals of Mobile Application Development	CSE	OEC	3	0	0	3	30	70	100
24.	20CS906	Principles of Ethical Hacking	CSE	OEC	3	0	0	3	30	70	100
25.	20CS907	Green Technology	CSE	OEC	3	0	0	3	30	70	100
26.	20CS908	Artificial Intelligence and Robotics	CSE	OEC	3	0	0	3	30	70	100
27.	20CS909	Big Data and Analytics	CSE	OEC	3	0	0	0	30	70	100
28.	20CS910	Hardware and Trouble Shooting	CSE	OEC	3	0	0	3	30	70	100
Electrical and Electronics Engineering											
29.	20EE901	Electrical Drives and Control	EE	OEC	3	0	0	3	30	70	100
30.	20EE902	Power Semiconductor Devices	EE	OEC	3	0	0	3	30	70	100
31.	20EE903	Electrical Power Generation Systems	EE	OEC	3	0	0	3	30	70	100
32.	20EE904	Control Engineering	EE	OEC	3	0	0	3	30	70	100
33.	20EE905	Industrial Automation	EE	OEC	3	0	0	3	30	70	100
34.	20EE906	Electrical Instruments and Measurements	EE	OEC	3	0	0	3	30	70	100
35.	20EE907	Energy Conservation and Management	EE	OEC	3	0	0	3	30	70	100
36.	20EE908	Electrical Wiring, Estimation and Costing	EE	OEC	3	0	0	3	30	70	100
37.	20EE909	Fundamentals of Electrical Machinery	EE	OEC	3	0	0	3	30	70	100
38.	20EE910	Principles of Soft Computing Techniques	EE	OEC	3	0	0	3	30	70	100
39.	20EE911	Embedded System Technology	EE	OEC	3	0	0	3	30	70	100
Electronics and Communication Engineering											

Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
40.	20EC901	Basics of Medical Electronics	EC	OEC	3	0	0	3	30	70	100
41.	20EC902	NANO Technology	EC	OEC	3	0	0	3	30	70	100
42.	20EC903	Electronics and Microprocessor	EC	OEC	3	0	0	3	30	70	100
43.	20EC904	Analog and Digital Communication	EC	OEC	3	0	0	3	30	70	100
44.	20EC905	Principles of Communication	EC	OEC	3	0	0	3	30	70	100
45.	20EC906	Fundamentals of Robotics	EC	OEC	3	0	0	3	30	70	100
46.	20EC907	Internet of Things Sensing and Actuator Devices	EC	OEC	3	0	0	3	30	70	100
47.	20EC908	Consumer Electronics	EC	OEC	3	0	0	3	30	70	100
Information Technology											
48.	20IT901	Data Science using R	IT	OEC	3	0	0	3	30	70	100
49.	20IT902	Principles of Cyber Security	IT	OEC	3	0	0	3	30	70	100
50.	20IT903	Fundamentals of Business Intelligence	IT	OEC	3	0	0	3	30	70	100
51.	20IT904	Blockchain Technologies	IT	OEC	3	0	0	3	30	70	100
52.	20IT905	Internet of Things and Applications	IT	OEC	3	0	0	3	30	70	100
53.	20IT906	Principles of Software Testing	IT	OEC	3	0	0	3	30	70	100
54.	20IT907	Foundation Skills in Logic Building	IT	OEC	3	0	0	3	30	70	100
55.	20IT908	Principles of Cloud Computing	IT	OEC	3	0	0	3	30	70	100
56.	20IT909	Open Source Technologies	IT	OEC	3	0	0	3	30	70	100
57.	20IT910	Principles of Software Engineering	IT	OEC	3	0	0	3	30	70	100
Mechanical Engineering											
58.	20ME901	Basic Mechanical Engineering	ME	OEC	3	0	0	3	30	70	100
59.	20ME902	Solar Energy Utilization	ME	OEC	3	0	0	3	30	70	100
60.	20ME903	Production Technology of Agricultural Machinery	ME	OEC	3	0	0	3	30	70	100
61.	20ME904	Selection of Materials	ME	OEC	3	0	0	3	30	70	100
62.	20ME905	Marine Vehicles	ME	OEC	3	0	0	3	30	70	100

B.E. – Computer Science and Engineering

Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
63.	20ME906	Sensors and Transducers	ME	OEC	3	0	0	3	30	70	100
64.	20ME907	Energy Auditing	ME	OEC	3	0	0	3	30	70	100
65.	20ME908	Fiber Reinforced Plastics	ME	OEC	3	0	0	3	30	70	100
66.	20ME909	Lean Manufacturing	ME	OEC	3	0	0	3	30	70	100
67.	20ME910	Surface Engineering	ME	OEC	3	0	0	3	30	70	100
Safety and Fire Engineering											
68.	20SF901	Occupational Health and Hygiene	SF	OEC	3	0	0	3	30	70	100
69.	20SF902	Construction Safety	SF	OEC	3	0	0	3	30	70	100
70.	20SF903	Building Fire Safety	SF	OEC	3	0	0	3	30	70	100
71.	20SF904	Safety in Electrical Engineering	SF	OEC	3	0	0	3	30	70	100
72.	20SF905	Legal Aspects of Safety	SF	OEC	3	0	0	3	30	70	100
73.	20SF906	Safety in Industries	SF	OEC	3	0	0	3	30	70	100
74.	20SF907	Food Safety	SF	OEC	3	0	0	3	30	70	100
75.	20SF908	Safety Management and its Principles	SF	OEC	3	0	0	3	30	70	100
76.	20SF909	Safety in Automobile Engineering	SF	OEC	3	0	0	3	30	70	100
77.	20SF910	Safety in Transportation	SF	OEC	3	0	0	3	30	70	100
Science and Humanities											
78.	20SH901	Applications of Statistics	FYA	OEC	3	0	0	3	30	70	100
79.	20SH902	Combinatorics and Graph Theory	FYA	OEC	3	0	0	3	30	70	100
80.	20SH903	Optimization Techniques	FYA	OEC	3	0	0	3	30	70	100
81.	20SH904	Basic Military Education and Training	FYA	OEC	3	0	0	3	30	70	100
82.	20SH905	Professional Communication	FYA	OEC	3	0	0	3	30	70	100
83.	20SH906	Fundamentals of Nanoscience and Technology	FYA	OEC	3	0	0	3	30	70	100

B.E. – Computer Science and Engineering

S1 - Recent Technologies and Computing

S3 - Computer Networks and Security

S5 - Entrepreneurship and Managerial Skills

S2 - Data and Knowledge Engineering

S4 - Systems and Software Engineering

LIST OF VALUE ADDED COURSES

Sl. No.	Course Name	Number of Hours	Offered by Internal / External
1	Business English Certification	45 Hours /12 Weeks	Internal / External
2	Other Linguistic Learning like German , Japanese , etc.,	45 Hours /12 Weeks	Internal / External
3	Student Internship Program	45 Hours /12 Weeks	Internal / External
4	Online courses on Coursera, Edx, Udemy	45 Hours /12 Weeks	Internal / External
5	Online Placement Aptitude on Nasscomnac-tech, I-pat.	45 Hours /12 Weeks	Internal/ External
6	Hands-on Training on Network Simulation Tools like NS3 etc.,	45 Hours /12 Weeks	Internal / External
7	Hands-on Training on Data Mining Tools like weka etc.,	45 Hours /12 Weeks	Internal / External
8	Online courses NPTEL / Swayam	45 Hours /12 Weeks	Internal / External

COURSE COMPONENT SUMMARY

S. No.	Subject Area	Credits Per Semester								Credits Total	Percentage Credits
		I	II	III	IV	V	VI	VII	VIII		
1.	HSMC	3	3	-	-	3	3	-	-	12	7.5
2.	BSC	8	8	4	4	-	-	-	-	24	15
3.	ESC	8	5	-	4	-	-	-	-	17	10.62
4.	PCC	-	4	18	16	15	10	11	-	74	46.25
5.	PEC	-	-	-	-	3	3	6	3	15	9.3
6.	OEC	-	-	-	-	-	3	3	3	9	5.62
7.	PROJ	-	-	-	-	-	3	-	6	9	5.62
TOTAL		19	20	22	24	21	22	20	12	160	100

HSMC - Humanities and Social Sciences including Management courses

BSC - Basic Science Courses

ESC - Engineering Science Courses

PCC - Professional core courses

PEC- Professional Elective courses

OEC - Open Elective courses

MC - Mandatory courses

PROJ - Project

Total No. of Credits = 160

SEMESTER - I**20EN151****TECHNICAL ENGLISH – I**

(Common to All Branches)

L	T	P	C
2	0	1	3

Prerequisite: No prerequisites are needed for enrolling into the course**Course Outcomes :** On Completion of this course, the student will be able to**Cognitive Level**

CO1: Comprehend and apply Grammar in context for professional communication

Understand

CO2: Infer the gist and specific information.

Apply

CO3: Discuss, express and interact in the society and place of study.

Create

CO4: Critically interpret and comprehend a given text.

Evaluate

CO5: Prioritize the listening skills for academic and professional purposes.

Apply

UNIT – I**[9]**

Synonyms & Antonyms – Use of Modal Auxiliaries – Infinitive and Gerund – Parts of Speech – Intensive Reading – Predicting Content – Interpretation – Active Listening – Listening for the main idea – Need based Correspondence (request for joining hostel, bonafide certificate) – Self Introduction – Introducing others

UNIT– II**[9]**

British & American Terminology – Tenses (Simple Present, Present Continuous, Present Perfect, Simple Past, and Simple Future) – Predicting Content – Drawing inferences – Listening for specific details – Listening to News – Job Application and Resume – Writing Instructions – Delivering Welcome Address

UNIT– III**[9]**

Standard Abbreviations and Acronyms – Preposition of Time, Place and Movement – Active Voice & Passive Voice – Consonant Sounds – Pronunciation guidelines related to Vowels and Consonant – Skimming & Scanning - Inference – Context Based Meaning – Recommendation Writing – Proposing Vote of Thanks.

UNIT – IV**[9]**

Vocabulary Building – Phrasal Verbs (Put, Give, Look, Take, Get, Call)- Impersonal passive – Newspaper Reading – Note making – Listening to Dialogues – E Mail Etiquettes & E-mail Writing. – MoC – Anchoring – Role play in academic context

UNIT – V**[9]**

Homonyms – Concord (Subject & Verb Agreement) – Rearranging the jumbled sentences – Listening to Telephonic Conversation – Letter of Invitation (inviting, accepting and declining) – Paragraph writing – Letter to the Editor of a News paper – Drills using Minimal pairs – Presentation Skills.

Total = 45 Periods**Text Books :**

- 1 Meenakshi Raman, Technical Communication, Oxford University Press, New Delhi, First Edition, 2017
- 2 S.Sumant, Technical English – I, Vijay Nicole, Chennai, Second Edition, 2018

Reference Books :

- 1 Dr.P.Rathna, English Work Book – I, VRB Publishers Pvt. Ltd., Chennai, Second Edition, 2018
- 2 Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi, First Edition, 2016
- 3 M Ashra Rizvi, Effective Technical Communication, Tata McGraw Hill, New Delhi, First Edition, 2005
- 4 P.Kiranmani Dutt, A course in Communication Skills, Cambridge University Press, New Delhi, First Edition, 2014

CO-PO MAPPING

Regulation: R 2020

Course Code: 20EN151

Course Name: TECHNICAL ENGLISH – I

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Comprehend and apply Grammar in context for professional communication.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO2	<i>Infer the gist and specific information.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO3	<i>Discuss, express and interact in the society and place of study.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO4	<i>Critically interpret and comprehend a given text.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO5	<i>Prioritize the listening skills for academic and professional purposes.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
Average		-	-	-	-	-	-	-	-	2	3	-	1	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – I

20MA151	ENGINEERING MATHEMATICS – I	L	T	P	C
	(Common to All Branches)	3	1	0	4

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes : On Completion of this course, the student will be able to	Cognitive Level
CO1: Interpret the concepts of Matrix applications in the field of engineering.	Understand
CO2: Acquire knowledge in solving ordinary differential equations.	Evaluate
CO3: Extend and apply the concepts of differential calculus problems.	Apply
CO4: Develop the skills in solving the functions of several variables.	Remember
CO5: Applying the concepts and solving the Vector Calculus problems.	Apply

UNIT – I LINEAR ALGEBRA [12]

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (Excluding proof) – Cayley Hamilton theorem (excluding proof) – Quadratic forms – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT – II ORDINARY DIFFERENTIAL EQUATIONS [12]

Linear differential equations of second and higher order with constant coefficients – Differential equations with variable coefficients – Cauchy's and Legendre's linear equations – Method of variation of parameters.

UNIT – III DIFFERENTIAL CALCULUS [12]

Curvature – Radius of curvature (Cartesian co-ordinates only) – Centre of curvature and Circle of curvature – Involute and Evolute.

UNIT – IV FUNCTIONS OF SEVERAL VARIABLES [12]

Partial derivatives – Total derivatives – Euler's theorem for homogenous functions – Taylor's series expansion – Maxima and Minima for functions of two variables – Method of Lagrangian multipliers.

UNIT – V VECTOR CALCULUS [12]

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Green's theorem in plane, Gauss divergence theorem and Stoke's theorem – Problems in Cube, Cuboid and Rectangular parallelepiped only.

Total (L: 45 T:15) = 60 Periods

Text Books :

- 1 Ravish R Singh and Mukul Bhatt, Engineering Mathematics – I, McGraw Hill Publications, Fourth Edition, New Delhi, 2016.
- 2 Grewal B.S, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, Forty Third Edition, New Delhi, 2015.

Reference Books :

- 1 Bali N. P and Manish Goyal, Textbook on Engineering Mathematics, Laxmi Publications (p) Ltd., Seventh Edition, 2016.
- 2 H.K. Dass, Advance Engineering Mathematics, S. Chand and company, Eleventh Edition, 2015.
- 3 Jain R.K. and Iyengar S.R.K., - Advanced Engineering Mathematics, Narosa Publications, Eighth Edition, 2012.
- 4 Narayanan.S and Manicavachagom Pillai. T.K. – Calculus vol I and Vol II, S.chand & Co, Sixth Edition, 2014.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20MA151

Course Name: ENGINEERING MATHEMATICS – I

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Interpret the concepts of Matrix applications in the field of engineering.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO2	<i>Acquire knowledge in solving ordinary differential equations.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	<i>Extend and apply the concepts of differential calculus problems.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	<i>Develop the skills in solving the functions of several variables.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO5	<i>Applying the concepts and solving the Vector Calculus problems.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Average		3	3	3	3	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – I

20CH051	ENGINEERING CHEMISTRY (Common to All Branches)	L	T	P	C
		3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes : On Completion of this course, the student will be able to

Cognitive Level

CO1: Make use of the manufacture, properties and uses of advanced engineering materials.	Understand
CO2: Explain the concept of corrosion and its control.	Understand
CO3: Use the concept of thermodynamics in engineering applications.	Understand
CO4: Recall the periodic properties such as ionization energy, electron affinity and electro negativity.	Remember
CO5: Analyze the usage of various spectroscopic techniques.	Understand

UNIT – I ADVANCED ENGINEERING MATERIALS [9]

Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS₂; Nano materials – CNT– synthesis [CVD, laser evaporation, pyrolysis] – applications – medicine, electronics, biomaterials and environment.

UNIT – II ELECTROCHEMISTRY AND CORROSION [9]

Introduction – electrode potential – Nernst equation – EMF series and its significance – types of cells (Electrolytic & electrochemical); Corrosion – causes, consequences – classification – chemical corrosion – electro chemical corrosion – mechanism; Galvanic & differential aeration corrosion – factors influencing corrosion – corrosion control – corrosion inhibitors.

UNIT – III CHEMICAL THERMODYNAMICS [9]

Terminology of thermodynamics – second law; Entropy – entropy change for an ideal gas – reversible and irreversible processes – entropy of phase transition – Clausius inequality; Free energy and work function – Helmholtz and Gibb's free energy functions – criteria of spontaneity; Gibb's – Helmholtz equation (Problems); Maxwell's relations – Van't Hoff isotherm and isochore.

UNIT – IV ATOMIC STRUCTURE AND CHEMICAL BONDING [9]

Effective nuclear charge – orbitals – variations of s, p, d and f orbital – electronic configurations – ionization energy – electron affinity and electro negativity; Types of bonding – ionic, covalent and coordination bonding – hydrogen bonding and its types; Crystal field theory – the energy level diagram for transition metal complexes ([Fe(CN)₆]³⁻, [Ni(CN)₄]²⁻ and [CoCl₄]²⁻ only); Role of transition metal ions in biological system; Band theory of solids.

UNIT – V PHOTOCHEMISTRY AND SPECTROSCOPIC TECHNIQUES [9]

Laws of photochemistry – Grotthuss Draper law – Stark-Einstein law – Beer-Lambert law – phosphorescence – fluorescence and it's applications in medicine – chemiluminescence; Colorimetry – principle – instrumentation (block diagram only) – estimation of iron by colorimetry; principles of spectroscopy – selection rules – vibrational and rotational spectroscopy – applications; Flame photometry – principle – instrumentation (block diagram only) – estimation of sodium; Atomic absorption spectroscopy – principle – instrumentation (block diagram only) – estimation of nickel.

Total = 45 Periods

Text Books :

- 1 Dr. A. Ravikrishnan, Engineering Chemistry, Srikrishna Hi-tech Publishing Company Private Limited, Chennai, Seventeenth Edition, 2016.
- 2 P.C. Jain and Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing company, New Delhi, Seventeenth Edition, 2015.

Reference Books :

- 1 S S. Dara and S. S. Umare, A Text book of Engineering Chemistry, S. Chand & Company Limited, New Delhi, Fifth Edition, 2015.
- 2 N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, PHI Learning Private Limited, New Delhi, Third Edition, 2014.
- 3 S. Vairam, P. Kalyani and Suba Ramesh, Engineering Chemistry, Wiley India Private Limited, New Delhi, First Edition, 2013.
- 4 B. Sivasankar, Engineering Chemistry, Tata McGraw – Hill Education Private Limited, New Delhi, First Edition, 2008.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CH051

Course Name: ENGINEERING CHEMISTRY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Make use of the manufacture, properties and uses of advanced engineering materials.</i>	3	3	2	-	-	-	2	-	-	-	-	1	-	-
CO2	<i>Explain the concept of corrosion and its control.</i>	3	3	2	-	-	-	3	-	-	-	-	2	-	-
CO3	<i>Use the concept of thermodynamics in engineering applications.</i>	3	3	2	-	-	-	2	-	-	-	-	2	-	-
CO4	<i>Recall the periodic properties such as ionization energy, electron affinity and electro negativity.</i>	3	3	2	-	-	-	2	-	-	-	-	1	-	-
CO5	<i>Analyze the usage of various spectroscopic techniques.</i>	3	3	2	-	-	-	3	-	-	-	-	1	-	-
Average		3	3	2	-	-	-	2	-	-	-	-	1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – I

20EE041	BASCIS OF ELECTRICAL AND ELECTRONICS ENGINEERING (Common To AU, CE, CS, IT, ME & SF)	L	T	P	C
		3	0	0	3

Prerequisite: Engineering Mathematics, Engineering Physics**Course Outcomes : On Completion of this course, the student will be able to** **Cognitive Level**

CO1: Solve the electric circuits by applying basic circuit laws for various combinations of circuit elements.	Apply
CO2: Explain the construction, operating principle and application of DC motor and transformers.	Understand
CO3: Enlighten the construction, operating principle and application of AC motors and Special Machines.	Understand
CO4: Illustrate the function of various measuring instruments.	Understand
CO5: Discuss the characteristics of Diodes, BJT and Digital systems.	Understand

UNIT – I ELECTRICAL CIRCUITS [9]

Structural of Electrical Power System – Ohm's Law – Kirchoff's Laws –circuit Analysis – Introduction to AC Circuits: R, RL & RLC series circuits, Average and RMS Value – Power and Power factor for single phase Circuits – Three Phase Star and Delta Connections – Electrical safety.

UNIT – II DC MOTOR AND TRANSFORMERS [9]

Faraday's Law – Lenz's Law-Fleming's left hand and right hand rule, DC Motor: Construction – Operation-series and shunt motor Characteristics Applications. Single Phase Transformer: Construction – Operation – EMF Equation – Types – Applications.

UNIT – III AC MOTORS & SPECIAL MACHINES [9]

Single Phase Induction Motor: Construction – Operation – Split Phase Induction Motor and Capacitor Start Induction Run Motor – Applications, Three Phase Induction Motor: Construction – Operation – Types – Applications. Special Machines: Stepper Motor.

UNIT – IV MEASURING INSTRUMENTS [9]

Basic Methods of Measurements: Direct and Indirect , Functional elements of an instrument – Errors in measurements– Analog and Digital Instruments – Basic Principle of Indicating Instruments – Moving Coil and Moving Iron Ammeter and Voltmeter. Dynamometer type Wattmeter – Induction type Energy Meter – Cathode Ray Oscilloscope.

UNIT – V ANALOG AND DIGITAL ELECTRONICS [9]

Semiconductor devices: PN Junction Diode, Zener diode: Operation and Characteristics – Bipolar Junction Transistor – CE Configurations and its Characteristics. Review of number systems – Digital logic gates – Introduction to Microprocessors.

