KSR College of Engineering

AN AUTONOMOUS INSTITUTION

NAAC ACCREDITED A++ | NBA ACCREDITED PROGRAMMES

25 Years KSRCE 2001 – 2026 Celebrating Academic Excellence

B.E. - Computer Science and Design

REGULATIONS 2020

(Academic Year 2023-24 Onwards)

Curriculum & Syllabus
Semester I to VI

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

(Autonomous)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E. COMPUTER SCIENCE AND DESIGN

(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 / Programme: (Computer Science and Design)

DV	To produce professionals for designing technology with ethical values, ingenious attitude and team sprit required for the continual development of the society and the nation.

Mission of the Department / Programme: (Computer Science and Design)

DM 1	To bestow academic environment for the development of skilled professionals qualified with knowledge, skills, values, and ethics, thereby take a role in the field of computer science and design.
DM 2	Imbibing holistic, creative learning and ethical attitude for embracing global challenges and leadership qualities in the field of computer science and design.
DM 3	To influence graduates with the skills to become self-employed entrepreneurs and future leaders.

Programme Educational Objectives (PEOs): (Computer Science and Design)

The graduates of the programme will be able to

PEO 1	**Techno Commercial Engineer:** To develop the ability to think critically, analyse and make innovative design for offering techno-commercially feasible solutions.
PEO 2	**Governance of Super Intelligence:** To apply current tools and technologies to contribute for industries, public sectors, research organization for solving time critical problems.
PEO 3	**Enduring Exploration:** To impart the knowledge of inventive design skills and lifelong learning to succeed in their professional challenges.

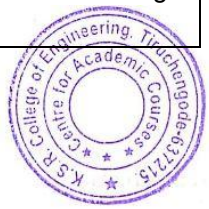
Chairman (BoS)

K.S.R. College of Engineering, Tiruchengode-637215 Centre for Academic Courses

Programme Outcomes (POs) of B.E. - Computer Science and Design

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	**Career through professional**: Acquire knowledge in several areas of Computer Science and Design to promote skills necessary for a profession, entrepreneurship and higher education.
PSO2	**Software design and development:** Ability to use appropriate tools and platforms successfully, as well as improve them, to produce applications/products for new media design in areas likes multimedia, animation, virtual reality and gaming.

Chairman (BoS)



	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 Design

SEMESTER – I

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20EN151	Technical English – I (Common To All Branches)	HSMC	2	0	1	3	40	60	100
2.	20MA151	Engineering Mathematics – I (Common To All Branches)	BSC	3	1	0	4	40	60	100
3.	20CH051	Engineering Chemistry (Common To All Branches)	BSC	3	0	0	3	40	60	100
4.	20EE041	Basics of Electrical and Electronics Engineering (Common To AU, CE, CS, CSD, IOT, IT, ME & SF)	ESC	3	0	0	3	40	60	100
5.	20CD111	Problem Solving Techniques with C Programming	ESC	3	0	0	3	40	60	100
MANDATORY COURSES										
6.	20MC151	Induction Program*	MC	0	0	0	0	-	-	-
7.	20GE051	தமிழ்மரபு/Heritage of Tamils	MC	3	0	0	1	40	60	100
PRACTICAL										
8.	20CH028	Chemistry Laboratory (Common To All Branches)	BSC	0	0	3	1	60	40	100
9.	20CD121	Problem Solving Techniques with C Programming Laboratory	ESC	0	0	3	1	60	40	100
10.	20AU127	Engineering Graphics Laboratory (Common To CE, CS, CSD, EC, EE & IT)	ESC	0	0	3	1	60	40	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	Total
THEORY										
1.	20EN251	Technical English –II (Common To All Branches)	HSMC	2	0	1	3	40	60	100
2.	20MA232	Discrete Mathematics (Common To CS, CSD, IOT & IT)	BSC	3	1	0	4	40	60	100
3.	20PH051	Engineering Physics (Common To All Branches)	BSC	3	0	0	3	40	60	100
4.	20CD211	Human Computer Interaction	PCC	3	0	0	3	40	60	100
5.	20IO241	Python Programming (Common To CSD & IOT)	ESC	3	0	0	3	40	60	100
MANDATORY COURSES										
6.	20MC052	Environmental Science and Engineering (Common To All Branches)	MC	3	0	0	0	-	-	-
7.	20GE052	தமிழரும்தொழில்நுட்பமும்/ Tamils and Technology	MC	3	0	0	1	40	60	100
PRACTICAL										
8.	20PH028	Physics Laboratory (Common To All Branches)	BSC	0	0	3	1	60	40	100
9.	20GE028	Manufacturing Practices Laboratory	ESC	0	0	3	1	60	40	100
10.	20IO227	Python Programming Laboratory (Common To CSD & IOT)	ESC	0	0	3	1	60	40	100
		Total		**17**	**1**	**13**	**20**	**900**		