Total = 45 Periods**Text Books :**

- 1 Smarajit Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI Learning Private Limited, New Delhi, Second Edition, 2007.
- 2 Jegathesan, V., VinothKumar, K., Saravanakumar, R., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, First Edition, 2012.

Reference Books :

- 1 Muthusubramanian, R., Salivahanan, S., and Muraleedharan, K.A., Basic Electrical, Electronics and Computer Engineering, Tata McGraw Hill, New Delhi, Second Edition, 2006.
- 2 Nagsarkar, T.K., and Sukhija M.S., Basics of Electrical Engineering, Oxford University press, New Delhi, Ninth Edition, 2005.
- 3 Mehta, V.K and Rohit Mehta, Principle of Electrical Engineering, S Chand & Company, New Delhi, Second Edition, 2008.
- 4 Mahmood Nahvi and Joseph A. Edminister, Electric Circuits, Schaum Outline Series, McGraw Hill, New Delhi, Fifth Edition, 2002.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE041

Course Name: BASICS OF ELECTRICAL AND
ELECTRONICS ENGINEERING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Solve the electric circuits by applying basic circuital laws for various combinations of circuit elements.	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO2	Explain the construction, operating principle and application of DC motor and transformers.	3	3	2	-	-	2	1	1	-	-	-	1	-	-
CO3	Enlighten the construction, operating principle and application of AC motors and Special Machines.	3	2	2	-	-	2	1	1	-	-	-	1	-	-
CO4	Illustrate the function of various measuring instruments.	3	3	2	-	-	2	1	1	-	-	-	1	-	-
CO5	Discuss the characteristics of Diodes, BJT and Digital systems.	3	3	2	-	-	2	1	1	-	-	-	1	-	-
Average		3	3	2	-	-	2	1	1				1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – I

20CS111	PROBLEM SOLVING TECHNIQUES	L	T	P	C
		3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes : On Completion of this course, the student will be able to

Cognitive Level

CO1: Identify the basic concepts of computer and internet.	Understand
CO2: Recognize the problem solving strategies.	Understand
CO3: Design the fundamental algorithm.	Understand
CO4: Factorize the numbers using methods.	Understand
CO5: Process the array for different operations.	Understand

UNIT – I FUNDAMENTALS OF COMPUTER AND INTERNET [9]

Introduction and Organization of Computer – History and Generation of Computer – Types of Computer – Components of Computer (Hardware, Software and Firmware) – Classification of Software – Introduction to Algorithms, Pseudo code and Flowchart – Introduction to Network and Internet – Terminologies in Internet – WWW.

UNIT – II COMPUTER PROBLEM SOLVING [9]

Introduction – Problem solving aspect – Top Down Design – Implementation of Algorithm – Program Verification – Efficiency of Algorithm – Analysis of Algorithm

UNIT – III FUNDAMENTAL ALGORITHMS [9]

Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Sine Function Computation – Generation of the Fibonacci Sequence – Reversing the Digits of an Integer – Base conversion – Character to Number conversion.

UNIT – IV FACTORING METHODS [9]

Finding the Square Root of a Number – Smallest Divisor of an Integer – GCD of Two Integers – Generating Prime Numbers – Computing Prime Factors of an Integer – Generation of Pseudo random numbers – Raising a number to a larger power – Computing the n^{th} Fibonacci number.

UNIT – V ARRAY TECHNIQUES [9]

Array order reversal – Array counting – Finding the maximum number in the set – Removal of duplicates from an ordered array – Finding the k^{th} smallest element – Longest monotone subsequence.

Total = 45 Periods

Text Books :

- 1 R.G.Dromey, How to Solve it by Computer, Pearson Education, India, Fifth Edition, 2008.
- 2 Shelly, Freund, Vermaat, Introduction to Computers, Shelly Cashman Series, Course Technology Inc, United States, Eighth Edition, 2010.

Reference Books :

- 1 IITL Educational Solutions Limited, Introduction to Information Technology, Pearson Education, India, Second Edition, India, 2012.
- 2 G. Polya, How to Solve It : A New Aspect of Mathematical Method, Princeton University Press, New Jersey, Second Edition, 2008
- 3 Ellis Horowitz, Fundamentals of Programming languages, Galgotia Publications, New Delhi, Second Edition, 2012.
- 4 www.nptel.ac.in/courses/106104074

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS111

Course Name: PROBLEM SOLVING TECHNIQUES

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify the basic concepts of computer and internet.	3	3	3	2	1	-	-	-	1	-	-	1	3	2
CO2	Recognize the problem solving strategies.	3	3	2	1	2	-	-	-	1	-	-	1	3	1
CO3	Design the fundamental algorithm.	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	Factorize the numbers using methods.	3	3	3	1	2	-	-	-	1	-	-	1	3	1
CO5	Process the array for different operations.	3	3	3	2	1	-	-	-	1	-	-	1	3	1
Average		3	3	2	2	1	-	-	-	1	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – I

20MC151	INDUCTION PROGRAMME (Common To All Branches)	L 0	T 0	P 0	C 0
----------------	--	--------	--------	--------	--------

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes : On Completion of this course, the student will be able to

Cognitive level

CO1: Involve in physical activity, creative arts and culture and feel comfortable in the new environment.	Understand
CO2: Build relationship between teachers and students and make familiarizing with departments.	Understand
CO3: Concentrate on literary activities.	Apply
CO4: Develop the required skills through lectures and workshops.	Remember
CO5: Acquire skills in extracurricular activities.	Analyze

List of activities during the three weeks Students Induction Programme (SIP):

3 Weeks

MODULE I : PHYSICAL ACTIVITY

- This would involve a daily routine of physical activity with games and sports. There would be games in the evening. These would help develop team work besides health.

MODULE II : CREATIVE ARTS & CULTURE

- Every student would chose one skill related to the arts whether visual arts or performing arts such as painting, music, dance, pottery, sculpture etc. The student would pursue it every day for the duration of the program.
- These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would help in engineering design later.

MODULE III : MENTORING AND CONNECTING THE STUDENTS WITH FACULTY

- Mentoring takes place in the context and setting of Universal Human Values. It gets the student to explore oneself and experience the joy of learning, prepares one to stand up to peer and take decisions with courage, be aware of relationships and be sensitive to others.
- Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for rest of the semester as a normal course, and not stop with the induction program.

MODULE IV: FAMILIRIZATION WITH COLLEGE/DEPARTMENTS & BRANCHES

- They should be shown their department, and told what it means to get into the branch or department. Describe what role the technology related to their department plays in society and after graduation what role the student would play in society as an engineer in that branch. A lecture by an alumnus of the Dept. would be very helpful in this regard. They should also be shown the laboratories, workshops and other facilities.

MODULE V: LITERARY ACTIVITIES

- Literary activity would encompass reading a book, writing a summary, debating, enacting a play etc.

MODULE VI: PROFICIENCY MODULES:

- The induction program period can be used to overcome some critical lacunas that students might have difficulties in communication skills. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially.

MODULE VII: LECTURES & WORKSHOPS

- Lectures by eminent people to be organized, say, once a week. It would give the students exposure to people who are eminent, in industry or engineering, in social service, or in public life. Alumni could be invited as well.
- Motivational lectures about life, meditation, etc. by Ramakrishna Mission, Art of Living, Vivekanand Kendras, S-VYASA, etc. may be organized. (3 sessions, 9 hours).

MODULE VIII: EXTRA CURRICULAR ACTIVITIES

- The new students should be introduced to the extra-curricular activities at the college.
- They should be shown the facilities and informed about activities related to different clubs etc. This is when selected senior students involved in or leading these activities can give presentations, under faculty supervision.

MODULE IX: FEED BACK & REPORT ON THE PROGRAMMES:

- Students should be asked to give their mid-program feedback. They should be asked to write their opinions about the program at the end of the first week.
- Finally, at the end of the program, each group (of 20 students) should be asked to prepare a single report on their experiences of the program. On the second last day, each group should present their report in front of other groups. Immediately after their presentation, they should submit their written report. This will also serve as a closure to the program.
- Finally, a formal written or online anonymous feedback should be collected at the end of the program.

**K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING**

Regulation: R 2020

Course Code: 20MC151

Course Name: INDUCTION PROGRAMME

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Involve in physical activity, creative arts and culture and feel comfortable in the new environment.</i>	3	-	-	-	-	3	3	2	3	2	-	3	-	-
CO2	<i>Build relationship between teachers and students and make familiarizing with departments.</i>	3	-	-	-	-	3	3	3	1	3	-	3	-	-
CO3	<i>Concentrate on literary activities.</i>	3	-	-	-	-	2	3	3	3	3	-	3	-	-
CO4	<i>Develop the required skills through lectures and workshops</i>	3	-	-	-	-	3	3	3	2	3	-	3	-	-
CO5	<i>Acquire skills in extracurricular activities.</i>	3	-	-	-	-	3	3	3	3	3	-	-	-	-
Average		3	-	-	-	-	3	3	3	2	3	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – I

20CH028

CHEMISTRY LABORATORY
(Common To All Branches)

L	T	P	C
0	0	3	1

Prerequisite: Knowledge of Engineering Chemistry**Course Outcomes: On Completion of this course, the student will be able to****Cognitive level**

CO1: Apply the principle of conductometric titration.

Understand

CO2: Relate the role of pH in quantitative analysis of a solution.

Understand

CO3: Perceive the knowledge of the concentration of Iron by electrochemical methods.

Understand

CO4: Analyze the application of water in various fields.

Understand

CO5: Recall the nature of corrosion process.

Remember

LIST OF EXPERIMENTS:

1. Conductometric Titration – Strong Acid Vs. Strong Base.
2. Conductometric Titration – Mixture of Weak and Strong Acids Vs. Strong Base.
3. Conductometric Titration – Precipitation, BaCl₂ Vs. Na₂SO₄.
4. Estimation of Ferrous ion by Potentiometry – Fe²⁺ Vs K₂Cr₂O₇.
5. Estimation of Hydrochloric Acid by pH metry.
6. Estimation of Iron by Spectrophotometry.
7. Estimation of hardness in water by EDTA method.
8. Estimation of chloride in water sample by Argentometry.
9. Estimation of dissolved oxygen (DO) in water by Winkler's method.
10. Determination of rate of corrosion of mild steel by weight loss method.

Total : 30 Periods**Text Book :**

- 1 Department of Chemistry Staff members, Chemistry Laboratory Manual, K.S.R. College of Engineering, Tiruchengode, Fourth Edition, 2020.
- 2 I. Vogel, Vogel's Textbook of Quantitative Chemical Analysis, John Wiley & sons, New York, Eighth Edition, 2014.

Reference Books :

- 1 S. K. Bhasin and Sudha Rani, Laboratory Manual of Engineering Chemistry, Dhanpat Rai Publishing Company Private Limited, New Delhi, Third Edition, 2012.
- 2 I. Vogel and J. Mendham, Vogel's Textbook of Quantitative Chemical Analysis, Harlow, Prentice Hall, Sixth Edition, 2000.
- 3 G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denny, Vogel's Text book of quantitative analysis chemical analysis, Longman, Singapore publishers, Singapore, ELBS Fifth Edition, 1996.
- 4 B.S. Furniss, A.J. Hannaford, P.W.G. Smith and A.R. Tatchel, Vogels Textbook of practical organic chemistry, John Wiley & sons, Newyork, Fifth Edition, 1989.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CH028

Course Name: CHEMISTRY LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the principle of conductometric titration.	3	3	3	-	-	2	-	1	2	-	-	1	-	-
CO2	Relate the role of pH in quantitative analysis of a solution.	3	2	3	-	-	1	-	1	2	-	-	1	-	-
CO3	Perceive the knowledge of the concentration of Iron by electrochemical methods.	3	1	3	-	-	1	-	1	2	-	-	1	-	-
CO4	Analyze the application of water in various fields.	3	2	2	-	-	1	-	1	2	-	-	1	-	-
CO5	Recall the nature of corrosion process.	3	2	3	-	-	1	-	1	2	-	-	1	-	-
Average		3	2	3	-	-	1	-	1	2	-	-	1	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – I

20CS121	PROBLEM SOLVING TECHNIQUES LABORATORY	L	T	P	C
		0	0	3	1

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course, the student will be able to

	Cognitive level
CO1: Illustrate the basic concepts of MS Office.	Understand
CO2: Build the knowledge of flowchart.	Apply
CO3: Create the fundamentals of algorithm.	Create
CO4: Demonstrate the simple problems using factorizing concepts.	Understand
CO5: Analyze the simple problems using array and string operations.	Analyze

LIST OF EXPERIMENTS:

1. Prepare a Bio-data using MS Word with appropriate page, text and table formatting options and send the same too many recipients using mail merge.
2. Prepare a mark sheet with five subjects for five students in MS Excel File using Formulas, Functions and Charts.
3. i) Prepare a Power Point presentation for your organization with varying animation effects using timer.
ii) Prepare a Student Database in MS Access, manipulate the data and generate report.
4. Design an algorithm and execute the flowchart for implement the concept of exchange of values.
5. Design an algorithm and execute the flowchart for count the digits and character of the input.
6. Design an algorithm to execute the flowchart for implement the factorization of given number.
7. Design an algorithm to execute the flowchart for produce various sequence of numbers like Fibonacci.
8. Design an algorithm to execute the flowchart for base conversion of numbers.
9. Design an algorithm to execute the flowchart for evaluates any one mathematical expression.
10. Design an algorithm to execute the flowchart for finding the LCM and GCD of the given input.
11. Design an algorithm to execute the flowchart for processing of Prime number.
12. Design an algorithm to execute the flowchart for array processing of set numbers.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS121

Course Name: **PROBLEM SOLVING TECHNIQUES
LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Illustrate the basic concepts of MS Office.</i>	3	3	2	1	1	-	-	-	1	-	-	1	3	2
CO2	<i>Build the knowledge of flowchart.</i>	3	3	3	2	1	-	-	-	1	-	-	1	3	2
CO3	<i>Create the fundamentals of algorithm.</i>	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	<i>Demonstrate the simple problems using factorizing concepts.</i>	3	3	2	1	2	-	-	-	1	-	-	1	3	1
CO5	<i>Analyze the simple problems using array and string operations.</i>	3	3	2	2	1	-	-	-	1	-	-	1	3	2
Average		3	3	2	2	1	-	-	-	1	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER - I

20AU127	ENGINEERING GRAPHICS LABORATORY (Common To CE,CS,EC,EE & IT)	L	T	P	C
		0	0	3	1

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1: Create and modify two-dimensional drawings using AutoCAD software	Understand
CO2: Construct various planes and do orthographic projection of lines and plane surfaces.	Remember
CO3: Draw projections of solids and development of surfaces.	Understand
CO4: Create the sections of solids and surfaces.	Understand
CO5: Sketch two dimensional isometric projections of simple solids.	Understand

List of Experiments:

1. Study of basic tools, commands and coordinate system (absolute, relative, polar, etc.) used in 2D software.
2. Draw the conic curves and special curves by using AutoCAD.
3. Draw the front view, top view, side view of objects from the given pictorial view.
4. Draw the projections of straight lines.
5. Draw the projections of polygonal surface.
6. Draw the projections of simple solid objects.
7. Draw the sectional view and the true shape of the given section.
8. Draw the development of surfaces like prism, pyramids, cylinders and cone.
9. Draw the isometric projections of simple solids, truncated prism and pyramids.
10. Draw the isometric projections of cylinder and cone.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20AU127

Course Name: **ENGINEERING GRAPHICS
LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Create and modify two-dimensional drawings using AutoCAD software	3	3	3	2	2	-	-	-	-	-	-	-	-	-
CO2	Construct various planes and do orthographic projection of lines and plane surfaces.	3	3	3	2	2	-	-	-	-	-	-	-	-	-
CO3	Draw projections of solids and development of surfaces.	3	3	3	2	2	-	-	-	-	-	-	-	-	-
CO4	Create the sections of solids and surfaces.	3	3	3	2	2	-	-	-	-	-	-	-	-	-
CO5	Sketch two dimensional isometric projections of simple solids.	3	3	3	2	2	-	-	-	-	-	-	-	-	-
Average		3	3	3	2	2	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20EN251	TECHNICAL ENGLISH – II	L	T	P	C
	(Common To All Branches)	2	0	1	3

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1: Infer and apply the enriched vocabulary, by knowing the basic grammatical structure, in academic and professional contexts.	Understand
CO2: Identify and use Standard English in diverse situations.	Apply
CO3: Interpret by reading a text and comprehend a given text.	Create
CO4: Organize and compose business letters.	Evaluate
CO5: Prioritize the listening skill for academic and personal development purposes.	Apply

UNIT – I [9]

Technical Vocabulary – Changing words from one form to another – Articles – Compound Nouns – Introducing Oneself – Biased Listening – Critical reading – Need based Correspondence (In plant training & Industrial Visit) – Context based meaning – Writing short Essays.

UNIT – II [9]

Prefixes & Suffixes – Numerical Adjectives – If Conditionals – Making Requests – Seeking Information – Listening for main ideas – Intensive Reading – E-mail Writing – Describing Likes & Dislikes – Report Writing.

UNIT – III [9]

Types of Collocations – Framing Questions – ‘Wh’ Question – Yes / No Question – Cause and Effect Expression – Greetings and Introductions – Inviting People – Listening and Note taking - Critical reading- Making inference – Transcoding (Interpretation of Charts).

UNIT – IV [9]

Common English idioms and phrases – Expression of Purpose – Editing text for Spelling and Punctuation – Oral Presentation – Extensive Listening – Short Comprehension Passages – Business Correspondence – Calling for Quotations, Seeking Clarification, placing order and Complaint .

UNIT – V [9]

Confused and misused words – Discourse markers – Redundancies – Instructions – Describing – Listening to fill up forms and gapped texts – Reading Short texts from Journals and Newspapers – Telephone Etiquette – Check list – Essay Writing.

Total = 45 Periods

Text Books :

- 1 Dr.S.Sumant, Technical English II, Tata McGraw Hill, New Delhi, Second Edition, 2016
- 2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2004.

Reference Books :

- 1 Michael Swan, Practical English Usage, Oxford University Press, New Delhi, First Edition, 2015.
- 2 Dept. of Humanities and social sciences, Anna University, Chennai, English for Engineers and Technologists, Orient Longman, First Edition, 2014
- 3 Hory Sankar Mukerjee, Business Communication, Oxford University Press, New Delhi, First Edition, 2013.
- 4 Department of English, English for Technologists and Engineers, Orient Black Swan, Chennai, First Edition, 2016

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20EN251

Course Name: TECHNICAL ENGLISH – II

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Infer and apply the enriched vocabulary, by knowing the basic grammatical structure, in academic and professional contexts.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO2	<i>Identify and use Standard English in diverse situations.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO3	<i>Interpret by reading a text and comprehend a given text.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO4	<i>Organize and compose business letters.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO5	<i>Prioritize the listening skill for academic and personal development purposes.</i>	-	-	-	-	-	-	-	-	2	3	-	1	-	-
Average		-	-	-	-	-	-	-	-	2	3	-	1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20MA232	DISCRETE MATHEMATICS	L	T	P	C
	(Common To CS & IT)	3	1	0	4

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes: On Completion of this course , the student will be able to

CO1: Solve logical problems.

Cognitive level

Understand

CO2: Construct algorithms and derive complexities.

Understand

CO3: Acquire the knowledge of sets that are required for developing computational models.

Remember

CO4: Solving computational operations associated with functions.

Understand

CO5: Apply the concepts of Graph theory and Combinatory in network algorithms.

Apply

UNIT – I PROPOSITIONAL CALCULUS [12]

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contra positive – Logical equivalences and implications – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference Theory.

UNIT – II PREDICATE CALCULUS [12]

Predicates – Statement functions – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization.

UNIT – III SET THEORY [12]

Cartesian product of sets – Relation on sets – Types of relations and their properties – Relational matrix and the graph of a relation – Equivalence relations – Partial ordering – Poset – Hasse diagram.

UNIT – IV FUNCTIONS [12]

Definition – Classification of functions – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of set – Permutation functions.

UNIT – V GRAPH THEORY AND COMBINATORICS [12]

Graphs: Graph terminology and special types of graphs – Representing graphs and graph isomorphism – connectivity – Euler and Hamilton paths – Matching. Combinatorics: Mathematical Induction – The Basics of Counting – Pigeonhole Principle – Recurrence Relations – Generating Functions.

Total (L: 45 T: 15) = 60 Periods

Text Books :

- 1 Trembly J.P, and Manohar R, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw–Hill Publishing Co. Ltd, New Delhi, Forty third Re-print ,2014.
- 2 Venkatraman M.K, Sridharan. N and Chandrasekaran N. Discrete Mathematics, The National Publishing Company, Chennai, Fourth edition, 2014.