Chairman (BoS)

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Department	Department of Computer Science and Engineering
Programme	B.E - Computer Science and Design

SEMESTER – III

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20MA343	Numerical Computational Techniques (Common To CS, CSD, IOT & IT)	BSC	3	1	0	4	40	60	100
2.	20IO341	Java programming (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
3.	20IO342	Data Structures (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
4.	20EE231	Digital Principles and Computer Design (Common To CS,CSD & IOT)	ESC	3	0	0	3	40	60	100
5.	20CD311	Design Thinking	PCC	3	0	0	3	40	60	100
6.	20CD343	Computer Organization and Architecture (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
PRACTICAL										
7.	20IO327	Java programming Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
8.	20EE225	Digital Systems Laboratory (Common To CS &CSD)	ESC	0	0	3	1	60	40	100
9.	20IO329	Data Structures Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
10.	20HR351	Career Development Skills I	EEC	0	2	0	0	60	40	100
			Total	**18**	**3**	**9**	**22**	**1000**		

SEMESTER – IV

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20MA441	Probability and Decision Models (Common To CS, CSD, IOT & IT)	BSC	3	1	0	4	40	60	100
2.	20CD441	Theory of Computation (Common To CSD & IOT)	PCC	3	1	0	4	40	60	100
3.	20IO442	Database Management Systems (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
4.	20CD411	Data Analytics and Visualization	PCC	3	0	0	3	40	60	100
5.	20CD443	Design and Analysis of Algorithms (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
6.	20IO444	Operating System (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
PRACTICAL										
7.	20IO427	Database Management Systems Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
8.	20CD421	Data Analytics and Visualization Laboratory	PCC	0	0	3	1	60	40	100
9.	20IO429	Operating System Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
10.	20HR432	Career Development Skills II	EEC	0	2	0	0	60	40	100
		Total		**18**	**4**	**9**	**23**	**1000**		

Chairman (BoS)

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Department	Department of Computer Science and Engineering
Programme	B.E - Computer Science and Design

SEMESTER – V

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20CD511	Principles of Compiler Design	PCC	3	1	0	4	40	60	100
2.	20CD512	Internet Programming	PCC	3	0	0	3	40	60	100
3.	20CD513	Object Oriented Analysis and Design	PCC	3	0	0	3	40	60	100
4.	20CD514	Computer Networks	PCC	3	0	0	3	40	60	100
5.	20CD515	Entrepreneurship Development	HSMC	3	0	0	3	40	60	100
6.		Professional Elective – I	PEC	3	0	0	3	40	60	100
PRACTICAL										
7.	20CD521	Internet Programming Laboratory	PCC	0	0	3	1	60	40	100
8.	20CD522	Computer Networks Laboratory	PCC	0	0	3	1	60	40	100
9.	20HR533	Career Development Skills III	EEC	0	2	0	0	60	40	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	Total
THEORY										
1.	20HS051	Universal Human values and Understanding Harmony (Common To All Branches)	HSMC	3	0	0	3	40	60	100
2.	20CD611	User Experience Design	PCC	3	0	0	3	40	60	100
3.	20CD612	Game Design	PCC	3	0	0	3	40	60	100
4.	20CD613	Cryptography and Network Security	PCC	3	0	0	3	40	60	100
5.		Professional Elective – II	PEC	3	0	0	3	40	60	100
6.		Open Elective – I	OEC	3	0	0	3	40	60	100
PRACTICAL										
7.	20CD621	User Experience Design laboratory	PCC	0	0	3	1	60	40	100
8.	20CD622	Mini project	PROJ	0	0	6	3	60	40	100
9.	20HR634	Career Development Skills IV	EEC	0	2	0	0	60	40	100
		Total		**18**	**2**	**9**	**22**	**900**		

Chairman (BoS)

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Department	Department of Computer Science and Engineering
Programme	B.E - Computer Science and Design

SEMESTER – VII

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20CD711	Agile Methodologies	PCC	3	0	0	3	40	60	100
2.	20CD712	User Interface Design	PCC	3	0	0	3	40	60	100
3.	20GET71	Engineering Economics and Management	HSMC	3	0	0	3	40	60	100
4.		Professional Elective – III	PEC	3	0	0	3	40	60	100
5.		Professional Elective – IV	PEC	3	0	0	3	40	60	100
6.		Open Elective – II	OEC	3	0	0	3	40	60	100
PRACTICAL										
7.	20CD721	Agile Methodologies Laboratory	PCC	0	0	3	1	50	50	100
8.	20CD722	User Interface Design 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	Total
THEORY										
1.		Professional Elective – V	PEC	3	0	0	3	40	60	100
2.		Open Elective – III	OEC	3	0	0	3	40	60	100
PRACTICAL										
3.	20CD821	Project Work	PROJ	0	0	12	6	60	40	100
Total				**6**	**0**	**12**	**12**	**300**		

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	3	-	15	**9.38**
2.	**BSC**	8	8	4	4	-	-	-	-	24	**15.00**
3.	**ESC**	8	5	4	-	-	-	-	-	17	**10.63**
4.	**PCC**	-	4	14	19	15	10	8	-	71	**43.75**
5.	**PEC**	-	-	-	-	3	3	6	3	15	**9.38**
6.	**OEC**	-	-	-	-	-	3	3	3	9	**5.63**
7.	**PROJ**	-	-	-	-	-	3	-	6	9	**5.63**
8.	**MC**	-	1	-	-	-	-	-	-	1	**0.63**
TOTAL		**19**	**20**	**22**	**23**	**21**	**22**	**20**	**12**	**160**	**100**

Chairman (BOS)

K.S.R. College of Engineering, Tiruchengode-637215. Centre for Academic Courses

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Department	Department of Computer Science and Engineering
Programme	B.E - Computer Science and Design

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	Total
1.	20CDE01	Data science	AI	PEC	3	0	0	3	40	60	100
2.	20CDE02	Artificial Intelligence	AI	PEC	3	0	0	3	40	60	100
3.	20CDE03	Introduction to 3D design	ID	PEC	3	0	0	3	40	60	100
4.	20CDE04	Animation Basics	ID	PEC	3	0	0	3	40	60	100
5.	20CDE05	Designing Human Centered Systems	ID	PEC	3	0	0	3	40	60	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	Total
1.	20CDE06	Deep Learning	AI	PEC	3	0	0	3	40	60	100
2.	20CDE07	Big Data Analytics	AI	PEC	3	0	0	3	40	60	100
3.	20CDE08	Information Design	ID	PEC	3	0	0	3	40	60	100
4.	20CDE09	Interactive Visual Data Analysis for Designers	ID	PEC	3	0	0	3	40	60	100
5.	20CDE10	Digital Marketing	ID	PEC	3	0	0	3	40	60	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	Total
1.	20CDE11	Design of Interactive Systems	ID	PEC	3	0	0	3	40	60	100
2.	20CDE12	Motion Graphics	ID	PEC	3	0	0	3	40	60	100
3.	20CDE13	Multimedia Tools and Applications	ID	PEC	3	0	0	3	40	60	100
4.	20CDE14	Web Mining	SDE	PEC	3	0	0	3	40	60	100
5.	20CDE15	Total Quality Management	SDE	PEC	3	0	0	3	40	60	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	Total
1.	20CDE16	Software Quality and Testing	SDE	PEC	3	0	0	3	40	60	100
2.	20CDE17	Managing Design Process	ID	PEC	3	0	0	3	40	60	100
3.	20CDE18	Responsive Web Design	ID	PEC	3	0	0	3	40	60	100
4.	20CDE19	Block Chain Technologies	AI	PEC	3	0	0	3	40	60	100
5.	20CDE20	Fundamentals of Research	GE	PEC	3	0	0	3	40	60	100

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PROFESSIONAL ELECTIVE - V (SEMESTER - VIII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20CDE21	Optimization Techniques	SD	PEC	3	0	0	3	40	60	100
2.	20CDE22	Creative Thinking	ID	PEC	3	0	0	3	40	60	100
3.	20CDE23	Usability Studies and Evaluation	ID	PEC	3	0	0	3	40	60	100
4.	20CDE24	Environmental Information Design	ID	PEC	3	0	0	3	40	60	100
5.	20CDE25	Special Effects	ID	PEC	3	0	0	3	40	60	100