Reference Books :

- 1 Kenneth. H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill P.Co, New Delhi, Seventh Edition, 2014.
- 2 Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, Discrete Mathematical Structures, Pearson Education Pvt Ltd ,New Delhi, Sixth Edition, 2013.
- 3 Seymour Lipschutz, Discrete Mathematics, Schaum'soulines series, Tata McGraw Hill P.Co, New Delhi, Second Edition, 2012.
- 4 N. Subramanian, Discrete Mathematics, SCM Publications, Erode, First Edition, 2010.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20MA232

Course Name: DISCRETE MATHEMATICS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Solve logical problems.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO2	<i>Construct algorithms and derive complexities.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	<i>Developing computational models.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	<i>Solving computational operations associated with functions.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO5	<i>Apply the concepts of Graph theory and Combinatory in network algorithms.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Average		3	3	3	3	-	-	-	-	-	-	-	-	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – II

20PH051	ENGINEERING PHYSICS (Common to All Branches)	L 3	T 0	P 0	C 3
----------------	--	--------	--------	--------	--------

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1:	Describe the impact of engineering solutions in the constructional and designing environment.	Remember
CO2:	Categorize the types of laser and utilize it for specific application based on their desirable requisite.	Analyze
CO3:	Utilize the conceived concepts and techniques for synthesizing novel crystals with enhanced multifunctional properties.	Apply
CO4:	Enumerate the preambles of quantum physics and implement its concepts to tackle the cumbersome engineering problems.	Apply
CO5:	Comprehend the fundamental ideas of optoelectronic materials and to fabricate it for the potential applications	Understand

UNIT – I ACOUSTICS AND ULTRASONICS [9]

Acoustics–Introduction – Classification of sound – Characteristics of musical sound – Loudness – Weber – Fechner law – Decibel – Absorption coefficient – Reverberation – Reverberation time – Sabine’s formula: growth and decay (derivation) – Factors affecting acoustics of buildings and their remedies. Ultrasonics – Production –piezoelectric method – Properties – Velocity measurement: acoustical grating – Engineering applications – SONAR.

UNIT – II LASER TECHNOLOGY [9]

Introduction – Principle of Spontaneous emission and stimulated emission – Population inversion, pumping – Einstein’s A and B coefficients (derivation). Types of lasers – Nd-YAG, CO₂ and Semiconductor lasers (homo-junction and hetero-junction) – Qualitative Industrial Applications: Lasers in welding, heat treatment and cutting – Medical applications – Holography (construction and reconstruction of images).

UNIT – III CRYSTAL PHYSICS [9]

Introduction to crystalline and amorphous solids – lattice and unit cell – seven crystal system and Bravais lattices – Miller indices(hkl) – d-spacing in cubic lattice – atomic radius – coordination number – packing factor calculation for sc, bcc, fcc and hcp– crystal defects – point, line and surface defects.

UNIT – IV QUANTUM PHYSICS [9]

Black body radiation – Planck’s theory (derivation) – Deduction of Wien’s displacement law and Rayleigh – Jeans’ Law from Planck’s theory – Compton effect - Theory and experimental verification – Matter waves – Schrödinger’s wave equation – Time independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box.

UNIT – V OPTOELECTRONIC DEVICES [9]

Photoconductive materials – Light Dependent Resistor (LDR) – Working – Applications – Photovoltaic materials – Solar cell – Construction, working and applications – Light Emitting Diode (LED) – Principle, construction and working - Liquid crystal Display (LCD) – Types and applications.

Total = 45 Periods

Text Books :

- 1 M.N. Avadhanulu and P.G. Kshirsagar, A text book of Engineering Physics, S. Chand and Company, New Delhi, seventh Edition, 2014.
- 2 R.K.Gaur & S.L.Gupta, Engineering Physics, Dhanpat Rai Publication, New Delhi, seventh Edition, 2014.

Reference Books :

- 1 D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, John Wiley & sons, USA, ninth Edition, 2011.
- 2 V. Rajendran, Engineering Physics, Tata McGraw Hill, New Delhi, first Edition, 2011.
- 3 R. A. Serway and J. W. Jewett, Physics for Scientists and Engineers with Modern Physics, ninth edition, Cengage Learning, USA, 2013.
- 4 Arthur Beiser, Concepts of Modern Physics, Tata McGraw Hill, New Delhi, sixth Edition, 2010.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20PH051

Course Name: ENGINEERING PHYSICS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Describe the impact of engineering solutions in the constructional and designing environment.</i>	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO2	<i>Categorize the types of laser and utilize it for specific application based on their desirable requisite.</i>	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO3	<i>Utilize the conceived concepts and techniques for synthesizing novel crystals with enhanced multifunctional properties.</i>	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO4	<i>Enumerate the preambles of quantum physics and implement its concepts to tackle the cumbersome engineering problems.</i>	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO5	<i>Comprehend the fundamental ideas of optoelectronic materials and to fabricate it for the potential applications</i>	3	3	-	-	2	-	-	1	-	2	-	2	-	-
Average		3	3	-	-	2	-	-	1	-	2	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20EE231	DIGITAL PRINCIPLES AND COMPUTER DESIGN	L	T	P	C
		3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course , the student will be able to **Cognitive level**

CO1: Identify the various methods used for the simplification of boolean functions.	Understand
CO2: Design and analyze the combinational circuits.	Analyze
CO3: Construct and analyze the sequential circuits.	Analyze
CO4: Apply the knowledge to design the processor unit.	Apply
CO5: Summarize the simple computer design and HDL.	Remember

UNIT – I BOOLEAN ALGEBRA AND LOGIC GATES [9]

Review of Number Systems – Arithmetic Operations – Binary Codes – Boolean Algebra and Theorems – Boolean Functions – Simplification of Boolean Functions using Karnaugh Map and Tabulation Methods – Logic Gates.

UNIT – II COMBINATIONAL LOGIC [9]

Combinational Circuits – Analysis and Design Procedures – Adder and Subtractor – Magnitude Comparator – Code Conversions – Decoders and Encoders – Multiplexers and Demultiplexers.

UNIT – III SYNCHRONOUS SEQUENTIAL LOGIC [9]

Sequential Circuits – Latches and Flip Flops – Analysis and Design Procedures – State Reduction and State Assignment – Shift Registers – Counters.

UNIT – IV PROCESSOR DESIGN [9]

Processor Organization – Design of ALU: Arithmetic Circuits – Logic Circuits – Arithmetic Logic Unit – Status Register – Design of Shifter – Processor Unit.

UNIT – V SIMPLE COMPUTER DESIGN AND HDL [9]

Inter Register Transfer – Conditional Control Statements – Instruction Codes – Design of a Simple Computer – Hardware Description Language (HDL) for Combinational Circuits and Sequential Logic Circuits.

Total = 45 Periods

Text Books :

- 1 Morris Mano, M., Digital Logic and Computer Design, Prentice-hall of India private limited, New Delhi, First Edition, 2016.
- 2 John F. Wakerly, Digital Design Principles and Practices, Pearson Education, Noida, Fourth Edition, 2008.

Reference Books :

- 1 Charles H. Roth Jr, Fundamentals of Logic Design, Jaico Publishing House, Mumbai, Fifth Edition, 2003.
- 2 Kharate, G.K., Digital Electronics, Oxford University Press, USA, 2012.
- 3 Morris Mano, M., and Michael D. Ciletti, Digital Design, Pearson Education, New Delhi, Fifth Edition, 2013.
- 4 Donald D. Givone, Digital Principles and Design, Tata Mcgraw Hill, Noida, First Edition, 2003.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE231

Course Name: **DIGITAL PRINCIPLES AND
COMPUTER DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Identify the various methods used for the simplification of boolean functions.</i>	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO2	<i>Design and analyze the combinational circuits.</i>	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO3	<i>Construct and analyze the sequential circuits.</i>	3	2	3	-	-	-	1	-	-	-	-	2	-	-
CO4	<i>Apply the knowledge to design the processor unit.</i>	3	2	3	-	-	-	1	-	-	-	-	2	-	-
CO5	<i>Summarize the simple computer design and HDL.</i>	3	2	3	-	-	-	1	-	-	-	-	2	-	-
Average		3	2	3	-	-	-	1	-	-	-	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20CS211

C PROGRAMMING

L	T	P	C
3	0	0	3

Prerequisite: Fundamental knowledge in problem solving techniques.**Course Outcomes: On Completion of this course , the student will be able to****Cognitive level**

CO1: Choose the right data representation formats based on the requirements of the problem

Understand

CO2: Categorize and abstract the programming task involve for given computational problem.

Analyze

CO3: Use the comparison and limitations of the various programming construct and choose the right one for the task in hand.

Evaluate

CO4: Identify the situation where the computational methods would be useful.

Apply

CO5: Evaluate the task in which the file concepts are applicable and apply them to write programs.

Apply

UNIT – I FUNDAMENTALS OF C PROGRAMMING**[9]**

History of C: Middle level language – Structured language – Programmer's language – Compilers Vs. Interpreters – Library and Linking – Expressions: Basic Data Types – Variables – C scopes –Type qualifiers –Storage class specifiers – Variable initialization – Constants – Operators – Expressions.

UNIT – II STATEMENTS, ARRAY AND STRING**[9]**

Statements: Selection Statements – Iteration statements – Jump statements – Expression statements – Block statements. Array: Single-Dimension arrays –Two-Dimensional arrays – Multidimensional arrays – String: Declaring and Initializing String Variables – String Handling Functions and Operations.

UNIT-III FUNCTIONS AND POINTERS**[9]**

Function: General form of function – Understanding the scope of a function – Function arguments – Recursion. Pointers: Pointer variables – Pointer Operators – Pointer expressions – Pointers and Arrays – Indexing pointer – Multiple indirections – Initializing pointers – Pointers to functions.

UNIT – IV STRUCTURES, UNIONS AND CONSOLE I/O**[9]**

Accessing Structure Members – Structure Assignments – Arrays of Structures – Passing Structures to Functions – Structure pointers – Arrays and Structures within structures. Unions – Console I/O: Reading and Writing Characters – Reading and Writing Strings – Formatted Console I/O: printf() and scanf().

UNIT – V FILES AND PREPROCESSORS**[9]**

Files: Streams and Files – File System Basics – fread() and fwrite() – fseek() and Random-Access I/O – fprintf() and fscanf() – Command line arguments. Preprocessor: #define, #error, #include, Conditional Compilation Directives, #undef.

Total = 45 Periods**Text Books :**

- 1 Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2013.
- 2 Ashok N.Kamathane, Computer Programming, Pearson Education, New Delhi, Second Edition, 2014.

References :

- 1 PradipDey and ManasGhosh, Fundamentals of Computing and Programming in C, Oxford University Press, Bengaluru, First Edition, 2013.
- 2 E.Balagurusamy, Programming in ANSI C, Tata McGraw-Hill, New Delhi, Sixth Edition, 2012.
- 3 Yashavant P. Kanetkar, Let Us C, BPB Publications, New Delhi, Seventeenth Edition, 2011.
- 4 Nptel.ac.in/courses/106104128/

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS211

Course Name: C PROGRAMMING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Choose the right data representation formats based on the requirements of the problem	3	3	1	3	1	-	-	-	1	-	-	1	2	2
CO2	Categorize and abstract the programming task involve for given computational problem.	3	3	1	3	2	-	-	-	1	-	-	1	3	3
CO3	Use the comparison and limitations of the various programming construct and choose the right one for the task in hand.	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	Identify the situation where the computational methods would be useful.	3	2	2	2	2	-	-	-	1	-	-	1	3	2
CO5	Evaluate the task in which the file concepts are applicable and apply them to write programs.	2	2	2	2	2	-	-	-	1	-	-	1	2	1
Average		3	3	2	2	2	-	-	-	1	-	-	1	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – II

20MC052	ENVIRONMENTAL SCIENCE AND ENGINEERING (Common to All Branches)	L	T	P	C
		3	0	0	0

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course , the student will be able to **Cognitive level**

CO1: Interpret the importance in conservation of resources for future generation. Understand

CO2: Relate the importance of ecosystem and biodiversity. Remember

CO3: Analyze the impact of pollution and hazardous waste in a global and societal context. Understand

CO4: Identify the contemporary issues that result in environmental degradation that would attempt to provide solutions to overcome the problems. Understand

CO5: Predict the concept of Sustainability and Green Chemistry. Understand

UNIT – I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES [9]

Environment – definition – scope and importance – need for public awareness; Forest resources – use – over exploitation – deforestation; Water resources – over-utilization of surface and ground water; Mineral resources – environmental effects of extracting and using mineral resources; Food resources – overgrazing – effects of modern agriculture – fertilizer-pesticide problems – water logging – salinity; Role of an individual in conservation of natural resources. **Activity:** Slogan making event on conserving natural resources or plantation of trees.

UNIT – II ECOSYSTEM AND BIODIVERSITY [9]

Concept of an ecosystem – structure and function of an ecosystem – producers – consumers and decomposers – Food chain – food web – energy flow in the ecosystem – ecological pyramids – Ecological succession; Forest ecosystem and Aquatic ecosystems (Estuary and marine ecosystem); Biodiversity – introduction – definition – Values of biodiversity; Hot-spots of biodiversity; Endangered and Endemic Species of India. **Activity:** Arrange a trip to visit different varieties of plants.

UNIT– III ENVIRONMENTAL POLLUTION [9]

Pollution – introduction and different types of pollution; Causes – effects and control measures of air pollution and water pollution – water quality parameters – hardness – definition – types; Alkalinity – definition – types; BOD and COD (definition and significance); Noise pollution – solid waste management – hazardous waste – medical and e-wastes; Role of an individual in prevention of pollution. **Activity:** Drive for segregation of waste or cleanliness drive.

UNIT– IV SOCIAL ISSUES AND ENVIRONMENT [9]

Water conservation – rain water harvesting and watershed management; Environmental ethics – Issues and possible solutions; Climate change – global warming and its effects on flora and fauna – acid rain – ozone layer depletion; Disaster Management – earth quake – cyclone – tsunami – disaster preparedness – response and recovery from disaster. **Activity:** Poster making event on water management or Climate change.

UNIT– V SUSTAINABILITY AND GREEN CHEMISTRY [9]

Sustainable development – from unsustainable to sustainable development – Environmental Impact Assessment (EIA); Human rights; Value education; HIV/AIDS; Role of information technology in environment and human health; 12 Principles of Green Chemistry. **Activity:** Group discussion on Sustainability or Lecture from an expert on Green chemistry.

Total = 45 Periods

Text Book :

- 1 Dr. T. Arun Luiz, Environmental Science and Engineering, S. Chand & Company Private Limited, New Delhi, First Edition, 2016.
- 2 Anubha Kaushik and C. P. Kaushik, Environmental Science and Engineering, New Age International Publishers, Chennai, Fifth Edition, 2016.

Reference Books :

- 1 G. Tyler Miller and Scott E. Spoolman, Environmental Science, Cengage Learning India Private Limited, New Delhi, Fourteenth Edition, 2014.
- 2 Dr. A. Ravikrishnan, Environmental Science and Engineering, Sri Krishna Hi-tech Publishing Company Private Limited, Chennai, Tenth Edition, 2014.
- 3 Raman Sivakumar, Introduction to Environmental Science and Engineering, Tata McGraw Hill Education Private Limited, Fourth Edition, 2012.
- 4 S S. Dara, A Text book of Environmental Chemistry and pollution control, S. Chand & Company Limited, New Delhi, Tenth Edition, 2005.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20MC052

Course Name: ENVIRONMENTAL SCIENCE AND
ENGINEERING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Interpret the importance in conservation of resources for future generation.</i>	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO2	<i>Relate the importance of ecosystem and biodiversity.</i>	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO3	<i>Analyze the impact of pollution and hazardous waste in a global and societal context.</i>	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO4	<i>Identify the contemporary issues that result in environmental degradation that would attempt to provide solutions to overcome the problems.</i>	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO5	<i>Predict the concept of Sustainability and Green Chemistry.</i>	3	2	2	-	-	3	3	2	-	-	-	1	-	-
Average		3	2	2	-	-	3	3	2	-	-	-	1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20PH028	PHYSICS LABORATORY (Common to All Branches)	L	T	P	C
		0	0	3	1

Prerequisite: Knowledge in Engineering Physics

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1:	Comprehend the different physical parameters of optics.	Analyze
CO2:	Perceive the production of ultrasonic waves through inverse piezoelectric effect and to determine the velocity of sound waves in the given liquid.	Remember
CO3:	Explore the principle of thermal conductivity thereby to calculate the thermal conductivity of various bad conductors like cardboard, mica, etc.	Apply
CO4:	Confer the experimental counterparts of materials properties such as modulus, solar cell, and energy gap.	Understand
CO5:	Imbibe the concept of capillary action in fluid dynamics and to compare the coefficient of viscosity of the given liquid.	Analyze

List of Experiments in Physics Laboratory

1. Determination of wavelength of Laser using grating and the Size of the Particles.
2. Determination of thickness of the given material by Air – wedge method.
3. Determination of velocity of Ultrasonic waves and compressibility using Ultrasonic interferometer.
4. Spectrometer grating - Determination of wavelength of mercury spectrum.
5. Determination of thermal conductivity of a bad conductor by Lee's disc method.
6. Determination of Young's modulus of the material of a uniform bar by Non – Uniform bending method.
7. Determination of Band gap energy of a semiconductor.
8. Determination of Viscosity of a given liquid by Poiseuille's method.
9. Torsional pendulum - Determination of rigidity modulus of a given wire.
10. V-I Characteristics of Solar Cell.

Total : 30 Periods

Text Book :

1. Faculty Members of Physics, Physics Lab manual, Department of Physics, K.S.R. College of Engineering, Namakkal, Seventeenth Edition, 2018.
2. Dr. P. Mani, Physics Lab Manual & Observation Book, Dhanam Publications, Twelfth Edition, Chennai, 2017.

References :

1. Dr. G. Senthilkumar, Physics Lab manual, VRB Publications Pvt. Ltd., Chennai, Tenth Edition, 2006.
2. R Suresh & Dr. C. Kalyanasundaram, Physics Laboratory, Sri Krishna Hitech Publishing Company Pvt Ltd., Chennai, Fifth Edition, 2017.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20PH028

Course Name: PHYSICS LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Comprehend the different physical parameters of optics.	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO2	Perceive the production of ultrasonic waves through inverse piezoelectric effect and to determine the velocity of sound waves in the given liquid	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO3	Explore the principle of thermal conductivity thereby to calculate the thermal conductivity of various bad conductors like cardboard, mica, etc.	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO4	Confer the experimental counterparts of materials properties such as modulus, solar cell, and energy gap.	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO5	Imbibe the concept of capillary action in fluid dynamics and to compare the coefficient of viscosity of the given liquid.	3	3	-	-	2	-	-	1	-	2	-	2	-	-
Average		3	3	-	-	2	-	-	1	-	2	-	2	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – II

20EE225

DIGITAL SYSTEMS LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: No prerequisites are needed for enrolling into the course**Course Outcomes: On Completion of this course , the student will be able to**

CO1: Outline basic Boolean theorems and verify their functionalities.

CO2: Implement combinational circuits using logic gates.

CO3: Design combinational circuits using MSI devices.

CO4: Construct sequential circuits using MSI devices.

CO5: Develop HDL models for combinational and sequential circuits.

Cognitive level

Understand

Understand

Apply

Apply

Understand

LIST OF EXPERIMENTS:

1. Verification of boolean theorems using logic gates.
2. Design and implementation of combinational circuits using logic gates for arbitrary functions, code converters.
3. Design and implementation of combinational circuits using MSI devices:
 - a) 4 - bit binary adder / subtractor
 - b) Parity generator / checker
 - c) Multiplexers and De-Multiplexers
4. Design and implementation of sequential circuits:
 - a) Shift-registers
 - b) Synchronous counter
5. Coding combinational / sequential circuits using HDL.
6. Design and implementation of a simple digital system.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE225

Course Name: DIGITAL SYSTEMS LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Outline basic Boolean theorems and verify their functionalities.</i>	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO2	<i>Implement combinational circuits using logic gates.</i>	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO3	<i>Design combinational circuits using MSI devices.</i>	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO4	<i>Construct sequential circuits using MSI devices.</i>	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO5	<i>Develop VHDL models for combinational and sequential circuits.</i>	1	-	3	-	-	-	-	2	2	-	-	1	-	-
Average		1	-	3	-	-	-	-	2	2	-	-	1	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20CS221

C PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: Fundamental knowledge in problem solving techniques**Course Outcomes: On Completion of this course , the student will be able to**

CO1: Apply the knowledge of programming using I/O Statements and expressions.

CO2: Build code segments for handling control and looping statements.

CO3: Identify the allocation of static & dynamic memory and its utilization.

CO4: Consume the knowledge of string handling functions.

CO5: Demonstrate use files and command line arguments.

Cognitive level

Apply

Create

Evaluate

Apply

Understand

LIST OF EXPERIMENTS:

1. I/O statements and expression.
2. Operators and Precedence of the operator.
3. Controls statements.
4. Decision making constructs.
5. Single and Multidimensional array.
6. String and String handling functions.
7. Functions and its types.
8. Recursion, call by value and call by reference.
9. Pointers.
10. Structures and unions.
11. Files & File handling functions.
12. Command line arguments.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS221

Course Name: C PROGRAMMING LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Apply the knowledge of programming using I/O Statements and expressions.</i>	3	3	3	2	3	-	-	-	1	-	-	1	2	1
CO2	<i>Build code segments for handling control and looping statements.</i>	3	2	3	1	3	-	-	-	1	-	-	1	2	1
CO3	<i>Identify the allocation of static & dynamic memory and its utilization.</i>	3	3	3	2	3	-	-	-	1	-	-	1	3	2
CO4	<i>Consume the knowledge of string handling functions.</i>	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO5	<i>Demonstrate use files and command line arguments.</i>	3	3	2	2	3	-	-	-	1	-	-	1	1	2
Average		3	3	3	2	3	-	-	-	1	-	-	1	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II

20GE028

MANUFACTURING PRACTICES LABORATORY

(Common to All Branches)

L	T	P	C
0	0	3	1

Prerequisite: No Prerequisites are needed for enrolling into the course.**GROUP A (CIVIL & MECHANICAL)****Course Outcomes: On Completion of this course , the student will be able to**

- CO1: Prepare green sand mould for simple patterns and carpentry components with simple joints.
- CO2: Perform welding practice to join simple structures.
- CO3: Practice simple operations in lathe and drilling machine.

Cognitive level

Create

Apply

Understand

LIST OF EXPERIMENTS

- Study of fitting, smithy, plastic moulding and glass cutting.
- Prepare a mould using solid/split patterns in Foundry.
- Make Lap joint / Butt joint / T joint from the given wooden pieces using carpentry tools.
- Make a Butt joint / Lap joint / Tee joints using arc / gas welding equipment.
- Perform simple Facing and Turning operation using Centre Lathe.
Make holes as per the given dimensions using drilling machine.

LIST OF EQUIPMENT

- Fitting tools and its accessories - 15 Sets
- Smithy tools and Open hearth furnace setup - 2 Sets
- Foundry tools and its accessories - 5 Sets
- Carpentry tools and its accessories - 15 Sets
- Arc Welding equipments and its accessories - 5 Sets
- Oxy Acetylene welding setup and its accessories - 1 Set
- Centre Lathe with its accessories - 2 Nos.
- Pillar type drilling machine - 1 No.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO MAPPING

Regulation: R 2020

Course Code: 20GE028

Course Name: MANUFACTURING PRACTICES
LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Prepare green sand mould for simple patterns and carpentry components with simple joints.	2	-	-	3	-	-	-	3	1	-	-	3	3	1
CO2	Perform welding practice to join simple structures.	2	-	-	3	-	-	-	3	1	-	-	3	3	1
CO3	Practice simple operations in lathe and drilling machine.	2	-	-	3	-	-	-	3	1	-	-	3	3	1
Average		2	-	-	3	-	-	-	3	1			3	3	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – II**20GE028****GROUP B (ELECTRICAL & ELECTRONICS)**

(Common to all Branches)

L	T	P	C
0	0	3	1

Prerequisite: No prerequisites are needed for enrolling into the course**Course Outcomes: On Completion of this course , the student will be able to**

CO1: Construct different types of wiring used in house.

CO2: Calibrate single phase Energy meter.

CO3: Demonstrate different electronic components, logic gates and CRO.

Cognitive level

Understand

Understand

Understand

List of Experiments:**ELECTRICAL ENGINEERING**

1. Fluorescent lamp wiring & Stair-case wiring.
2. Residential house wiring using switches, fuse, indicator, lamp and fan.
3. Calibration of Single phase Energy meter

ELECTRONICS ENGINEERING

1. Study of Electronic components and Soldering practice.
2. Study of logic gates AND, OR, EX-OR, NOT, Half and Full Adder.
3. Study of CRO

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO MAPPING

Regulation: R 2020

Course Code: 20GE028

Course Name: MANUFACTURING PRACTICES
LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Construct different types of wiring used in house.	3	2	3	-	-	-	-	1	1	-	-	3	-	-
CO2	Calibrate single phase Energy meter.	3	1	2	-	-	-	-	1	1	-	-	3	-	-
CO3	Demonstrate different electronic components, logic gates and CRO.	3	2	3	-	-	-	-	1	1	-	-	3	-	-
Average		3	2	3	-	-	-	-	1	1	-	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20MA343	NUMERICAL COMPUTATIONAL TECHNIQUES (Common To CS & IT)	L	T	P	C
		3	1	0	4

Prerequisite: No prerequisites are needed for enrolling into the course.

Course Outcomes: On Completion of this course , the student will be able to	Cognitive level
CO1: Solve polynomial, transcendental equations, simultaneous linear equations numerically.	Understand
CO2: Predict the unknown values by using Interpolation techniques.	Apply
CO3: Evaluate the problems in differentiation and integration by using numerical techniques.	Evaluate
CO4: Solving the initial value problems for ordinary differential equations.	Remember
CO5: Determine the numerical solutions to boundary value problems.	Remember

UNIT – I SOLUTIONS OF EQUATIONS AND EIGEN VALUE PROBLEMS [12]

Solutions to polynomial and transcendental equations – Newton Raphson Method – Solutions to simultaneous linear system of equations by Gauss Elimination Method – Gauss Seidel Method - Inverse of a matrix by Gauss Jordan Method – Eigen value of a matrix by power method.

UNIT – II INTERPOLATION AND APPROXIMATION [12]

Interpolation – Newton’s Forward and Backward difference interpolation Techniques – Newton’s divided difference method – Lagrange’s interpolation and Inverse Lagrange’s interpolation methods.

UNIT – III NUMERICAL DIFFERENTIATION AND INTEGRATION [12]

Numerical differentiation using Newton’s Forward and Backward difference interpolation methods – Numerical integration by Trapezoidal rule – Simpson’s 1/3rd rule and 3/8th rule – Double integration using Trapezoidal and Simpson’s rules.

UNIT – IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS [12]

Solving ODE by Taylor’s Series Method – Euler’s Method for first order equation – Modified Euler’s Method for first order equation – Fourth order Runge-Kutta method for solving first order equations – Adams and Milne’s Predictor and Corrector Method.

UNIT – V BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS [12]

Classification of PDE – One dimension heat equation by Crank Nicolson method – One dimensional wave equation – Two Dimensional Laplace and Poisson equations.

Total (L: 45 T:15) = 60 Periods

Text Books :

- 1 Dr. B. S Grewal, Numerical Methods in Engineering and Science, Khanna Publishers, New Delhi, Twelfth Edition, 2016.
- 2 Dr. M.K. Venkataraman, Numerical Methods in Science and Engineering, National Publishing Company, Chennai, Fourth Edition, 2012.

References :

- 1 Sukhendu Dey and Shishir Gupta, Numerical Methods , Tata McGraw Hill Publishing Company, New Delhi, First Edition, 2013.
- 2 Gerald.V, Applied Numerical Analysis, Pearson Education, New Delhi, Sixth Edition, 2013.
- 3 P. Kandasamy, K. Thilagavathy, K. Gunavathy Numerical Methods , S. Chand Company, New Delhi, Fifth Edition, 2016.
- 4 S.R.K. Iyengar, R.K.Jain, Numerical Methods, New Age International Publishers, New Delhi, First Edition, 2014.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20MA343

Course Name: NUMERICAL COMPUTATIONAL
TECHNIQUES

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Solve polynomial, transcendental equations, simultaneous linear equations numerically.</i>	3	3	3	3										
CO2	<i>Predict the unknown values by using Interpolation techniques.</i>	3	3	3	3										
CO3	<i>Evaluate the problems in differentiation and integration by using numerical techniques.</i>	3	3	3	3										
CO4	<i>Solving the initial value problems for ordinary differential equations.</i>	3	3	3	3										
CO5	<i>Determine the numerical solutions to boundary value problems.</i>	3	3	3	3										
Average		3	3	3	3										

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20CS311	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of C programming.

Course Outcomes: On Completion of this course , the student will be able to **Cognitive level**

CO1: Illustrate basic concepts of python programming.	Understand
CO2: Apply the necessary data structures includes list, tuple and dictionary in the required fields and exception handling.	Apply
CO3: Analyze, design and implement the problems using OOP concepts.	Analyze
CO4: Demonstrate the simple file operations and data manipulation techniques.	Understand
CO5: Design web site using python GUI.	Create

UNIT – I FUNDAMENTALS OF PYTHON [9]

Introduction to Python – Advantages of Python programming – Variables and Data types – Comments – I/O function – Operators – Selection control structures – Looping control structures – Functions: Declaration – Types of arguments – Anonymous functions: Lambda.

UNIT – II HANDLING STRINGS AND EXCEPTIONS [9]

Strings – List – Tuples – Dictionaries – Sets – Exception Handling: Built-in Exceptions – User-defined exception– Modules and Packages.

UNIT – III OBJECT ORIENTED PROGRAMMING CONCEPTS [9]

Object Oriented Programming basics –Inheritance and Polymorphism – Operator Overloading and Overriding – Get and Set Attribute Values – Name Mangling –Duck Typing – Relationships.

UNIT – IV FILES AND DATA BASES [9]

File I/O operations – Directory Operations – Reading and Writing in Structured Files: CSV and JSON – Data manipulation using Oracle, MySQL and SQLite.

UNIT – V GUI AND WEB PROGRAMING USING PYTHON [9]

UI design: Tkinter – Events – Socket Programming – Sending email – CGI: Introduction to CGI Programming, GET and POST Methods, File Upload.

Total = 45 Periods

Text Books :

- 1 Mark Lutz, Learning Python, O'Reilly Media, California, Fifth Edition, 2013
- 2 Wesley J.Chun, Core Python Programming, Pearson Education, India, Second Edition, 2017

References :

- 1 Allen B. Downey, Think Python, O'Reilly Media, California, Second Edition 2016.
- 2 Bill Lubanovic, Introducing Python Modern Computing in Simple Packages, O'Reilly Media, California, First Edition, 2014
- 3 David Beazley, Brian K. Jones, Python Cookbook, O'Reilly Media, California, Third Edition, 2013
- 4 Mark Lutz, Python Pocket Reference, O'Reilly Media, California, Fifth Edition, 2014
- 5 www.python.org

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS311

Course Name: PYTHON PROGRAMMING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Illustrate basic concepts of python programming.</i>	3	3	2	2	1	-	-	-	1	-	-	3	3	2
CO2	<i>Apply the necessary data structures includes list, tuple and dictionary in the required fields and exception handling.</i>	3	3	3	2	2	-	-	-	1	-	-	3	3	2
CO3	<i>Analyze, design and implement the problems using OOP concepts.</i>	3	3	3	2	2	-	-	-	1	-	-	3	3	2
CO4	<i>Demonstrate the simple file operations and data manipulation techniques.</i>	3	3	3	3	2	-	-	-	1	-	-	2	3	3
CO5	<i>Design web site using python GUI.</i>	3	3	3	3	2	-	-	-	1	-	-	2	3	3
Average		3	3	3	2	2	-	-	-	1	-	-	3	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – III

20CS312	DATA STRUCTURES	L	T	P	C
		3	0	0	3

Prerequisite: Basic Knowledge of C programming

Course Outcomes: On Completion of this course , the student will be able to	Cognitive level
CO1: Construct the different linear data structure to solve simple problems.	Understand
CO2: Build the various tree structures with its operations.	Create
CO3: Analyze the concept of AVL tree, splay tree, B tree and B+ tree.	Analyze
CO4: Apply graph data structure to solve real time problems.	Apply
CO5: Evaluate various sorting, hashing and searching techniques.	Evaluate

UNIT– I LINEAR DATA STRUCTURES-ARRAY AND LINKED LIST [9]

Abstract Data Types (ADT) – List ADT – Array Based Implementation – Linked List Implementation – Singly Linked Lists – Doubly Linked Lists – Circularly Linked Lists – Applications of Lists: Polynomial Manipulation – Radix sort.

UNIT– II LINEAR DATA STRUCTURES-STACK AND QUEUE [9]

Stack ADT – Implementation of Stack using Array and Linked List – Applications of Stack : Evaluating arithmetic expressions – Conversion of Infix to postfix expression Recursion – Queue ADT – Implementation of Queue using Array and Linked List-Circular Queue – Applications of Queues

UNIT – III NON LINEAR DATA STRUCTURES-TREE STRUCTURES [9]

Tree ADT – Binary Tree ADT – Binary Tree Traversal – Expression Trees – Applications of Trees – Binary Search Tree – AVL Trees – B Tree – B+ Tree – Binary Heaps – Applications of Priority Queues.

UNIT – IV NON LINEAR DATA STRUCTURES -GRAPHS [9]

Introduction to Graphs and its Types – Breadth First Traversal – Depth First Traversal – Topological Sort – Biconnectivity – Minimum Spanning Tree: Prim's and Kruskal's algorithms – Shortest Path Algorithms : Dijkstra's Algorithm – Applications of Graphs.

UNIT – V SEARCHING,HASHING AND SORTING [9]

Searching: Linear and Binary Search – Hashing :Hash function– Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – Sorting: Bubble Sort – Selection Sort – Insertion Sort – Heap Sort – Merge Sort – Quick Sort

Total = 45 Periods

Text Books :

- 1 M. A. Weiss, Data Structures and Algorithm Analysis in C, Pearson Education, India, Second Edition, 2015.
- 2 Reema Thareja, Data Structures Using C, Oxford University Press, England, Second Edition, 2011

References :

- 1 R. F. Gilberg, B. A. Forouzan, Data Structures, Thomson, India, Second Edition, 2005.
- 2 A.K. Sharma, Data Structures using C, Pearson Education, India, First Edition, 2011.
3. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Fundamentals of Data Structures in C++,University Press, United States, Second Edition, 2008
4. <http://www.nptelvideos.in/2012/11/data-structures-and-algorithms.html>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS312

Course Name: DATA STRUCTURES

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Construct the different linear data structure to solve simple problems.	3	2	3	2	2	-	-	-	-	-	3	2	3	2
CO2	Build the various tree structures with its operations.	3	2	3	2	2	-	-	-	-	-	3	2	3	2
CO3	Analyze the concept of AVL tree, splay tree, B tree and B+ tree.	3	3	2	2	2	-	-	-	-	-	3	2	3	2
CO4	Apply graph data structure to solve real time problems.	3	2	2	2	2	-	-	-	-	-	3	2	3	2
CO5	Evaluate various sorting, hashing and searching techniques.	3	2	2	2	2	-	-	-	-	-	3	2	3	2
Average		3	2	2	2	2	-	-	-	-	-	3	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20CS313	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of computer architecture.

Course Outcomes: On Completion of this course , the student will be able to	Cognitive level
CO1: Identify the components and their functionalities in the operating system.	Remember
CO2: Apply various CPU scheduling algorithms and synchronization Techniques.	Apply
CO3: Examine the performance of various memory management techniques.	Understand
CO4: Summarize the virtual memory concepts and file access methods.	Understand
CO5: Study the performance of disk management and file system.	Analyze

UNIT– I OPERATING SYSTEMS CONCEPTS [9]

Introduction to Operating Systems – Time sharing systems – Multiprocessor systems – Distributed systems – Real-Time systems – Operating System Structures: Operating System Services – System Calls- System Programs – Process: Process Concept – Process Scheduling – Operation on Processes – Cooperating Process – Inter Process Communication.

UNIT– II PROCESS SCHEDULING [9]

Threads: Overview – Multithreading Models. CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms: FCFS – SJF – Priority – Round Robin – Algorithm Evaluation. Process Synchronization: The critical Section Problem – Synchronization Hardware – Semaphores – Classic Problems of Synchronization.

UNIT – III DEADLOCK AND MEMORY MANAGEMENT [9]

Deadlock : Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock – Memory Management: Swapping – Contiguous memory Allocation – Segmentation – Paging – Structure of the Page Table.

UNIT – IV VIRTUAL MEMORY AND FILE SHARING INTERFACE [9]

Virtual Memory: Demand Paging – Copy-on-Write – Page Replacement – Allocation of Frames – Thrashing – File Concepts: Access Methods – Directory Structure – File System Mounting – File Sharing – Protection.

UNIT – V FILE SYSTEM STRUCTURE AND STORAGE STRUCTURE [9]

File System Structure – File System Implementation: Directory Implementation – Allocation Methods – Free space Management – Mass Storage Structure : Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management – RAID structure – I/O Systems: I/O Hardware – Kernel I/O Subsystem – Case Study: The Linux System.

Total = 45 Periods

Text Books :

- 1 Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating System Concepts, John Wiley & Sons, United States, 2013.
- 2 Andrew S. Tanenbaum, Modern Operating Systems, Prentice Hall, United States, Third Edition, 2007

References :

- 1 D. M. Dhamdhare, Operating Systems, Tata McGraw-Hill Education India, Second Edition, 2006.
- 2 Paul J. Deitel and David R. Choffnes, Operating Systems, Prentice Hall, United States, Third Edition, 2003.
3. Richard Fox, Linux with Operating System Concepts, Taylor & Francis Limited, United States, Second Edition, 2014.
- 4 <http://nptel.ac.in/courses/106108101>.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS313

Course Name: OPERATING SYSTEMS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify the components and their functionalities in the operating system.	3	2	2	1	1	-	-	-	-	1	-	1	3	2
CO2	Apply various CPU scheduling algorithms and synchronization Techniques.	3	2	2	1	1	-	-	-	-	1	-	1	3	2
CO3	Examine the performance of various memory management techniques.	3	2	1	1	1	-	-	-	-	1	-	1	3	2
CO4	Summarize the virtual memory concepts and file access methods.	3	2	1	1	1	-	-	-	-	1	-	1	3	2
CO5	Study the performance of disk management and file system.	3	2	1	1	1	-	-	-	-	1	-	1	3	2
Average		3	2	1	1	1	-	-	-	-	1	-	2	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – III

20CS314	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of digital computer operations

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1: Identify the basics structure of computers, operations and instructions.

Remember

CO2: Outline the arithmetic operations and working of hardwired micro programmed control.

Understand

CO3: Comprehend pipelined execution and design control unit.

Apply

CO4: Recognize the hierarchical memory system including cache memory and virtual memory

Understand

CO5: Analyze the different ways of communicating with I/O devices and standard I/O interfaces.

Analyze

UNIT – I BASIC STRUCTURE AND ARITHMETIC OPERATIONS [9]

Functional Units – Basic Operational Concepts – Performance – Instruction Set Architecture: Instructions and Instruction sequencing – Addressing Modes – RISC and CISC – Fixed Point and Floating Point Operations.

UNIT – II BASIC PROCESSING UNIT [9]

Fundamental Concepts – Instruction Execution – Hardware Components – Instruction Fetch and Execution Steps – Hardwired Control – Micro Programmed Control – Nano Programming.

UNIT – III PIPELINING EXECUTION [9]

Basic Concepts – Pipeline Organization – Pipelining Issues – Data Dependencies – Memory Delays – Branch Delays – Resource Limitations – Performance Evaluation – Superscalar Operation.

UNIT – IV MEMORY SYSTEM AND STORAGES [9]

Basic Concepts – Semiconductor RAM Memories – Read Only Memories – Memory Hierarchy – Cache Memories – Performance Considerations – Virtual Memory – Memory Management Requirements – Secondary Storage Devices.

UNIT – V I/O ORGANIZATION [9]

Accessing I/O Devices – Programmed I/O – Interrupt Initiated I/O – Direct Memory Access – Buses – Bus Arbitration – Interconnection Standards: SCSI – USB – SATA – I/O Devices and Processors.

Total = 45 Periods

Text Books :

- 1 Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian, Computer Organization and Embedded Systems, McGraw Hill, US, Sixth Edition, 2012.
- 2 M.Morris Mano, Computer System Architecture, McGraw Hill, United states, Third Edition, 2012.

References :

- 1 William Stallings, Computer Organization and Architecture - Designing for Performance, Prentice Hall, United states, Eighth Edition, 2010.
- 2 David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software interface, University of California, Berkeley, Fifth Edition, 2014.
- 3 Carpinelli, Computer Systems Organization & Architecture, Pearson Education, India, First Edition, 2001.
- 4 www.nptel.ac.in/courses/106102062.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS314

Course Name: COMPUTER ORGANIZATION AND ARCHITECTURE

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify the basics structure of computers, operations and instructions.	3	2	2	1	1	-	-	-	2	2	2	2	3	1
CO2	Outline the arithmetic operations and working of hardwired micro programmed control.	3	3	3	2	1	-	-	-	2	1	2	3	3	1
CO3	Comprehend pipelined execution and design control unit.	3	2	3	2	2	-	-	-	1	1	2	3	3	2
CO4	Recognize the hierarchical memory system including cache memory and virtual memory	3	3	2	1	1	-	-	-	2	1	1	3	3	2
CO5	Analyze the different ways of communicating with I/O devices and standard I/O interfaces.	3	3	3	2	1	-	-	-	1	1	1	3	3	2
Average		3	3	3	2	1	-	-	-	2	1	2	3	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SEMESTER – III

20CS315	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

Prerequisite: Fundamental knowledge in problem solving techniques

Course Outcomes: On Completion of this course , the student will be able to **Cognitive level**

CO1: Outline the concepts behind SDLC software engineering practices.	Understand
CO2: Identify the customer requirement and determine the appropriate life cycle model.	Understand
CO3: Apply the design methods for software development.	Apply
CO4: Evaluate the various testing techniques.	Analyze
CO5: Ensure the quality of software product.	Understand

UNIT – I FUNDAMENTALS OF SOFTWARE ENGINEERING [9]

The nature of Software – Software Engineering – Software Process – Software Engineering Practice – Generic Process Model– Process Assessment and Improvement – Prescriptive Process models – Specialized Process Model – Process Technology – Product and Process – Agile Development

UNIT – II REQUIREMENT ENGINEERING [9]

Requirement Engineering – Establishing Groundwork – Eliciting Requirements – Developing Use cases – Building the Requirements Model – Requirements Analysis – Requirements Modeling Strategies – Flow Oriented Modeling – Creating a Behavioral Model.