*** AI – Artificial Intelligence, SD-Systems Development, SDE – Software Development and Engineering, GE – General Engineering, ID – Interface Design**

OPEN ELECTIVE COURSES

Automobile Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20AU901	Basics of Automobile Engineering	AE	OEC	3	0	0	3	40	60	100
2.	20AU902	Automotive Engine Technology	AE	OEC	3	0	0	3	40	60	100
3.	20AU903	Automotive Vehicle Technology	AE	OEC	3	0	0	3	40	60	100
4.	20AU904	Automotive Safety	AE	OEC	3	0	0	3	40	60	100
5.	20AU905	Hybrid Vehicles	AE	OEC	3	0	0	3	40	60	100
6.	20AU906	Off Highway Vehicles	AE	OEC	3	0	0	3	40	60	100
7.	20AU907	Modern and Intelligent Vehicle System	AE	OEC	3	0	0	3	40	60	100
8.	20AU908	Vehicle Maintenance	AE	OEC	3	0	0	3	40	60	100

Civil Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20CE901	Architectural Heritage of India	CE	OEC	3	0	0	3	40	60	100
2.	20CE902	Building Planning and Construction	CE	OEC	3	0	0	3	40	60	100
3.	20CE903	Elementary Civil Engineering	CE	OEC	3	0	0	3	40	60	100
4.	20CE904	Energy and Environment	CE	OEC	3	0	0	3	40	60	100
5.	20CE905	Environmental Laws and Policies	CE	OEC	3	0	0	3	40	60	100
6.	20CE906	Global Warming and Climate Change	CE	OEC	3	0	0	3	40	60	100
7.	20CE907	Introduction to Disaster Management and Mitigation	CE	OEC	3	0	0	3	40	60	100
8.	20CE908	Introduction to Earthquake Engineering	CE	OEC	3	0	0	3	40	60	100
9.	20CE909	Solid Waste Management	CE	OEC	3	0	0	3	40	60	100

Chairman (BoS)

10.	20CE910	Water and Air Pollution Management	CE	OEC	3	0	0	3	40	60	100

Computer Science and Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20CS901	Programming in Java	CSE	OEC	3	0	0	3	40	60	100
2.	20CS902	Basic concepts of Data Structure	CSE	OEC	3	0	0	3	40	60	100
3.	20CS903	Fundamentals of Database Concepts	CSE	OEC	3	0	0	3	40	60	100
4.	20CS904	Internet Programming	CSE	OEC	3	0	0	3	40	60	100
5.	20CS905	Fundamentals of Mobile Application	CSE	OEC	3	0	0	3	40	60	100
6.	20CS906	Principles of Ethical Hacking	CSE	OEC	3	0	0	3	40	60	100
7.	20CS907	Green Technology	CSE	OEC	3	0	0	3	40	60	100
8.	20CS908	Artificial Intelligence and Robotics	CSE	OEC	3	0	0	3	40	60	100
9.	20CS909	Big Data and Analytics	CSE	OEC	3	0	0	3	40	60	100
10.	20CS910	Hardware and Trouble Shooting	CSE	OEC	3	0	0	3	40	60	100

Electrical and Electronics Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20EE901	Electrical Drives and Control	EE	OEC	3	0	0	3	40	60	100
2.	20EE902	Power Semiconductor Devices	EE	OEC	3	0	0	3	40	60	100
3.	20EE903	Electrical Power Generation Systems	EE	OEC	3	0	0	3	40	60	100
4.	20EE904	Control Engineering	EE	OEC	3	0	0	3	40	60	100
5.	20EE905	Industrial Automation	EE	OEC	3	0	0	3	40	60	100
6.	20EE906	Electrical Instruments and Measurements	EE	OEC	3	0	0	3	40	60	100
7.	20EE907	Energy Conservation and Management	EE	OEC	3	0	0	3	40	60	100
8.	20EE908	Electrical Wiring, Estimation and Costing	EE	OEC	3	0	0	3	40	60	100
9.	20EE909	Fundamentals of Electrical Machinery	EE	OEC	3	0	0	3	40	60	100
10.	20EE910	Principles of Soft Computing Techniques	EE	OEC	3	0	0	3	40	60	100
11.	20EE911	Embedded System Technology	EE	OEC	3	0	0	3	40	60	100