UNIT – III DESIGN CONCEPTS AND ARCHITECTURAL DESIGN [9]

Design within the context of Software Engineering – Design Process – Design Concepts – Design Model – Architectural Design: Software Architecture – Architectural Genres – Architectural Styles – Architectural Design – Architecture Mapping using Dataflow

UNIT – IV TESTING TECHNIQUES [9]

A strategic Approach for Software Testing – Test Strategies for Conventional Software – Validation Testing – System Testing – Art of Debugging – Testing Conventional Applications : Software testing Fundamentals – Internal and External Views Testing – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing – Model Based Testing – Testing for Specialized Environments – Architectures and Applications – Patterns for Software Testing.

UNIT – V PROJECT AND QUALITY MANAGEMENT [9]

Quality Concepts: Software Quality – The Software Quality Dilemma – Achieving Software Quality – Formal Technical Review – Software Quality Assurance – Process and Project Metrics – Emerging Trends in Software Engineering.

Total = 45 Periods

Text Books :

- 1 Roger S. Pressman, Software Engineering: A Practitioner Approach, McGraw-Hill, New Delhi, Eighth Edition, 2019
- 2 Ian Sommerville, Software Engineering, Pearson Education, India, Ninth Edition, 2013

References :

- 1 David Gustafson, Software Engineering, Schaum's Outlines, Tata McGraw-Hill, New Delhi, Third Edition, 2004.
- 2 Shari Lawrence Pfleeger, Joanne M.Atle, Software Engineering Theory and Practice, Pearson Education, New Delhi, Fourth Edition, 2009.
- 3 Richard Schmidt, Software Engineering: Architecture-driven Software Development, Elsevier Science, Netherlands, Fourth Edition, 2013.
- 4 <http://nptel.ac.in/courses/106101061/1>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS315

Course Name: SOFTWARE ENGINEERING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Outline the concepts behind SDLC software engineering practices.</i>	3	3	3	3	2	-	-	-	-	3	3	3	3	2
CO2	<i>Identify the customer requirement and determine the appropriate life cycle model.</i>	3	3	3	3	2	-	-	-	-	3	3	3	3	2
CO3	<i>Apply the design methods for software development.</i>	3	3	3	3	2	-	-	-	-	3	3	3	3	2
CO4	<i>Evaluate the various testing techniques.</i>	3	3	3	3	2	-	-	-	-	2	3	3	3	2
CO5	<i>Ensure the quality of software product.</i>	3	3	3	3	2	-	-	-	-	3	3	3	3	2
Average		3	3	3	3	2	-	-	-	-	3	3	3	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20CS321

PYTHON PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: Basic knowledge of C programming.

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1: Design simple programs using conditional statements and loops.

Apply

CO2: Using python list, tuples and dictionaries.

Apply

CO3: Detecting the exception handling mechanism in python.

Analyze

CO4: Construct GUI applications using python programming.

Create

CO5: Demonstrate the use of files in python.

Create

LIST OF EXPERIMENTS:

1. Write a simple program to display a single level and multilevel string.
2. Write a function to compute the GCD of two numbers
3. Write a program to display the largest number among three numbers.
4. Create a program to change, delete, add and remove elements in Dictionary.
5. Develop a program to perform operations on list.
6. Write a program to display the Fibonacci series and multiplication table by using looping constructs.
7. Create a Python program to demonstrate inheritance.
8. Write a python program to implement polymorphism with inheritance.
9. Display a simple calendar in python program without using the calendar module using string array or list.
10. Write a program to demonstrate the user-defined exception handling mechanism in Python.
11. Design and implement a graphical user interface to perform any arithmetic operation.
12. Write a python program to insert and retrieve data using MySQL.

Total : 45 Periods

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS321

Course Name: PYTHON PROGRAMMING
LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Design simple programs using conditional statements and loops.</i>	2	3	3	2	2	-	-	-	1	-	-	1	3	1
CO2	<i>Using python list, tuples and dictionaries.</i>	3	3	3	2	2	-	-	-	1	-	-	1	3	1
CO3	<i>Detecting the exception handling mechanism in python.</i>	3	3	3	2	2	-	-	-	1	-	-	1	3	1
CO4	<i>Construct GUI applications using python programming.</i>	3	3	3	1	3	-	-	-	1	-	-	1	3	1
CO5	<i>Demonstrate the use of files in python.</i>	3	3	3	1	3	-	-	-	1	-	-	1	3	1
Average		3	3	3	2	2	-	-	-	1	-	-	1	3	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III**20CS322****DATA STRUCTURES LABORATORY**

L	T	P	C
0	0	3	1

Prerequisite: Basic knowledge of C programming**Course Outcomes: On Completion of this course , the student will be able to**

CO1: Apply the concepts of singly and doubly linked lists.

CO2: Implement the applications of stack and queue.

CO3: Design the balanced tree concepts.

CO4: Demonstrate the sorting algorithm techniques.

CO5: Construct the minimum spanning tree.

Cognitive level

Apply

Create

Create

Create

Create

LIST OF EXPERIMENTS:

1. Implementation of Singly Linked List.
2. Implementation of Doubly linked list
3. Develop a program for Polynomial manipulation.
4. Array implementation of Stack and Queue
5. Linked list implementation of Stack and Queue
6. Write a program that uses stack operations to convert a given infix expression into its postfix equivalent and Evaluation of Arithmetic expression, implement the stack using an array.
7. Design and develop a program for applications of Queue.
8. Develop a program to generate expression tree and display it in the following order : i) Preorder
ii) Postorder iii) Inorder
9. Implementation of Binary Search Tree.
10. Implementation of AVL Tree.
11. Write programs for implementing the following graph traversal and MST algorithms:
a) DFS Algorithm b) Prims Algorithm.
12. Write programs for implementing the following sorting methods to arrange a list of integers in ascending order: a) Insertion sort b) Merge sort
13. Implementation of Hashing.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS322

Course Name: DATA STRUCTURES LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Apply the concepts of singly and doubly linked lists.</i>	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO2	<i>Implement the applications of stack and queue.</i>	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO3	<i>Design the balanced tree concepts.</i>	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO4	<i>Demonstrate the sorting algorithm techniques.</i>	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO5	<i>Construct the minimum spanning tree.</i>	2	2	3	2	2	-	-	-	-	-	2	2	3	2
Average		2	2	3	2	2	-	-	-	-	-	2		2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20CS323

OPERATING SYSTEMS LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: Basic knowledge about the C Programming.**Course Outcomes: On Completion of this course , the student will be able to**

CO1: Implement the commands in Linux OS.

CO2: Evaluate the performance of various CPU scheduling algorithms.

CO3: Create process and Implement IPC, deadlock avoidance and detection Algorithms.

CO4: Analyze the performance of the various page replacement Algorithms.

CO5: Examine file organization and file allocation strategies.

Cognitive level

Create

Evaluate

Create

Analyze

Understand

List of Experiments:

1. Implementations of basic Linux commands and shell programming.
2. Write programs using the following system calls of Linux operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir, open, read and write.
3. Write a C program to simulate ls, grep and cp.
4. Write a C program to simulate shared memory and IPC
5. Write a C program to implement CPU scheduling algorithms.
6. Write a C program to implement producer consumer problem using semaphores.
7. Write a C program to implement banker's algorithm
8. Write a C program to implement page replacement algorithms
9. Write a C program to implement memory management schemes(first fit, worst fit and best fit)
10. Write a C program to implement File allocation strategies(Sequential, Indexed and Linked list)

Total : 45 Periods

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS323

Course Name: OPERATING SYSTEMS
LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Implement the commands in Linux OS.	2	3	2	1	1	-	-	-	-	1	-	1	2	1
CO2	Evaluate the performance of various CPU scheduling algorithms.	2	3	2	1	1	-	-	-	-	1	-	1	2	1
CO3	Create process and Implement IPC, deadlock avoidance and detection Algorithms.	2	3	2	1	1	-	-	-	-	1	-	1	3	2
CO4	Analyze the performance of the various page replacement Algorithms.	2	3	1	1	1	-	-	-	-	1	-	1	3	2
CO5	Examine file organization and file allocation strategies.	2	3	1	1	1	-	-	-	-	1	-	1	3	1
Average		2	3	2	1	1	-	-	-	-	1	-	1	3	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – III

20HR351	CAREER DEVELOPMENT SKILLS – I (Common to All Branches)	L	T	P	C
		0	2	0	0

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course , the student will be able to

CO1: Have competent knowledge on grammar with an understanding of its basic rules.

CO2: Communicate effectively and enhance interpersonal skills with renewed self – confidence

CO3: Construct sentence in English and make correction

CO4: Perform oral communication in any formal situation

CO5: Develop their LSRW skills.

Cognitive level

Understand

Apply

Apply

Create

Understand

UNIT – I EFFECTIVE ENGLISH – SPOKEN ENGLISH [6]

Basic Rules of Grammar – Parts of Speech – Tenses – Verbs – Sentences construction - Vocabulary – idioms & phrases – Synonyms – Antonyms – Dialogues and conversation – Exercise(Speaking).

UNIT – II ESSENTIAL COMMUNICATION [6]

Verbal communication – Effective communication – Active Listening – Paraphrasing – Feedback, Non Verbal Communication – Body language of self and Others, Important of feelings in communication – Dealing with feelings in communication practice – Exercise.

UNIT – III WRITTEN COMMUNICATION – PART 1 [6]

Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articles and Preposition – Change of Voice – Change of Speech – One word Substitution – Using the same word as different parts of speech – Odd Man Out – Spelling & Punctuation (Editing).

UNIT – IV WRITTEN COMMUNICATION – PART – 2 [6]

Analogies – Sentences Formation – Sentence Completion – Sentence Correction – idioms & Phrases – Jumbled Sentences, Letter Drafting (Formal Letters) – Reading Comprehension (Level 1) – Contextual Usage – Foreign Languages Words used in English – Exercise.

UNIT – V ORAL COMMUNICATION – PART – 1 [6]

Self introduction – Situational Dialogues / Role Play (Telephonic Skills) – Oral Presentations – Prepared – ‘ Just A Minute’ Sessions (JAM) – Presentation Skills – Exercise.

Total =30Periods

Text Books :

- 1 Anne Laws, Writing Skills, Orient Black Swan, Hyderabad, Second Edition, 2011.
- 2 Sarah Freeman, Written Communication in English, Orient Black Swan, Hyderabad, First Edition, 2015

References :

- 1 Raj N Bakshmi, English Grammar Practice, Orient Black Swan, Hyderabad, First Edition, 2009.
- 2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2005.
- 3 Thakur K B Sinha, Enrich Your English, Vijay Nicole, Chennai, First Edition, 2005.
- 4 Norman Lewis. W.R., Word Power Made Easy, Goyal Publications.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20HR351

Course Name: CAREER DEVELOPMENT SKILLS – I

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Have competent knowledge on grammar with an understanding of its basic rules.</i>	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO2	<i>Communicate effectively and enhance interpersonal skills with renewed self – confidence</i>	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO3	<i>Construct sentence in English and make correction</i>	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO4	<i>Perform oral communication in any formal situation</i>	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO5	<i>Develop their LSRW skills.</i>	-	-	-	-	1	-	-	-	3	3	-	3	-	-
Average		-	-	-	-	1	-	-	-	3	3	-	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

Regulation: R 2020

Course Code: 20MA441

Course Name: PROBABILITY AND DECISION
MODELS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Explain the importance of one dimensional random variables discrete and continuous distribution.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO2	<i>Develop their skills in joint, marginal and conditional distributions and knowing the concept of covariance correlation & regression.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	<i>Analyze the theory of stationary process, Markov Process and transition probabilities, and Poisson Process.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	<i>Illustrate the basic concept of single server and multi-server queuing models.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO5	<i>Estimate Critical Path in PERT and CPM.</i>	3	3	3	3	-	-	-	-	-	-	-	-	-	-
Average		3	3	3	3	-	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – IV

20CS411	THEORY OF COMPUTATION	L	T	P	C
		3	1	0	4

Prerequisite: Basic concepts of discrete mathematics.

Course Outcomes: On Completion of this course , the student will be able to **Cognitive level**

CO1:	Compare and analyze various finite automata and convert NFA to DFA.	Evaluate
CO2:	Construct finite automata to regular expression and identify the properties of regular language.	Analyze
CO3:	Construct context free grammars to generate strings from a context free language and convert them into normal forms.	Evaluate
CO4:	Construct pushdown automata and convert pushdown automata to context-free grammar.	Apply
CO5:	Design turing machines for various problems and analyze the undecidability of languages.	Apply

UNIT – I INTRODUCTION TO AUTOMATA THEORY [12]

Mathematical preliminaries Finite Automata (FA) – Central Concepts of Automata Theory – Deterministic Finite Automata (DFA) – Non Deterministic Finite Automata (NFA) – Equivalence of NFA and DFA – Finite Automata with Epsilon Transition – Applications of Finite Automata.

UNIT – II REGULAR EXPRESSIONS AND LANGUAGES [12]

Regular Expressions: Definitions – Equivalence of Regular Expression and Finite Automata: Thomson Method – Basic Method (R_i^k method) – State Elimination Method – Arden's Theorem. Proving languages not to be regular – Closure Properties of Regular Language – Equivalence and Minimization of Automata (DFA).

UNIT – III CONTEXT-FREE GRAMMAR AND LANGUAGES [12]

Context-Free Grammar (CFG): Definition – Derivations – Parse Trees – Ambiguity – Simplification of Grammars – Conversion to Normal Forms: Chomsky (CNF) – Greibach (GNF). Pumping Lemma for Context –Free Languages – Applications of Pumping Lemma – Closure Properties of CFL.

UNIT – IV PUSHDOWN AUTOMATA [12]

Pushdown Automata (PDA): Introduction – Definition – Instantaneous Description of Pushdown Automata – Design Examples – The Languages of Pushdown Automata – The Language acceptance by Final State and Empty Stack .Equivalence of PDA and CFG: Construction of PDA from CFG – Construction of CFG from PDA – Deterministic Pushdown Automata.

UNIT – V TURING MACHINE AND UNDECIDABILITY [12]

Definition – Notation – Instantaneous Description and Languages – Design of TM – Programming Techniques for TM: Storage in State – Multiple Tracks – Subroutines. Variants of TM: Multitape – Nondeterministic – Enumerators. Universal Turing Machine – A language that is not Recursively Enumerable (RE) – Undecidable problems about Turing machine – Rice Theorem-Post's correspondence problem.

Total (L: 45 T:15) = 60 Periods

Text Books :

- 1 John E. Hopcroft, Rajeev Motwani and Jeffrey D.Ullman, Introduction to Automata Theory, Languages and Computation, Pearson Education, New Delhi, Third Edition, 2014.
- 2 Michael Sipser, Introduction to the Theory of Computation, Thompson Course Technology, Cengage Learning India Pvt. Ltd., India, Third Edition, 2014.

References :

- 1 John C Martin, Introduction to Languages and Automata Theory, Tata McGraw-Hill, New Delhi, Third Edition, 2007.
- 2 K.L.P Misra and N.Chandrasekharan, Theory of Computer Science, Automata, Languages and Computation, Prentice Hall, India, Third Edition, 2010.
- 3 Adesh K. Pandey, An introduction to automata theory and formal languages, S.K. Kataria & Sons, New Delhi, First Edition, 2009.
- 4 https://www.youtube.com/watch?v=_9fuEO5khrl

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS411

Course Name: THEORY OF COMPUTATION

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Compare and analyze various finite automata and convert NFA to DFA.	3	3	3	3	2	1	-	-	-	-	-	2	3	2
CO2	Construct finite automata to regular expression and identify the properties of regular language.	3	3	3	3	3	2	-	-	-	-	-	2	3	3
CO3	Construct context free grammars to generate strings from a context free language and convert them into normal forms.	3	3	3	3	3	2	-	-	-	-	-	2	3	3
CO4	Construct pushdown automata and convert pushdown automata to context-free grammar.	3	3	3	3	3	1	-	-	-	-	-	2	3	2
CO5	Design turing machines for various problems and analyze the undecidability of languages.	3	3	3	3	2	1	-	-	-	-	-	2	3	3
Average		3	3	3	3	3	1	-	-	-	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – IV

20CS412	JAVA PROGRAMMING	L	T	P	C
		3	0	0	3

Prerequisite: Fundamentals of C programming and object oriented concepts

Course Outcomes: On Completion of this course , the student will be able to

Course Outcome	Cognitive level
CO1: Apply java programming fundamentals to solve real world problem.	Apply
CO2: Implement the concept of overloading and inheritances.	Apply
CO3: Examine important features of java like packages, interfaces and exception handling.	Understand
CO4: Illustrate the features of multithreaded programming and I/O operations.	Understand
CO5: Demonstrate the concepts of string manipulations and database connectivity.	Analyze

UNIT – I JAVA FUNDAMENTALS [9]

The Java Buzzwords – Data Types – Variables – Arrays – Operators – Control Statements – Class Fundamentals – Declaring Objects – Methods – Method Overloading – Objects as Parameters – Returning Objects – Recursion –this keyword – Garbage Collection.

UNIT – II CONSTRUCTORS AND INHERITANCE [9]

Constructors – Constructor Overloading – Access Control – static – final – Nested and Inner Class – Inheritance : Basics –Super – Multilevel – Hierarchical – Method Overriding – Abstract class –Final with Inheritance.

UNIT-III PACKAGES, INTERFACES AND EXCEPTION HANDLING [9]

Packages – Access Protection – Importing Packages – Interfaces – Default Interface Methods – Static Methods in Interface – Exception Handling Fundamentals – Types – Uncaught Exceptions –Try and Catch – Multiple Catch – Nested Try – Throw – Throws – Finally – Array List-Wrapper Classes.

UNIT – IV MULTITHREADED PROGRAMMING AND I/O OPERATIONS [9]

Java Thread Model – Main Thread – Creating a Thread – Creating Multiple Threads – isAlive and join Methods – Thread Priorities - Synchronization – Interthread Communication – Suspending, Resuming, and Stopping Threads – Obtaining a Thread's State – Using Multithreading – I/O Basics – Reading Console Input – Writing Console Output – The PrintWriter Class – Reading and Writing Files – Automatically Closing a File – Scanner class.

UNIT – V STRING AND DATABASE CONNECTIVITY [9]

The String Constructors – String Length – Character Extraction – String Comparison – Searching Strings – Modifying a String – Data Conversion using valueOf method – Methods in StringBuffer – JDBC Product Components – JDBC API – JDBC Driver Manager – JDBC Test Suite – JDBC-ODBC Bridge – JDBC Architecture – Establishing Connection – Handling SQL Exceptions.

Total = 45 Periods

Text Books :

- 1 Herbert Schildt, Java - The Complete Reference, Oracle Press, McGraw-Hill Education, New Delhi, Tenth Edition, 2018.
- 2 Cay S. Horstmann, Core Java Volume 1 – Fundamentals, Prentice Hall, India, Tenth Edition, 2015.

References :

- 1 Herbert Schildt, Java - A Beginner Guide, Oracle Press, McGraw-Hill Education, New Delhi, Sixth Edition, 2014.
- 2 Joshua Bloch, Effective Java: A Programming Language Guide, Addison-Wesley Professional, USA, Third Edition, 2018.
- 3 Allen B. Downey and Chris Mayfield, Think Java: How to Think Like a Computer Scientist, O'Reilly, California, First Edition, 2016.
- 4 https://onlinecourses.nptel.ac.in/noc19_cs07/preview

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS412

Course Name: JAVA PROGRAMMING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply java programming fundamentals to solve real world problem.	3	3	2	3	3	-	-	-	-	-	2	3	3	3
CO2	Implement the concept of overloading and inheritances.	3	3	2	3	2	-	-	-	-	-	2	3	3	3
CO3	Examine important features of java like packages, interfaces and exception handling.	3	3	1	3	2	-	-	-	-	-	3	2	3	2
CO4	Illustrate the features of multithreaded programming and I/O operations.	3	3	2	2	3	-	-	-	-	-	2	3	3	3
CO5	Demonstrate the concepts of string manipulations and database connectivity.	3	3	2	3	1	-	-	-	-	-	2	3	3	3
Average		3	3	2	3	2	-	-	-	-	-	2	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – IV

20CS413	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

Prerequisite: Basic Knowledge about data structures and computer systems.

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1:	Be aware of database architecture and the relational algebra.	Understand
CO2:	Apply Structured query language to create and manipulate a relational database.	Apply
CO3:	Create functions, triggers, recursive queries and indexing.	Apply
CO4:	Demonstrate the purpose of ER Model and normalization.	Analyze
CO5:	Discover about transaction, query processing and advanced database concepts.	Understand

UNIT – I BASIC CONCEPTS AND RELATIONAL MODEL [9]

Database System Applications – Purpose of Database Systems – Views of Data – Database Languages – Database and Application Architecture. Introduction to Relational Model: Structure of Relational Databases – Database Schema – Keys – Schema Diagrams – Relational Algebra.