Electronics and Communication Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20EC901	Basics of Medical Electronics	EC	OEC	3	0	0	3	40	60	100

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2.	20EC902	NANO Technology	EC	OEC	3	0	0	3	40	60	100
3.	20EC903	Electronics and Microprocessor	EC	OEC	3	0	0	3	40	60	100
4.	20EC904	Analog and Digital Communication	EC	OEC	3	0	0	3	40	60	100
5.	20EC905	Principles of Communication	EC	OEC	3	0	0	3	40	60	100
6.	20EC906	Fundamentals of Robotics	EC	OEC	3	0	0	3	40	60	100
7.	20EC907	Internet of Things Sensing and Actuator Devices	EC	OEC	3	0	0	3	40	60	100
8.	20EC908	Consumer Electronics	EC	OEC	3	0	0	3	40	60	100

Information Technology											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20IT901	Data Science using R	IT	OEC	3	0	0	3	40	60	100
2.	20IT902	Principles of Cyber Security	IT	OEC	3	0	0	3	40	60	100
3.	20IT903	Fundamentals of Business Intelligence	IT	OEC	3	0	0	3	40	60	100
4.	20IT904	Blockchain Technologies	IT	OEC	3	0	0	3	40	60	100
5.	20IT905	Internet of Things and Applications	IT	OEC	3	0	0	3	40	60	100
6.	20IT906	Principles of Software Testing	IT	OEC	3	0	0	3	40	60	100
7.	20IT907	Foundation Skills in Logic Building	IT	OEC	3	0	0	3	40	60	100
8.	20IT908	Principles of Cloud Computing	IT	OEC	3	0	0	3	40	60	100
9.	20IT909	Open Source Technologies	IT	OEC	3	0	0	3	40	60	100

Mechanical Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20ME901	Basic Mechanical Engineering	ME	OEC	3	0	0	3	40	60	100
2.	20ME902	Solar Energy Utilization	ME	OEC	3	0	0	3	40	60	100
3.	20ME903	Production Technology of Agricultura	ME	OEC	3	0	0	3	40	60	100
4.	20ME904	Selection of Materials	ME	OEC	3	0	0	3	40	60	100
5.	20ME905	Marine Vehicles	ME	OEC	3	0	0	3	40	60	100
6.	20ME906	Sensors and Transducers	ME	OEC	3	0	0	3	40	60	100
7.	20ME907	Energy Auditing	ME	OEC	3	0	0	3	40	60	100
8.	20ME908	Fiber Reinforced Plastics	ME	OEC	3	0	0	3	40	60	100
9.	20ME909	Lean Manufacturing	ME	OEC	3	0	0	3	40	60	100
10.	20ME910	Surface Engineering	ME	OEC	3	0	0	3	40	60	100

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Safety and Fire Engineering											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20SF901	Occupational Health and Hygiene	SF	OEC	3	0	0	3	40	60	100
2.	20SF902	Construction Safety	SF	OEC	3	0	0	3	40	60	100
3.	20SF903	Building Fire Safety	SF	OEC	3	0	0	3	40	60	100
4.	20SF904	Safety in Electrical Engineering	SF	OEC	3	0	0	3	40	60	100
5.	20SF905	Legal Aspects of Safety	SF	OEC	3	0	0	3	40	60	100
6.	20SF906	Safety in Industries	SF	OEC	3	0	0	3	40	60	100
7.	20SF907	Food Safety	SF	OEC	3	0	0	3	40	60	100
8.	20SF908	Safety Management and its Principles	SF	OEC	3	0	0	3	40	60	100
9.	20SF909	Safety in Automobile Engineering	SF	OEC	3	0	0	3	40	60	100
10.	20SF910	Safety in Transportation	SF	OEC	3	0	0	3	40	60	100

Science and Humanities											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P	C	CA	ES	Total
1.	20SH901	Applications of Statistics	FYA	OEC	3	0	0	3	40	60	100
2.	20SH902	Combinatorics and Graph Theory	FYA	OEC	3	0	0	3	40	60	100
3.	20SH903	Optimization Techniques	FYA	OEC	3	0	0	3	40	60	100
4.	20SH904	Basic Military Education and Training	FYA	OEC	3	0	0	3	40	60	100
5.	20SH905	Professional Communication	FYA	OEC	3	0	0	3	40	60	100
6.	20SH906	Fundamentals of Nanoscience and Technology	FYA	OEC	3	0	0	3	40	60	100