UNIT – II SQL FUNDAMENTALS AND INTERMEDIATE SQL [9]

Overview of the SQL Query Language – SQL Data Definition – Basic Structure of SQL Queries – Additional Basic Operations – Set operations – Null values – Aggregate functions – Nested Sub Queries – Modification of the Database – Join Expressions – Views – Transactions – Integrity Constraints – Authorization.

UNIT– III ADVANCED SQL, INDEXING AND HASHING [9]

Accessing SQL from Programming Language – Functions and Procedures – Triggers – Recursive Queries – Indexing: Basic Concepts – Ordered Indices – B+ Tree Index Files – Hash Indices – Multiple-Key Access – Creation of Indices – Bitmap Indices.

UNIT – IV DATABASE DESIGN [9]

Overview of the Design Process – The Entity-Relationship model – Complex Attributes – Mapping Cardinalities – Primary key – Functional Dependencies – Non-loss Decomposition – First, Second and Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT – V TRANSACTIONS, QUERY PROCESSING AND ADVANCED DATABASE CONCEPTS [9]

Transaction Concept – A Simple Transaction Model – Storage Structure – Transaction Atomicity and Durability – Transaction Isolation – Serializability – Concurrency Control – Lock-Based protocols – Query Processing overview – Spatial Database Concepts – Multimedia Database Concepts – Introduction to Deductive Databases.

Total = 45 Periods

Text Books :

- 1 Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, New Delhi, Seventh Edition, 2019.
- 2 Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, New Delhi, Seventh Edition, 2016.

References :

- 1 Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, New Delhi, Sixth Edition, 2015.
- 2 S.K.Singh, Database Systems Concepts, Design and Applications, Pearson Education, New Delhi, second Edition, 2011.
- 3 C.J.Date, A.Kannan and S.Swamynathan, An Introduction to Database Systems, Pearson Education, New Delhi Eighth Edition, 2006.
- 4 <http://freevideolectures.com/course/2668/database-management-system#>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS413

Course Name: DATABASE MANAGEMENT
SYSTEMS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Be aware of database architecture and the relational algebra.</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO2	<i>Apply Structured query language to create and manipulate a relational database.</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO3	<i>Create functions, triggers, recursive queries and indexing.</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO4	<i>Demonstrate the purpose of ER Model and normalization.</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO5	<i>Discover about transaction, query processing and advanced database concepts.</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
Average		3	3	3	3	2	2	-	-	2	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – IV

20CS414

DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	1	0	4

Prerequisite: Basic Knowledge about data structures**Course Outcomes: On Completion of this course , the student will be able to****Cognitive level**

CO1: Analyze the efficiency of algorithms.

Analyze

CO2: Design and analyze problems using decrease, transform and conquer techniques.

Understand

CO3: Identify optimal solution by applying dynamic techniques.

Understand

CO4: Evaluate various backtracking, branch and bound techniques.

Evaluate

CO5: Summarize the knowledge about P and NP problems.

Understand

UNIT – I DIVIDE AND CONQUER TECHNIQUE [12]

Algorithm Analysis Framework – Asymptotic Notations and Basic Efficiency Classes – Analysis of Non-recursive and Recursive Algorithms – Divide and Conquer: Merge Sort – Quick Sort – Strassen's Matrix Multiplication.

UNIT – II DECREASE AND CONQUER TECHNIQUE [12]

Depth First Search and Breadth First Search – Decrease and Conquer: Insertion sort – Binary Search – Selection Problem – Transform and Conquer: Presorting – Balanced Search Trees: AVL tree – 2-3 Tree.

UNIT– III DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE [12]

Dynamic Programming: Knapsack Problem – Optimal Binary Search Trees – Warshall's Algorithm – Floyd's Algorithm – Greedy Technique: Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman Trees and Codes.

UNIT – IV BACKTRACKING,BRANCH AND BOUND TECHNIQUES [12]

Backtracking: 8-Queens – Hamiltonian Circuit – Sum of Subset – Graph Coloring – Branch and Bound: Assignment Problem – Knapsack Problem – Traveling Salesman Problem.

UNIT – V NP PROBLEMS AND APPROXIMATION ALGORITHMS [12]

P and NP Problems – NP Complete Problems – Approximation Algorithms for NP Hard Problems – Travelling Salesman Problem: Nearest Neighbor Algorithm – Multifragment Heuristic Algorithm – Knapsack Problem.

Total (L: 45 T: 15) = 60 Periods**Text Books :**

- 1 Anany Levitin, Introduction To The Design And Analysis Of Algorithms, Pearson Education, India, Third Edition, 2017.
- 2 A.V.Aho, J.E. Hopcroft and J.D.Ullman, The Design and Analysis of Computer Algorithms, Pearson Education Asia, India, Fourth Edition, 2010.

References :

- 1 Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Introduction to Algorithms, Prentice Hall of India, India, Second Edition, 2007.
- 2 Sara Baase and Allen Van Gelder, Computer Algorithms - Introduction to Design and Analysis, Pearson Education, India, Third Edition, 2010.
- 3 Robert Sedgewick, Philippe Flajolet, An Introduction to the Analysis of Algorithms, Addison-Wesley, USA, Second Edition, 2013.
- 4 <http://www.nptelvideos.in/2012/11/design-analysis-of-algorithms.html>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS414

Course Name: DESIGN AND ANALYSIS OF ALGORITHMS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Analyze the efficiency of algorithms.	3	3	2	3	2	-	-	-	1	-	-	1	3	2
CO2	Design and analyze problems using decrease, transform and conquer techniques.	3	3	3	3	2	-	-	-	1	-	-	1	3	2
CO3	Identify optimal solution by applying dynamic techniques.	3	3	3	3	1	-	-	-	1	-	-	1	3	2
CO4	Evaluate various backtracking, branch and bound techniques.	3	3	3	3	1	-	-	-	1	-	-	1	3	1
CO5	Summarize the knowledge about P and NP problems.	3	3	2	3	1	-	-	-	1	-	-	1	3	1
Average		3	3	3	3	1	-	-	-	1	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER - IV

20EE431	MICROPROCESSORS AND MICROCONTROLLERS	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge in Digital Electronics

Course Outcomes : On successful completion of the course, the student will be able to **Cognitive Level**

CO1: Explain the programs based on 8085 microprocessor.	Understand
CO2: Practice the use of 8086 microprocessor for simple applications.	Understand
CO3: Illustrate the concepts of multiprocessors.	Understand
CO4: Design and interface devices with microprocessors.	Understand
CO5: Design and implement 8051 microcontroller based systems.	Understand

UNIT - I 8085 MICROPROCESSOR [9]

Introduction – Address, data and control bus – 8085: Hardware architecture, pin diagram, addressing modes, instruction set, assembly language programming.

UNIT - II 8086 MICROPROCESSOR [9]

.8086: Hardware architecture, Pin diagram, Addressing modes, Instruction set, Interrupts and Interrupt service routines, Assembly language programming – Assembler directives – Procedures – Macros – BIOS DOS function calls.

UNIT - III MULTIPROCESSOR CONFIGURATIONS [9]

Coprocessor configuration – Closely coupled configuration – Loosely coupled configuration – Numeric data processor (8087) architecture and data types – I/O processor architecture (8089).

UNIT - IV PERIPHERAL INTERFACING [9]

Memory and I/O interfacing – Parallel communication interface (8255) – Serial communication interface (8251) – Programmable interval timer (8253) – Keyboard / display controller (8279) – Interrupt controller (8259) – DMA controller (8237) – ADC and DAC.

UNIT - V 8051 MICROCONTROLLER [9]

8051: Hardware architecture, special function register, I/O ports, external memory, addressing modes, instruction set, timers and counters, serial data I/O, interrupts – Interfacing: Keyboard, LCD, stepper motor.

Total = 45 Periods

Text Books :

- 1 Ramesh S. Gaonkar, Microprocessor - Architecture, programming and applications with 8085, Penram International Publisher, Sixth Edition, 2013
- 2 A.K.Ray, K.M. Bhurchandi, Advanced Microprocessors and Peripherals, Tata McGraw Hill, New Delhi, Third Edition, 2012.

Reference Books :

- 1 Kenneth J. Ayala, The 8051 Microcontroller Architecture, Programming and Applications, Penram International, Mumbai, Second Edition, 2007.
- 2 Douglas V. Hall, Microprocessors and Interfacing, Programming and Hardware, Tata McGraw Hill Education, NewDelhi, Second Edition,2012.
- 3 Yu-Cheng Liu, Glenn A.Gibson, Microcomputer Systems: The 8086 / 8088 Family -Architecture, Programming and Design, Prentice Hall of India, New Delhi, Second Edition, 2007.
- 4 Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin Mc Kinlay, The 8051 Microcontroller and Embedded Systems: Using Assembly and C, Pearson education, New Delhi, Second Edition, 2011.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE431

Course Name: MICROPROCESSORS AND
MICROCONTROLLERS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Explain the programs based on 8085 microprocessor.</i>	3	3	-	-	-	-	-	-	1	-	-	-	-	-
CO2	<i>Practice the use of 8086 microprocessor for simple applications</i>	3	3	-	-	-	-	-	-	1	-	-	-	-	-
CO3	<i>Illustrate the concepts of multiprocessors</i>	3	3	2	-	3	-	-	-	1	-	-	2	-	-
CO4	<i>Design and interface devices with microprocessors.</i>	3	3	2	-	1	-	-	-	1	-	-	2	-	-
CO5	<i>Design and implement 8051 microcontroller based systems</i>	3	3	2	-	3	-	-	-	1	-	-	2	-	-
Average		3	3	3	2	3	-	-	-	1	-	-	2	2	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – IV

20CS421

JAVA PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: Basic knowledge of object oriented concepts**Course Outcomes: On Completion of this course , the student will be able to****Cognitive level**

CO1:	Apply the features of java to find optimal solution for the real world problems.	Apply
CO2:	Practically implement the concept of arrays, constructors, inheritance and overloading.	Apply
CO3:	Recall interface, abstract class and packages concepts.	Understand
CO4:	Outline the features of exception handling, string handling, threads and command line arguments practically.	Understand
CO5:	Examine the concept of database connectivity and to implement.	Analyze

List of Experiments:

1. Write a program to get n numbers in an array. Display the elements in ascending and descending order.
2. Write a program for student management system. Initialize the register number of the student through constructors.
3. Write a program for the following using inheritances
 - a) Finding area of sphere using single inheritance
 - b) Calculating performance of the students using multi-level inheritance
 - c) Students information manipulation using hierarchical inheritance
4. Write a program for calculating area of rectangle and triangle using interface
5. Write a program for employee management using packages.
6. Write a program for calculator operations and handle the exceptions
7. Write a program for manipulating strings.
8. Write a program using the concept of command line arguments
9. Write a program for threads (extending Threads class and implementing runnable interface)
10. Write a program to read and display the student details from the database using database connectivity

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS421

Course Name: **JAVA PROGRAMMING
LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Apply the features of java to find optimal solution for the real world problems.</i>	3	3	2	3	3	-	-	-	2	-	2	3	3	3
CO2	<i>Practically implement the concept of arrays, constructors, inheritance and overloading.</i>	3		2	3	2	-	-	-	2	-	2	3	3	3
CO3	<i>Recall interface, abstract class and packages concepts.</i>	3	3	1	3	2	-	-	-	1	-	3	2	3	2
CO4	<i>Outline the features of exception handling, string handling, threads and command line arguments practically.</i>	3	3	2	2	3	-	-	-	2	-	2	3	3	3
CO5	<i>Examine the concept of database connectivity and to implement.</i>	3	3	2	3	3	-	-	-	2	-	2	3	3	3
Average		3	3	2	3	2	-	-	-	2	-	2	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – IV

20CS422	DATABASE MANAGEMENT SYSTEMS LABORATORY	L	T	P	C
		0	0	3	1

Prerequisite: Basic Knowledge in Data Structures.

Course Outcomes: On Completion of this course , the student will be able to

Cognitive level

CO1: Design and implement a database schema for real time applications.	Apply
CO2: Populate and query a database.	Apply
CO3: Create and maintain tables using PL/SQL.	Apply
CO4: Utilize function and procedures on any application.	Apply
CO5: Apply trigger and generate report.	Apply

List of Experiments:

1. Create and apply DDL (SQL) statements for employee /student /bank /online shopping detail sets.
2. Perform data manipulation using DML (SQL) statements for employee /student /bank /online shopping detail sets.
3. Verify DCL and TCL (SQL) statements for employee /student /bank /online shopping detail sets.
4. Perform all the nested, join queries and set oriented operations for employee /student /bank /online shopping detail sets.
5. Create and apply view for employee /student /bank /online shopping detail sets.(create, insert, update and drop)
6. Write PL/SQL code to display employee details using explicit cursors, implicit cursors and cursor loop.
7. Write a PL/SQL function to find the sum, average, minimum and maximum salary of the employee and count the number of employees in a given company name.
8. Write a PL/SQL procedure to calculate for the following i) factorial ii) prime or not iii) biggest of three number.
9. Write and implement before and after insert, update and delete triggers for employee details.
10. Design and implement employee payroll system form design using visual basic and generate report.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS422

Course Name: DATABASE MANAGEMENT
 SYSTEMS LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Design and implement a database schema for real time applications.</i>	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO2	<i>Populate and query a database.</i>	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO3	<i>Create and maintain tables using PL/SQL.</i>	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO4	<i>Utilize function and procedures on any application.</i>	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO5	<i>Apply trigger and generate report.</i>	3	3	3	3	3	1	-	-	2	-	-	3	3	3
Average		3	3	3	3	3	1	-	-	2	-	-	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER - IV

20EE425 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

L	T	P	C
0	0	3	1

Prerequisite: Digital Systems Laboratory

Course Outcomes : On successful completion of the course, the student will be able to

Cognitive Level

CO1: Develop assembly language programming for 8085 microprocessor.	Understand
CO2: Build assembly language programming for 8086 microprocessor.	Understand
CO3: Illustrate programming concepts with 8051 microcontroller.	Understand
CO4: Analyze the program for Peripheral interfacing using 8085	Understand
CO5: Design the control word and develop the program for interface peripherals using 8051	Understand

LIST OF EXPERIMENTS

8085 Microprocessor

1. Arithmetic operations
2. Array processing
3. Code conversion.

8086 Microprocessor

4. Arithmetic operations
5. Sorting and searching and String manipulation
6. BIOS/DOS Calls: Keyboard control, Display control, File Manipulation

8051 Microcontroller

7. Perform Arithmetic & Logical and bit manipulation operations using 8051

Peripheral interfacing using 8085/8051

8. Programmable peripheral interface (8255)
9. Keyboard and display controller (8279)
10. Stepper motor

Total = 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE425

Course Name: MICROPROCESSORS AND
 MICROCONTROLLERS
 LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Develop assembly language programming for 8085 microprocessor.	3	3	-	-	-	-	-	-	3	-	-	2	-	-
CO2	Build assembly language programming for 8086 microprocessor.	3	3	-	-	-	-	-	-	3	-	-	2	-	-
CO3	Illustrate programming concepts with 8051 microcontroller.	3	3	-	-	-	-	-	-	3	-	-	2	-	-
CO4	analyze the program for Peripheral interfacing using 8085	3	3	-	-	3	-	-	-	3	-	-	2	-	-
CO5	Design the control word and develop the program for interface peripherals using 8051	3	3	-	-	3	-	-	-	3	-	-	2	-	-
Average		3	3		-	3	-	-	-	3	-	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20HR532

Course Name: CAREER DEVELOPMENT SKILLS - II

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Speak and write appropriately by understanding verbal and logical reasoning</i>	-	-	-	-	-	-	-	-	2	3	-	3	2	2
CO2	<i>Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions</i>	-	-	-	-	-	-	-	-	2	3	-	3	2	2
CO3	<i>Enhance their skills on quantitative aptitude</i>	-	-	-	-	-	-	-	-	2	3	-	3	2	2
CO4	<i>Speak and write appropriately by understanding and applying the basic grammatical rules</i>	-	-	-	-	-	-	-	-	2	3	-	3	2	2
CO5	<i>Critically evaluate problems related to quantitative aptitude</i>	-	-	-	-	-	-	-	-	2	3	-	3	2	2
Average		-	-	-	-	-	-	-	-	2	3	-	3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V

20CS511	PRINCIPLES OF COMPILER DESIGN	L	T	P	C
		3	1	0	4

Prerequisite: Basic knowledge about Theory of Computation.

Course Outcomes : On successful completion of the course, the student will be able to **Cognitive Level**

CO1:	Infer the knowledge about how to implement system software like assembler, loader and linker.	Understand
CO2:	Analyze the output generated in each phase of the compiler and Construct Finite Automata and apply minimization techniques.	Analyze
CO3:	Develop and analyze various top down and bottom up parsers.	Apply
CO4:	Construct intermediate code for programming constructs.	Apply
CO5:	Design and analyze code generation schemes and optimized compilers.	Create

UNIT – I ASSEMBLER, LINKER AND LOADER [12]

Overview of Language Processors – SIC architecture – Assemblers: Functions – Data Structures – Design of Two Pass Assembler. Loaders and Linkers: Basic Loader Functions – Types of Loaders – Design of Absolute Loader – Simple Bootstrap Loader – Design of Dynamic Linking Loader.

UNIT – II COMPILER AND LEXICAL ANALYSIS [12]

The Phases of Compiler – Cousins of Compiler – The Grouping of Phases – Compiler Construction Tools – Need and Role of Lexical Analyzer – Specification and Recognition of Tokens – Lex – Converting Regular Expression to DFA(Direct and Indirect method) – Minimization of DFA.

UNIT – III SYNTAX ANALYSIS [12]

Need and Role of the Parser – Context Free Grammar – Top Down Parsing: Recursive Descent Parser – Predictive Parser – LL(1) Parser – Bottom up parsing: Shift Reduce Parser – Operator Precedence Parser – LR Parser – Construction of SLR Parsing Table – CLR Parser – LALR Parser – Error Handling and Recovery in Syntax Analyzer – YACC.

UNIT – IV INTERMEDIATE CODE AND RUN TIME ENVIRONMENT [12]

Intermediate Languages: Postfix Notation – Syntax tree – Three Address Code. Implementation of Three Address Code – Declarations – Assignment statements – Boolean Expressions – Case statements – Back patching – Procedure Calls. Run time environment: Source Language Issues – Storage Organizations – Storage Allocation Strategies.

UNIT – V CODE OPTIMIZATION AND CODE GENERATION [12]

Principal Sources of Optimization – Peephole Optimization – Basic Blocks and Flow Graphs – DAG Representation of Basic Blocks – Optimization of Basic Blocks – Global Data Flow Analysis – Code Improving Transformations – Issues in a Design of Code Generator – Simple Code Generator Algorithm.

Total (L: 45 T:15) = 60 Periods

Text Books :

- 1 Alfred V Aho, Monica S Lam, Ravi Sethi and Jeffrey D Ullman, Compilers – Principles, Techniques and Tools, Pearson Education, India, Second Edition, 2014.
- 2 Leland L. Beck, System Software -An Introduction to Systems Programming, Pearson Education, Asia, Fifth Edition, 2006.

Reference Books :

- 1 Steven S. Muchnick, Advanced Compiler Design and Implementation, Morgan Kaufmann Publishers - Elsevier Science, India, Seventh Edition Reprint 2012.
- 2 Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures: A Dependence-based Approach, Morgan Kaufmann Publishers, United States, Second Edition, 2008
- 3 Keith D Cooper and Linda Torsion, Engineering a Compiler, Morgan Kaufmann Publishers Elsevier Science, Pearson Education, New Delhi, Third Edition, 2008.
- 4 <https://nptel.ac.in/courses/106108113>.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS511

Course Name: PRINCIPLES OF COMPILER DESIGN

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Infer the knowledge about how to implement system software like assembler, loader and linker.</i>	3	3	3	3	3	1	1	-	1	-	-	3	3	3
CO2	<i>Analyze the output generated in each phase of the compiler and Construct Finite Automata and apply minimization techniques.</i>	3	3	3	3	3	2	1	-	1	-	-	3	3	3
CO3	<i>Develop and analyze various top down and bottom up parsers.</i>	3	3	3	3	3	2	1	-	1	-	-	3	3	3
CO4	<i>Construct intermediate code for programming constructs.</i>	3	3	3	3	3	2	1	-	1	-	-	3	3	3
CO5	<i>Design and analyze code generation schemes and optimized compilers.</i>	3	3	3	3	3	2	1	-	1	-	-	3	3	3
Average		3	3	3	3	3	2	1	-	1	-	-	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V**20CS512****WEB PROGRAMMING**

L	T	P	C
3	0	0	3

Prerequisite: Basic knowledge about problem solving techniques.**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Outline the technologies around the internet.

Understand

CO2: Construct the idea of web designing at user interface.

Apply

CO3: Infer the knowledge of data processing on client and server side.

Analyze

CO4: Create the web oriented response at server side.

Create

CO5: Design and handle the online database and web service.

Create

UNIT-I INTRODUCTION TO WEB [9]

Web Essentials: Clients, Servers, and Communications. The Internet – History – Basic Internet Protocols: TCP and IP – DNS – URL. The World Wide Web – HTTP: Request Message – Response Message – Web Clients – Web Servers – Case Study.