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K.S.R. College of Engineering, Tiruchengodu-637215 Centre for Academic Courses

R 2020

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

SEMESTER - I

		L	T	P	C
20EN151	**TECHNICAL ENGLISH – I** (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:	*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 Newspaper – 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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E - COMPUTER SCIENCE AND DESIGN

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
CO 1	*Comprehend and apply Grammar in context for professional communication.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 2	*Infer the gist and specific information.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 3	*Discuss, express and interact in the society and place of study.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 4	*Critically interpret and comprehend a given text.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	*Prioritize the listening skills for academic and professional purposes.*	-	-	-	-	-	-	-	-	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

		L	T	P	C
20MA151	**ENGINEERING MATHEMATICS – I** (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 – Involutes and Evolutes.

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 parallelopiped 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 Publicaitons, Eighth Edition, 2012.
4. Narayanan.S and Manicavachagom Pillai. T.K. – Calculas vol I and Vol II, S.chand & Co, Sixth Edition, 2014.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Interpret the concepts of Matrix applications in the field of engineering.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 2	*Acquire knowledge in solving ordinary differential equations.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 3	*Extend and apply the concepts of differential calculus problems.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 4	*Develop the skills in solving the functions of several variables.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 5	*Applying the concepts and solving the Vector Calculus problems.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
	Average	3	3	3	**3**	**-**	**-**	**-**	-	-	-	-	-	-	-

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – I

		L	T	P	C
20CH051	**ENGINEERING CHEMISTRY** (Common to All Branches)	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:	4. Explain the concept of corrosion and its control.	*Understand*
CO3:	5. 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 MoS_2; 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 $[CoCl_4]^{2-}$ 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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E- COMPUTER SCIENCE AND DESIGN

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
CO 1	*Make use of the manufacture, properties and uses of advanced engineering materials.*	3	3	2	-	-	-	2	-	-	-	-	1	-	-
CO 2	6. Explain the concept of corrosion and its control.	3	3	2	-	-	-	3	-	-	-	-	2	-	-
CO 3	7. Use the concept of thermodynamics in engineering applications.	3	3	2	-	-	-	2	-	-	-	-	2	-	-
CO 4	*Recall the periodic properties such as ionization energy, electron affinity and electro negativity.*	3	3	2	-	-	-	2	-	-	-	-	1	-	-
CO 5	*Analyze the usage of various spectroscopic techniques.*	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

		L	T	P	C
20EE041	**BASCIS OF ELECTRICAL AND ELCTRONICS ENGINEERING**				
	(Common To AU, CE, CS, CSD, IOT, IT, ME & SF)	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 circuital 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 – Kirchhoff'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. 8. Jegathesan,V.,VinothKumar, K.,Saravanakumar,R., Basic Electrical and Electronics Engineering, Wiley India,NewDelhi,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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E- COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20EE041** **COURSE NAME:** **BASCIS OF ELECTRICAL AND ELCTRONICS ENGINEERING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Solve the electric circuits by applying basic circuital laws for various combinations of circuit elements.*	3	2	2	-	-	-	-	-	-	-	-	1	-	-
CO 2	*Explain the construction, operating principle and application of DC motor and transformers.*	3	3	2	-	-	2	1	1	-	-	-	1	-	-
CO 3	*Enlighten the construction, operating principle and application of AC motors and Special Machines.*	3	2	2	-	-	2	1	1	-	-	-	1	-	-
CO 4	*Illustrate the function of various measuring instruments.*	3	3	2	-	-	2	1	1	-	-	-	1	-	-
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – I

		L	T	P	C
20CD111	**PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING**	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 problem solving*	*Understand*
CO2:	*Choose the right data representation formats based on the requirements of the problem.*	*Understand*
CO3:	*Explore the concepts of Statements, Array and Strings.*	*Apply*
CO4:	*Illustrate the usage of Functions and Pointers.*	*Evaluate*
CO5:	*Apply the concept of Structures and Files.*	*Apply*

UNIT – I FUNDAMENTALS OF PROBLEM SOLVING [9]

Introduction: History and Generation of Computer – Types of Computer – Components of Computer-Introduction to Algorithms, Pseudo code and Flowchart – Algorithm: Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Generation of the Fibonacci Sequence

UNIT – II 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 – III 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 – IV 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 – V STRUCTURES, UNIONS AND FILES [9]

Accessing Structure Members – Structure Assignments – Arrays of Structures – Passing Structures to Functions – Structure pointers – Arrays and Structures within structures. Unions – Files: Streams and Files – File System Basics – fread() and fwrite() – fseek() and Random-Access I/O – fprintf() and fscanf() – Command line arguments.