UNIT – II BASICS OF HTML AND CSS [9]

HTML: An Introduction to HTML History and Version - Structure of HTML Page – HTML tags for data formatting – Tables – Links – Images – List – Frames – Forms – Media – HTML 5 Tags and Validation. Style Sheets: CSS Syntax and Structure – CSS Rules for Backgrounds, Colours, and Properties – Manipulating Texts, Fonts, borders and Boxes – Margin – Padding Lists – CSS Positioning. Animations – Tool tips – Wildcard Selectors in CSS – Basics of frameworks like Bootstrap.

UNIT – III CLIENT SIDE SCRIPTING [9]

JavaScript: Syntax and Execution – Internal, embedded and External JavaScript. JavaScript: Variables – Arrays – Functions – Conditions – Loops – Type Conversion – Objects and DOM – Inbuilt Functions – Validation and Regular Expressions – Event Handling. JQuery: Introduction – Syntax – Selectors – Events – Effects.

UNIT-IV SERVER SIDE SCRIPTING [9]

NODE: Getting Started – Modules – File System – Debugger – Automation and Deployment. Servlet: Servlet API – Interface – Classes – Life Cycle – Servlet Request – Request Dispatcher – ServletConfig – ServletContext – Attribute – Session Tracking. JSP: Introduction – Life Cycle – Scriptlet – Expression – Declaration – Implicit Objects – Directive Elements – JSP Exceptions – Action Elements.

UNIT –V WEB SERVICE AND DATABASE [9]

AJAX: Introduction – XMLHttpRequest: Request – Response – AJAX XML File. JSON: Introduction – Syntax – JSON Vs XML – JDBC: Introduction – Drivers – Driver Manager – Connection – Statement – Result Set. MongoDB: Introduction – Advantages – Database – Collection – Data Types.

Total = 45 Periods**Text Books :**

- 1 Randy Connolly and Ricardo Hoar, Fundamentals of Web Development, Pearson Education, New Delhi, Third Edition, 2022.
- 2 Paul Deitel, Harvey Deitel and Abbey Deitel, Internet and World Wide Web – How to Program, Pearson Education, New Delhi, Fifth Edition, 2018.

Reference Books :

- 1 Chris Bates, Web Programming – Building Internet Applications, John Wiley & Sons Ltd, USA, Third Edition, 2007.
- 2 John Dean, Web Programming With HTML5, CSS and JavaScript, Jones and Bartlett Publishers, Inc, United States, Third Edition, 2018.
- 3 Jon Duckett, Beginning Web Programming With HTML, XHTML and CSS, Wiley Publishing Inc, India, Second Edition, 2008.
- 4 <https://nptel.ac.in/courses/106106222>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS512

Course Name: WEB PROGRAMMING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Outline the technologies around the internet.</i>	3	3	3	3	3	2	-	-	-	-	3	3	3	3
CO2	<i>Construct the idea of web designing at user interface.</i>	3	3	3	3	3	2	-	-	-	-	2	3	3	2
CO3	<i>Inference the knowledge of data processing on client and server side.</i>	3	3	3	3	3	1	-	-	-	-	2	2	3	3
CO4	<i>Create the web oriented response at server side.</i>	3	3	3	2	3	2	-	-	-	-	1	2	3	2
CO5	<i>Design and handle the online database and web service.</i>	3	2	3	3	3	2	-	-	-	-	2	3	3	2
Average		3	3	3	3	3	2	-	-	-	-	2	3	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER– V

20CS513

OBJECT ORIENTED ANALYSIS AND DESIGN

L	T	P	C
3	0	0	3

Prerequisite: Basic knowledge about Software Engineering.**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Aware of the object model for System development.

Understand

CO2: Express software design with UML diagrams.

Understand

CO3: Identify the concept of Relationships.

Understand

CO4: Acquire knowledge in object oriented design and protocols.

Create

CO5: Obtain information about software quality assurance and system usability.

Apply

UNIT – I OVERVIEW OF OBJECT ORIENTED ANALYSIS AND DESIGN [9]

An Overview of Object Oriented Systems Development – Object Basics – Object Oriented System Development Life Cycle – The software development process – Building high quality software and Reusability.

UNIT – II OBJECT ORIENTED METHODOLOGIES AND MODELLING [9]

Rum Baugh Methodology – Booch Methodology – Jacobson Methodology – Patterns – Frameworks – Unified Approach – Unified Modelling Language – Class diagram – Use case diagram – Interaction Diagram – State chart Diagram – Activity diagram – Package Diagram – Implementation Diagram.

UNIT – III OBJECT ORIENTED ANALYSIS [9]

Identifying use cases – Use case model – Classification – Approaches for Identifying Classes: Noun Phrase Approach – Common Class Patterns Approach – Use case Driven approach – Classes, Responsibilities and Collaborators – Identifying Object Relationships, Attributes and Methods.

UNIT – IV OBJECT ORIENTED DESIGN [9]

Object Oriented Design Axioms – Designing Classes – Refining attributes – Designing methods and protocols – Access Layer – Object Storage and Object Interoperability.

UNIT – V SOFTWARE QUALITY AND SYSTEM USABILITY [9]

Designing Interface Objects – Software Quality Assurance – System usability – Measuring User Satisfaction.

Total = 45 Periods**Text Books :**

- 1 Ali Bahrami, Object Oriented Systems Development, Tata McGraw-Hill, New Delhi, Fifth Edition, 2015
- 2 Mahesh P.Matha, Object Oriented Analysis and Design Using UML, PHI, India, Second Edition, 2010.

Reference Books :

- 1 Cay Horstmann, Object Oriented Design & Patterns, Wiley India, New Delhi, Fifth Edition, 2015.
- 2 Martin Fowler, UML Distilled, PHI/Pearson Education, Bangalore, Third Edition, 2011.
- 3 Srinivasan Desikan, Gopalaswamy Ramesh, Software Testing, Pearson Education, New Delhi, Sixth Edition, 2008.
- 4 https://onlinecourses.nptel.ac.in/noc16_cs19.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS513

Course Name: OBJECT ORIENTED ANALYSIS AND DESIGN

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Aware of the object model for System development.</i>	3	3	3	3	3	-	-	-	2	-	2	3	3	3
CO2	<i>Express software design with UML diagrams.</i>	3	2	2	3	3	-	-	-	2	-	2	3	3	3
CO3	<i>Identify the concept of Relationships</i>	3	3	2	3	3	-	-	-	1	-	3	3	3	3
CO4	<i>Acquire knowledge in object oriented design and protocols.</i>	3	3	3	2	3	-	-	-	2	-	2	3	3	3
CO5	<i>Obtain information about software quality assurance and system usability.</i>	3	3	3	3	3	-	-	-	2	-	2	3	3	3
Average		3	3	3	3	3	-	-	-	2	-	2	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – V

20CS514	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge about computer organization and architecture.

Course Outcomes : On successful completion of the course, the student will be able to	Cognitive Level
CO1: Demonstrate the key concepts and functions of physical layer.	Remember
CO2: Analyze the various flow and error control techniques and identify the best method for data transmission.	Analyze
CO3: Design the network layer packet delivery using appropriate routing algorithms.	Create
CO4: Apply transport layer services using TCP or UDP protocols.	Apply
CO5: Identify the suitable network services for the given network applications.	Analyze

UNIT – I DATA COMMUNICATIONS [9]

Data Communication: Data Representation – Data Flow-Networks: Topology – Types – Protocols and Standards – Network Models: TCP/IP – OSI Model – Transmission Media – Wired LANs: Ethernet – Standard Ethernet – Fast Ethernet – Gigabit Ethernet – Wireless LAN – IEEE 802.11 – Connecting Devices.

UNIT – II DATA LINK LAYER [9]

Introduction – Link Layer Addressing – Error Detection and Correction – Block Coding – Cyclic Codes – Checksum – Hamming Code – Data Link Control – Stop and Wait Protocol – Go Back N Protocol – Selective Repeat Protocol – Piggybacking – Medium Access Control.

UNIT – III NETWORK LAYER [9]

Network Layer Services – Packet Switching – Internet Protocol – Forwarding of IP Packets – Logical Addressing: IPv4 Addressing – IPv6 Addressing – Unicast Routing: RIP, OSPF and BGP – Multicast Routing: IGMP

UNIT – IV TRANSPORT LAYER [9]

Process to Process Communication – Transport layer Protocols: User Datagram Protocol: Datagram – Services – Applications – Transmission Control Protocol: Services – Features – Segment – Connections – Congestion control – Timers.

UNIT – V APPLICATION LAYER AND NETWORK MANAGEMENT [9]

DNS – FTP – E-MAIL: SMTP, MIME, POP3, IMAP, Web Mail – TELNET – SSH – WWW and HTTP – SNMP.

Total = 45 Periods**Text Books :**

- 1 Behrouz A. Forouzan, Data Communications and Networking, Tata McGraw Hill Education, USA, Sixth Edition, 2018.
- 2 William Stallings, Data and Computer Communications, Pearson Education, New Delhi, Tenth Edition, 2013.

Reference Books :

- 1 Larry L. Peterson and Bruce S. Davie, Computer Networks: A Systems Approach, Morgan Kauffmann Publishers Inc., United States, Sixth Edition, 2021.
- 2 Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, Prentice Hall, Delhi, Sixth Edition, 2021.
- 3 James F. Kurose, Keith W. Ross, Computer Networking, Pearson Education, Delhi, Eighth Edition, 2021.
- 4 <http://nptel.ac.in/syllabus/106105081/>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS514

Course Name: COMPUTER NETWORKS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Demonstrate the key concepts and functions of physical layer.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO2	<i>Analyze the various flow and error control techniques and identify the best method for data transmission.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO3	<i>Design the network layer packet delivery using appropriate routing algorithms.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO4	<i>Apply transport layer services using TCP or UDP protocols.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO5	<i>Identify the suitable network services for the given network applications.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
Average		2	3	2	2	3	-	-	-	2	2	1	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER –V

20CS515	ENTREPRENEURSHIP DEVELOPMENT	L	T	P	C
		3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On successful completion of the course, the student will be able to **Cognitive Level**

CO1: Explain the fundamentals of entrepreneurial activities. *Understand*

CO2: Describe the various practical exposure about the preparation of the business plan *Analyze*

CO3: Discuss the various supports from Government and other non-governmental organizations while starting an enterprise. *Understand*

CO4: Explain the fundamental concepts in the management of small Enterprises. *Understand*

CO5: Illustrate various Entrepreneurial Development Strategies *Apply*

UNIT – I INTRODUCTION [9]

Entrepreneur – Entrepreneurship – Women Entrepreneurs, Social Entrepreneurship – Family Business – Entrepreneurial Motivation – Entrepreneurial Competencies – Entrepreneurship Development programs

UNIT – II STARTUP ENTREPRENEURSHIP [9]

Micro and Small Enterprises – Opportunity Identification and Selection – Formulations of Business Plans – Project Appraisal – Financing of Enterprise – Forms of Business Ownership.

UNIT – III SUPPORT TO ENTREPRENEURS [9]

Institutional Finance to Entrepreneurs – Lease Financing and Hire Purchase – Institutional Support to Entrepreneurs – Taxation Benefits to Small-Scale Enterprises – Government Policy for Small-Scale Enterprises.

UNIT – IV ENTREPRENEURSHIP MANAGEMENT [9]

Fundamentals of Management – Working Capital Management – Inventory Management – Production Management – Marketing Management – Human Resources Management – Total Quality Management for Small-Scale Enterprises.

UNIT – V DEVELOPMENT OF ENTERPRISES [9]

Intellectual Property Rights – Growth Strategies – Success in Small Enterprise – E-commerce – Franchising – Social Responsibility of Business – Case Studies.

Total = 45 Periods

Text Books :

- 1 S.S. Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, First Edition (Reprint), 2020.
- 2 Vasant Desai, The Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, Mumbai, Sixth Edition, 2018.

Reference Books :

- 1 M.B. Shukla, Entrepreneurship & Small Business Management, KitabMahal, New Delhi, Second Edition, 2015.
- 2 Madhurimalall, Entrepreneurship, Excel Books, New Delhi, First Edition, 2016
- 3 Rajshankar, Entrepreneurship theory and practice, McGraw Hill, New Delhi , First Edition 2017
- 4 https://onlinecourses.swayam2.ac.in/ntr22_ed08/preview

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS515

Course Name: **ENTREPRENEURSHIP
DEVELOPMENT**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Explain the fundamentals of entrepreneurial activities.</i>	2	2	1	-	1	-	1	1	-	3	1	1	2	2
CO2	<i>Describe the various practical exposure about the preparation of the business plan</i>	2	2	3	-	2	-	2	1	-	3	1	1	3	3
CO3	<i>Discuss the various supports from Government and other non-governmental organizations while starting an enterprise.</i>	1	1	2	-	1	-	1	2	-	2	3	2	3	2
CO4	<i>Explain the fundamental concepts in the management of small Enterprises.</i>	2	2	2	-	2	-	2	2	-	3	1	2	2	2
CO5	<i>Illustrate various Entrepreneurial Development Strategies</i>	2	2	2	-	2	-	2	2	-	3	1	2	3	3
Average		2	2	2	-	2	-	2	2	-	3	1	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – V

20CS521	WEB PROGRAMMING LABORATORY	L	T	P	C
		0	0	3	1

Prerequisite: Basic knowledge about problem solving techniques.

Course Outcomes: On Completion of this course, the student will be able to

Cognitive level

CO1: Design simple web pages using markup languages like HTML and XHTML.	Create
CO2: Create dynamic web pages using DHTML and java script that is easy to navigate and use.	Create
CO3: Program Server side web pages that have to process request from client web pages.	Create
CO4: Represent web data using XML and develop web pages using JSP.	Create
CO5: Deploy various web services and how these web services interact,	Analyze

LIST OF EXPERIMENTS:

1. Create a web page with the following using HTML.
 - a. To embed an image in a web page.
 - b. To fix the hot spot.
 - c. Show all the related information when the hot spots are clicked.
2. Create a web page with all types of cascading style sheets.
3. Develop Client Side Scripts for Validating Web Form Controls using DHTML.
4. Installation of Apache Tomcat Web Server.
5. Write Programs in Java using Servlets.
 - a. To invoke servlets from HTML forms.
 - b. Session Tracking.
6. Write programs in java to create three-tier applications using JSP and Databases
 - a. For conducting on-line examination.
 - b. For displaying mark list. Assume that student information is available in a database which has been stored in a database server.
7. Program using XML – Schema – XSLT/XSL.
8. Program using DOM and SX Parsers.
9. Program using AJAX.
10. Consider a case where we have two web services – an airline service and a travel agent. The travel agent is searching for an airline. Implement this scenario using Web Service and Database.

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS521

Course Name: WEB PROGRAMMING
LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Design simple web pages using markup languages like HTML and XHTML.</i>	3	3	3	1	1	-	-	-	1	-	-	1	3	2
CO2	<i>Create dynamic web pages using DHTML and java script that is easy to navigate and use.</i>	3	3	3	2	2	-	-	-	1	-	-	1	3	2
CO3	<i>Program Server side web pages that have to process request from client web pages.</i>	3	3	2	2	1	-	-	-	2	-	-	1	3	2
CO4	<i>Represent web data using XML and develop web pages using JSP.</i>	3	3	2	1	2	-	-	-	1	-	-	1	3	1
CO5	<i>Deploy various web services and how these web services interact,</i>	3	3	3	2	2	-	-	-	2	-	-	1	3	2
Average		3	3	3	2	2	-	-	-	1	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V

20CS522	COMPUTER NETWORKS LABORATORY	L	T	P	C
		0	0	3	1

Prerequisite: Basic Knowledge about Java Programming

Course Outcomes: On Completion of this course, the student will be able to

CO1: Demonstrate the various network topologies.

CO2: Implement the performance of error control and data link layer protocols.

CO3: Create and analyze the routing algorithms and congestion control mechanism.

CO4: Apply TCP and UDP to Infer network security and communication.

CO5: Be aware of the simulation of Network simulator.

Cognitive level

Remember

Evaluate

Analyze

Apply

Understand

LIST OF EXPERIMENTS:

1. Study of Network topology configuration and Network Devices in detail.
2. Connect the computers in Local Area Network.
3. Simulation of error detecting code using CRC.
4. Simulation of Stop and wait protocol.
5. Simulation of Go Back-N and selective repeat protocols.
6. Simulation of Distance vector routing algorithm.
7. Simulation of Link state routing algorithm.
8. Apply Caesar cipher security algorithm for network security.
9. Apply TCP program for date/time server.
10. Simple UDP socket program for echo server client chat.
11. Develop a program for congestion control using Leaky bucket algorithm.
12. Study the simulation of Network Simulator

Total : 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS522

Course Name: **COMPUTER NETWORKS
LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Demonstrate the various network topologies.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO2	<i>Implement the performance of error control and data link layer protocols.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO3	<i>Create and analyze the routing algorithms and congestion control mechanism.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO4	<i>Apply TCP and UDP to Infer network security and communication.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
CO5	<i>Be aware of the simulation of Network simulator.</i>	2	3	2	2	3	-	-	-	2	2	1	2	3	2
Average		2	3	2	2	3	-	-	-	2	2	1	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER - V

20HR533	CAREER DEVELOPMENT SKILLS - III	L	T	P	C
		2	0	0	0

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes : On successful completion of the course, the student will be able to

	Cognitive Level
CO1: Understand the nearness of leading various texts.	Apply
CO2: Perform well in verbal and logical reasoning.	Apply
CO3: Understand and develop the etiquette necessary to present oneself in a professional setting.	Understand
CO4: Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.	Create
CO5: Enhance the comprehension Skills in core subjects.	Apply

UNIT – I WRITTEN AND ORAL COMMUNICATION – PART 1 [6]

Reading Comprehension Level 3 – Self-Introduction – News Paper Review – Self-Marketing – Debate – Structured and Unstructured GDs Psychometric Assessment – Types and strategies to answer the questions – Practices : Sentence Completion – Sentence Correction – Jumbled Sentences – Synonyms and Antonyms – Using the same word as different parts of speech – Interpretation of Pictorial Representations – Editing.

UNIT – II VERBAL AND LOGICAL REASONING – PART 2 [6]

Syllogism – Assertion and Reasons – Statements and Assumptions – Identifying Valid Inferences – Identifying strong arguments and weak arguments – Statements and Conclusions – Cause and Effect – Deriving conclusions from passages – Seating Arrangements – Practices : Analogies – Blood Relations – Statement and Conclusions.

UNIT – III QUANTITATIVE APTITUDE – PART 3 [6]

Probability – Calendar – Clocks – Logarithms – Permutations and Combinations.

UNIT – V QUANTITATIVE APTITUDE – PART 4 [6]

Algebra – Linear Equations – Quadratic Equations – Polynomials – Problem on Numbers – Ages – Train – Time and Work – Sudoku – Puzzles.

UNIT – V DOMAIN PROFICIENCY [6]

C Language – Control Structures – Data Types – Arrays – Operators – Functions – Structures – Pointers – Files.

Total (L= 0, T = 30) = 30 Periods

Text Books :

- 1 Anne Laws, Writing Skills, Orient Black Swan, Hyderabad, 2011.
- 2 Abhijit Guha, Quantitative Aptitude, TMH, New Delhi, Third Edition, 2009

Reference Books :

- 1 Agarwal. R.S ,A.Modern Approach to Verbal and Non- verbal Reasoning, Revised Edition 2008, Reprint 2009, S.Chand& Co Ltd., New Delhi.
- 2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2005.
- 3 M.B. Lal & Goswami, Objective Instant Arithmetic, Upkar Publications, New Delhi, second edition, 2012.
- 4 Norman Lewis. W.R., Word Power Made Easy, Goyal Publications
- 5 Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2013.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CO-PO MAPPING

Regulation: R 2020

Course Code: 20HR533

Course Name: CAREER DEVELOPMENT SKILLS - III

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Understand the nearness of leading various texts.</i>	-	-	-	-	-	-	-	1	3	3	-	-	1	1
CO2	<i>Perform well in verbal and logical reasoning.</i>	-	-	-	-	-	-	-	1	3	3	-	2	1	1
CO3	<i>Understand and develop the etiquette necessary to present oneself in a professional setting.</i>	-	-	-	-	-	-	-	1	3	3	-	1	1	1
CO4	<i>Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.</i>	-	-	-	-	-	-	-	1	3	3	-	2	1	1
CO5	<i>Enhance the comprehension Skills in core subjects.</i>	-	-	-	-	-	-	-	1	3	3	-	-	1	1
Average		-	-	-	-	-	-	-	1	3	3	-	2	1	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V

20CS561	DISTRIBUTED SYSTEMS (PROFESSIONAL ELECTIVE - I)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge about operating systems

Course Outcomes : On successful completion of the course, the student will be able to	Cognitive Level
CO1: Identify the problems in developing distributed applications.	Understand
CO2: Discover feasibilities and impossibilities in managing resources.	Apply
CO3: Analyze the necessity of consistency and replication.	Analyze
CO4: Attain information about transactions concurrency control and distributed transactions	Understand
CO5: Acquire knowledge about distributed object and file systems.	Understand

UNIT – I OVERVIEW OF DISTRIBUTED SYSTEMS [9]

Introduction – Examples of Distributed Systems – Resource Sharing and Web – Challenges – API for Internet Protocol – External Data Representation and Marshalling – Remote Procedure Call – Communication Between Distributed Objects – Client Server Communication – Group Communication.

UNIT – II PROCESS AND SYNCHRONIZATION [9]

Processes – Threads – Communication and Invocation – Clocks, Events and Process States – Synchronization : Physical Clocks – Logical Time and Logical Clocks – Global States – Distributed Mutual Exclusion – Elections – Distributed Transactions.

UNIT – III CONSISTENCY AND REPLICATION [9]

Introduction – Data Centric Consistency Models – Client Centric Consistency Models – Distribution Protocols – Consistency Protocols – Casually Consistent – Lazy Replication.

UNIT – IV CONCURRENCY CONTROL AND DISTRIBUTED TRANSACTIONS [9]

Transactions and Concurrency Control: Introduction – Transactions – Nested Transactions – Locks – Optimistic Concurrency Control – Timestamp Ordering – Comparison of Methods for Concurrency Control. Distributed Transactions: Introduction – Flat and Nested Distributed Transactions – Atomic Commit Protocols – Concurrency Control in Distributed Transactions – Distributed Deadlocks – Transaction Recovery.

UNIT – V DISTRIBUTED OBJECT AND FILE SYSTEMS [9]

Distributed Object Based System – CORBA – COM+ – Distributed File System – Sun NFS – Andrew File System – Distributed Coordination Based System – JINI.

Total = 45 Periods

Text Books :

- 1 George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, Distributed Systems: Concepts and Design, Pearson Education, Fifth Edition, New Delhi, 2017.
- 2 Andrew S. Tanenbaum, Maarten Van Steen, Distributed Systems, Pearson Education, New Delhi, Third Edition, 2017.

Reference Books :

- 1 Sunita Mahajan and Seema Shah, Distributed Computing, Oxford Higher Education, UK, Second Edition, 2013.
- 2 A.S. Tanenbaum, Distributed Operating Systems, Pearson Education, New Delhi, 2011.
- 3 Ajay D. Kshemkalyani and Mukaeshsinghal, Distributed Computing Principles Algorithms & Systems, Cambridge University press, UK, 2017
- 4 <http://nptel.ac.in/syllabus/106106107/>.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS561

Course Name: DISTRIBUTED SYSTEMS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Identify the problems in developing distributed applications.	3	3	2	2	2	1	-	-	-	2	-	2	-	-
CO2	Discover feasibilities and impossibilities in managing resources.	3	3	3	2	2	1	-	-	-	1	-	2	-	-
CO3	Analyze the necessity of consistency and replication.	3	3	1	1	2	1	-	-	-	2	-	2	-	-
CO4	Attain information about transactions concurrency control and distributed transactions	3	1	2	2	2	1	-	-	-	2	-	2	-	-
CO5	Acquire knowledge about distributed object and file systems.	3	3	2	1	2	1	-	-	-	1	-	2	-	-
Average		3	3	2	2	2	1	-	-	-	2	-	2	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V

	L	T	P	C
201E591				
AUGMENTED INTELLIGENCE LED MANAGED SERVICES (AIMS) – I				
(Common To CS,EC,EE & IT)				
(PROFESSIONAL ELECTIVE - I)	3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes : On successful completion of the course, the student will be able to

CO1: Identify the operation policies and procedures based on how the organization

CO2: Analysing the procedures to achieve a safe working environment in line with health and safety regulation.

CO3: Apprehend the Key Concepts of Service Management of IT-enabled services

CO4: Recognize an IT Infrastructure and Information Security

CO5: Implement the policies in Microsoft 365.

Cognitive Level

Understand

Analyze

Create

Analyze

Understand

UNIT – I IT OPERATIONS [9]

Evolution of Technologies – IT Operations Introduction – Policies – Roles –Support – Procedures for Managing Problems and Incidents

UNIT– II SECURE WORKING ENVIRONMENT AND ETIQUETTE [9]

Introduction – Safety Enforcement – National Standards – Safety Compliance – Health and Safety Awareness – Components of Etiquette – Professionalism and Ethics – Etiquette Standards – Email Communication – Business Meetings, Grooming and Personal Attire – Dining Etiquette

UNIT– III ITIL [9]

Introduction – Understanding ITIL Guiding Principles in an Organization – Optimize and Automate – Four Dimensions of Service Management – Key Activities of the Service Value Chain

UNIT – IV IT INFRASTRUCTURE AND INFORMATION SECURITY [9]

IT Infrastructure – Hardware, Software, Network – IT Infrastructure Types – Designing, Maintenance – Risks faced by Computer Systems and Networks – Analyzing Security Problems – Standard Security Mechanism

UNIT – V AMS AND TOOLS [9]

Introduction – Support Models – Activities Type – Audits – Microsoft 365 – Domain Management – Licensing – Managing Teams – Meeting Policies – Messaging Policies

Total = 45 Periods

Text Books :

- 1 Eric N. Smith, Workplace Security Essentials. A Guide for Helping Organizations Create Safe Work Environments, Butterworth Heinemann, Elsevier, United States of America, 2014
2. AXELOS, ITIL Foundation ITIL 4 Edition, AXELO Limited, London, Second Edition, 2019

Reference Books :

- 1 John R. Vacca, Cyber Security and IT Infrastructure Protection, Syngress, ELSEVIER, United States of America ,First Edition, 2014
- 2 <https://docs.microsoft.com/en-us/learn/m365/>

CO-PO MAPPING

Regulation: R 2020

Course Code: 20IE591

Course Name: AUGMENTED INTELLIGENCE LED
MANAGED SERVICES (AIMS) – I

CO	Course Outcomes	Programme Outcomes														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	Identify the operation policies and procedures based on how the organization	3	3	3	1	1	2	2	1	3	3	3	3	3	3	
CO2	Analysing the procedures to achieve a safe working environment in line with health and safety regulation.	3	3	1	2	-	2	2	3	2	3	2	2	2	2	
CO3	Apprehend the Key Concepts of Service Management of IT-enabled services	3	-	3	3	3	1	1	1	2	3	1	2	3	3	
CO4	Recognize an IT Infrastructure and Information Security	3	3	3	3	-	3	2	3	2	3	1	1	2	3	
CO5	Implement the policies in Microsoft 365.	3	2	1	1	1	-	1	-	1	1	2	3	3	3	
Average		3	3	3	2	1	2	2	2	2	2	3	2	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – V

20CS563	DATA WAREHOUSING AND DATA MINING	L	T	P	C
	(PROFESSIONAL ELECTIVE - I)	3	0	0	3

Prerequisite: Basic knowledge of Database Management Systems.

Course Outcomes : On successful completion of the course, the student will be able to	Cognitive Level
CO1: Demonstrate a Data warehouse system to perform business analysis with OLAP tools	Understand
CO2: Decide suitable pre-processing and visualization techniques for data analysis	Evaluate
CO3: Apply frequent pattern and association rule mining techniques for data analysis	Apply
CO4: Apply appropriate classification and clustering techniques for data analysis	Apply
CO5: Design a real-time application using recent data mining software	Create

UNIT – I BASICS OF DATA WAREHOUSE [9]

Basic Concepts – Data Warehouse Modeling – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization by Attribute Oriented Induction.

UNIT– II DATA MINING AND DATA PREPROCESSING [9]

Data Mining : Introduction – Kinds of Data – Data Mining Functionalities – Classification of Data Mining Systems – Data Mining Task Primitives – Data Mining Applications – Major Issues in Data Mining – Data Preprocessing – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

UNIT– III ASSOCIATION RULE MINING [9]

Mining Frequent Patterns, Associations and Correlations: Basic Concepts – Frequent Item set Mining Methods – Pattern Evaluation Methods – Pattern Mining in Multilevel – Multidimensional Space – Constraint Based Frequent Pattern Mining – Mining High Dimensional Data and Colossal Patterns.

UNIT – IV CLASSIFICATION TECHNIQUES [9]

Basic Concepts – Decision Tree Induction – Bayes Classification Methods – Rule Based Classification – Techniques to Improve Classification Accuracy – Classification by Backpropagation – Support Vector Machine – Classification Using Frequent Patterns – Lazy Learners – Other Classification Methods.

UNIT– V CLUSTER ANALYSIS AND DATA MINING TOOLS [9]

Cluster Analysis – Requirements for Cluster Analysis – Clustering Methods – Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Model Based Clustering Methods – Machine Learning with Open Source and Commercial Software – Machine Learning with WEKA – XLMiner.

Total = 45 Periods**Text Books :**

- 1 Jaiwei Han, Micheline Kamber and Jian Pei, Data Mining Concepts and Techniques, Morgan Kauffman, US, Third Edition, 2012.
- 2 K.P. Soman, Shyam Diwakar and V. Ajay, Insight into Data mining Theory and Practice, PHI/Eastern Economy, UK, Fifth Edition, 2014.

Reference Books :

- 1 Alex Berson and Stephen J.Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill, India, Thirty Fifth Edition, 2016.
- 2 G. K. Gupta, Introduction to Data Mining with Case Studies, Prentice Hall of India, India, Third Edition, 2014.
- 3 Ian H.Witten and Eibe Frank, Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, US, Third Edition, 2011.
- 4 https://onlinecourses.nptel.ac.in/noc20_cs12/preview

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS563

Course Name: DATA WAREHOUSING AND DATA MINING

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Illustrate a Data warehouse system to perform business analysis with OLAP tools</i>	3	2	3	3	1	1	-	-	-	-	-	3	3	3
CO2	<i>Decide suitable pre-processing and visualization techniques for data analysis</i>	3	3	3	3	3	2	-	-	-	-	-	3	3	3
CO3	<i>Apply frequent pattern and association rule mining techniques for data analysis</i>	3	3	3	3	3	2	-	-	-	-	-	3	3	3
CO4	<i>Apply appropriate classification and clustering techniques for data analysis</i>	3	3	3	3	3	2	-	-	-	-	-	3	3	3
CO5	<i>Design a real-time applications using recent data mining software</i>	3	3	3	3	3	2	-	-	-	-	-	3	3	3
Average		3	3	3	3	3	2	-	-	-	-	-	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER – V

20CS564	OPEN SOURCE TECHNOLOGIES (PROFESSIONAL ELECTIVE - I)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of Operating Systems and Database management systems.

Course Outcomes : On successful completion of the course, the student will be able to

Cognitive Level

CO1: Comprehend the need of open source software's.	Understand
CO2: Develop skills in analyzing the usability of My SQL.	Create
CO3: Generate an application based upon the concepts of PHP.	Apply
CO4: Implement python programming to construct small to large scale applications.	Create
CO5: Develop hands on experience using Perl concepts.	Apply

UNIT – I INTRODUCTION TO OPEN SOURCES [9]

Introduction to Open Sources – Need of Open Sources – Advantages of Open Sources – Application of Open Sources – Open Source Operating Systems: LINUX: Introduction – General Overview – Kernel Mode and User Mode – Development with Linux.

UNIT – II MYSQL TECHNIQUES [9]

Introduction – Setting up Account – Record Selection Technology – Working with Strings – Date and Time – Sorting Query Results – Generating Summary – Working with Metadata – Using Sequences.

UNIT – III WORKING WITH PHP [9]

Introduction – Programming in Web Environment – Variables – Constants –Data; Types – Operators – Statements – Functions – Arrays – OOP – String Manipulation and Regular Expression – File Handling and Data Storage – PHP and SQL Database – PHP and LDAP – PHP Connectivity – Sending and Receiving E-mails.

UNIT – IV PYTHON CONDITIONS AND FUNCTIONS [9]

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT – V PERL STRUCTURES AND MODULES [9]

Perl Background – Perl Overview – Perl Parsing Rules – Variables and Data – Statements and Control Structures – Subroutines – Packages and Modules – Working with Files – Data Manipulation.

Total = 45 Periods

Text Books :

- 1 Martin C. Brown, Perl: The Complete Reference, Tata McGraw-Hill, India, Second Edition, 2015.
- 2 Remy Card, Eric Dumas and Frank Mevel, The Linux Kernel Book, Wiley Publications, New Jersey, United States, Third Edition, 2003

Reference Books :

- 1 Steven Holzner, PHP: The Complete Reference, Tata McGraw-Hill, Indian Reprint, Second Edition, 2009
- 2 Vikram Vaswani, MYSQL: The Complete Reference, Tata McGraw-Hill, Indian Reprint, Second edition, 2009.
- 3 <http://dev.mysql.com>.
4. <https://nptel.ac.in/courses/108108166>.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS564

Course Name: OPEN SOURCE TECHNOLOGIES

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Comprehend the need of open source software's.	3	3	3	3	3	-	-	-	2	-	2	3	3	3
CO2	Develop skills in analyzing the usability of MySQL.	3	2	2	3	3	-	-	-	2	-	2	3	3	3
CO3	Generate an application based upon the concepts of PHP.	3	3	2	3	3	-	-	-	1	-	3	3	3	3
CO4	Implement python programming to construct small to large scale applications.	3	3	3	2	3	-	-	-	2	-	2	3	3	3
CO5	Develop hands on experience using Perl concepts.	3	3	3	3	3	-	-	-	2	-	2	3	3	3
Average		3	3	3	3	3	-	-	-	-	-	2	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

SEMESTER –V

20CS565	ADVANCED DATABASE TECHNOLOGY (PROFESSIONAL ELECTIVE - I)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of database management systems.

Course Outcomes : On successful completion of the course, the student will be able to

CO1: Design relational database systems using ER and normalization.

CO2: Apply the concepts of parallel and distributed databases.

CO3: Use object-oriented technologies and XML to design relational databases.

CO4: Design relational databases using advanced models.

CO5: Acquire the knowledge in advanced indexing, application development and Blockchain databases.

Cognitive Level

Analyze

Apply

Analyze

Analyze

Understand

UNIT - I RELATIONAL MODEL ISSUES [09]

ER Model: overview of database design process – Entity-Relationship model – Complex Attributes – Mapping Cardinalities – Primary key – Removing Redundant Attributes in Entity Sets Reducing E-R diagrams to Relation Schemas – Extended E-R Feature. Normalization: Features of Good Relational Designs –Decomposition using Functional dependencies – Functional Dependency Theory – 1NF, 2NF, 3NF & BCNF– Decomposition Using Multivalued Dependencies.

UNIT - II PARALLEL AND DISTRIBUTED DATABASES [09]

Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems– Distributed Systems –Transaction processing in parallel and Distributed Systems. Parallel and Distributed Storage: Overview – Data partitioning – Dealing with skew in partitioning – Replication. Parallel and Distributed Transaction Processing: Distributed Transactions – Commit protocols.

UNIT - III OBJECT-RELATIONAL AND XML [09]

Overview of Object Database Concepts – Object Database Extensions to SQL – The ODMG Object Model and the Object Definition Language ODL – Object Database Conceptual Design – The Object Query Language OQL. XML and Internet Databases: Structured, Semi structured, and Unstructured Data – XML Hierarchical (Tree) Data Model – XML Documents, DTD, and XML Schema – Storing and Extracting XML Documents from Databases – XML Languages – Extracting XML Documents from Relational Databases.

UNIT - IV ADVANCED DATABASE MODELS AND APPLICATIONS [09]

Enhanced Data Models for Advanced Applications: Active Database Concepts and Triggers –Temporal Database Concepts – Spatial Database Concepts – Multimedia Database Concepts – Introduction to Deductive Databases. Overview of Data Mining Technology – Applications of Data Mining – Commercial Data Mining Tools – Overview of Data Warehousing – Introduction, Definitions and Terminology – Characteristics of Data Warehouses – Mobile Databases.

UNIT - V ADVANCED INDEXING AND BLOCKCHAIN [09]

Advanced Indexing Techniques: Bloom Filter – Log-Structured Merge Tree and Variants – Bitmap Indices – Indexing of Spatial Data. Advanced Application Development: Performance Tuning – Performance Benchmarks. Blockchain Databases: Overview – Blockchain Properties – Achieving Blockchain Properties via Cryptographic Hash Functions – Consensus – Data Management in a Blockchain – Smart Contracts – Performance Enhancement – Emerging Applications.

Total = 45 Periods

Text Books :

- 1 Abraham Silberschatz, Henry F. Korth, Sudarshan, Database System Concepts, Tata McGraw Hill, New Delhi, Seventh Edition, 2021.
- 2 R.Elmasri, S.B.Navathe, Fundamentals of Database Systems, Pearson Education, New Delhi, Seventh Edition, 2017.

Reference Books :

- 1 Thomas Connolly, Carolyn Begg, Database Systems, A Practical Approach to Design, Implementation and Management, Addison Wesley Person Education, New Delhi, Sixth Edition, 2015
- 2 Peter Rob and Corlos Coronel, Database Systems - Design, Implementation and Management, Thompson Learning, India, Seventh Edition, 2006
- 3 Raghu Ramakrishnan, Database Management Systems, Tata McGraw Hill, India, Fourth Edition, 2015.
- 4 <http://www.nptelvideos.in/2012/11/database-management-system.html>

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS565

Course Name: **ADVANCED DATABASE
TECHNOLOGY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Design relational database systems using ER and normalization.</i>	3	3	3	2	1	-	-	-	1	1	-	3	2	2
CO2	<i>Apply the concepts of parallel and distributed databases.</i>	3	3	3	2	2	-	-	-	1	1	-	3	2	2
CO3	<i>Use object-oriented technologies and XML to design relational databases.</i>	3	3	3	2	1	-	-	-	1	1	-	3	2	2
CO4	<i>Design relational databases using advanced models.</i>	3	3	3	2	2	-	-	-	1	1	-	3	2	2
CO5	<i>Acquire the knowledge in advanced indexing, application development and Blockchain databases.</i>	3	3	3	2	1	-	-	-	1	1	-	3	2	2
Average		3	3	3	2	1				1	1		3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

K.S.R. COLLEGE OF ENGINEERING (Autonomous)

R 2020

SEMESTER – V

20CS566	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS (PROFESSIONAL ELECTIVE - I)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge of problem solving techniques.

Course Outcomes : On successful completion of the course, the student will be able to	Cognitive Level
CO1: Describe agents structure and predict appropriate uninformed search algorithms for any AI problem	Understand
CO2: Illustrate appropriate AI methods to solve a given problem.	Apply
CO3: Explain a problem using first order and predicate logic.	Analyze
CO4: Use planning algorithms and illustrate about learning	Apply
CO5: Describe about expert systems.	Understand

UNIT – I FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE [9]

Intelligent Agents – Agents and environments – Good behavior– Nature of environments – Structure of agents – Problem Solving: Problem solving agents – Example problems – Searching for solutions – Un-informed search strategies – Avoiding repeated states – Searching with partial information

UNIT – II INFORMED SEARCHING TECHNIQUES [9]

Informed search and exploration – Informed search strategies – Heuristic function – Local search algorithms and optimistic problems – Constraint Satisfaction Problems – Backtracking search – Structure of problems – Adversarial Search – Games – Optimal decisions in games – Alpha-Beta Pruning.

UNIT – III LOGICAL REASONING [9]

First order logic – Representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic – Inference in First order logic – Propositional versus first order logic – Unification and lifting – Forward chaining – Backward chaining – Resolution – Knowledge representation.

UNIT– IV PLANNING AND LEARNING [9]

Planning Problem – Planning with state – space search – Partial-order planning – Planning graphs – Planning and acting in the real world: Time schedules and resources – Learning from observation – Inductive learning – Decision trees – Explanation based learning.

UNIT – V EXPERT SYSTEMS [9]

Expert Systems – Architecture of Expert Systems – Roles of Expert Systems – Knowledge Acquisition – Typical Expert Systems – MYCIN – Expert Systems Shells.

Total = 45 Periods

Text Books :

- 1 Stuart Russell and Peter Norvig, Artificial Intelligence – A Modern Approach, Pearson Education, New Delhi, Third Edition, 2016
- 2 Kevin Night and Elaine Rich, Nair B., Artificial Intelligence (SIE), McGraw Hill, New York, Third Edition, 2008

Reference Books :

- 1 Dan W. Patterson, Introduction to AI and ES, Pearson Education, New Delhi, Third Edition, 2007.
- 2 Peter Jackson, Introduction to Expert Systems, Pearson Education, New Delhi, Third Edition, 2007.
- 3 Deepak Khemani, Artificial Intelligence, Tata McGraw Hill Education, New York, First Edition, 2013.
- 4 David L. Poole and Alan K. Mackworth, Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, Second Edition, 2010.

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CS566

Course Name: ARTIFICIAL INTELLIGENCE AND
EXPERT SYSTEMS

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Describe agents structure and predict appropriate uninformed search algorithms for any AI problem</i>	3	3	3	3	3	2	-	-	-	2	-	3	3	3
CO2	<i>Illustrate appropriate AI methods to solve a given problem.</i>	3	3	3	3	3	2	-	-	-	2	-	3	3	3
CO3	<i>Explain a problem using first order and predicate logic.</i>	3	3	3	3	3	2	-	-	-	2	-	3	3	3
CO4	<i>Use planning algorithms and illustrate about learning</i>	3	3	3	3	3	2	-	-	-	2	-	3	3	3
CO5	<i>Describe about expert systems</i>	3	3	3	3	3	2	-	-	-	2	-	3	3	3
Average		3	3	3	3	3	2	-	-	-	2	-	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)