Total = 45 Periods

Text Books:

1. R.G.Dromey, How to Solve it by Computer, Pearson Education, India, 2008.
2. Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2017.

Reference Books:

1. PradipDey and Manas Ghosh, 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/

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E- COMPTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20CD111** **COURSE NAME:** **PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING**

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 problem solving.*	3	3	1	3	1	-	-	-	1	-	-	1	2	2
CO2	*Choose the right data representation formats based on the requirements of the problem.*	3	3	1	3	2	-	-	-	1	-	-	1	3	3
CO3	*Explore the concepts of Statements, Array and Strings.*	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	*Illustrate the usage of Functions and Pointers.*	3	2	2	2	2	-	-	-	1	-	-	1	3	2
CO5	*Apply the concept of Structures and Files.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – I

		L	T	P	C
20MC151	**INDUCTION PROGRAMME** (Common To All Branches)	0	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:	*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 choose 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, VivekanandKendras, 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

B.E- COMPTER SCIENCE AND DESIGN

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
CO 1	*Involve in physical activity, creative arts and culture and feel comfortable in the new environment.*	3	-	-	-	-	3	3	2	3	2	-	3	-	-
CO 2	*Build relationship between teachers and students and make familiarizing with departments.*	3	-	-	-	-	3	3	3	1	3	-	3	-	-
CO 3	*Concentrate on literary activities.*	3	-	-	-	-	2	3	3	3	3	-	3	-	-
CO 4	*Develop the required skills through lectures and workshops*	3	-	-	-	-	3	3	3	2	3	-	3	-	-
CO 5	*Acquire skills in extracurricular activities.*	3	-	-	-	-	3	3	3	3	3	-	-	-	-
	Average	**3**	**-**	**-**	**-**	**-**	**3**	**3**	**3**	**2**	**3**	**-**	**3**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - I

		L	T	P	C
20GE051	**HERITAGE OF TAMILS** (common to all branches)	1	0	0	1

Prerequisite(s): *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:	*Recognize the extensive literature of Tamil and its classical nature.*	Understand
CO2:	*Apprehend the heritage of sculpture, painting and musical instruments of ancient people.*	Understand
CO3:	*Review on folk and martial arts of Tamil people.*	Understand
CO4:	*Insight thinai concepts, trade and victory of Chozha dynasty.*	Understand
CO5:	*Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.*	Understand

UNIT - I LANGUAGE AND LITERATURE [03]

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

UNIT - II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE [03]

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

UNIT - III FOLK AND MARTIAL ARTS [03]

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

UNIT - IV THINAI CONCEPT OF TAMILS [03]

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

UNIT - V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE [03]

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

Total (L= 15, T = 0) = 15 Periods

Text Books:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)

Reference Books :

1. Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).
2. The Contribution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Puplished by International Institute of Tamil Studies).
3. Keeladi – 'Sangam City Civilzation on the banks of river Vaigai; (Jointly Published by: Department of Archaeology &Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4. Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20GE051** **Course Name:** **Heritage of Tamils**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1 :	*Recognize the extensive literature of Tamil and its classical nature.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2 :	*Apprehend the heritage of sculpture, painting and musical instruments of ancient people.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3 :	*Review on folk and martial arts of Tamil people.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4 :	*Insight thinai concepts, trade and victory of Chozha dynasty.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5 :	*Realize the contribution of Tamil in Indian freedom struggle, self-esteemmovement and siddha medicine.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	-	-	-	-	-	-	**3**	**3**	**-**	**2**	**-**	**3**	-	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - I

		L	T	P	C
20GE051	**தமிழர்மரபு** (**அனைத்துதுறைகளுக்கும்பொதுவானது**)	1	0	0	1

முன்கூட்டியதுறைசார்அறிவு : தேவைஇல்லை

பாடம்கற்றத்தின்விளைவுகள் :பாடத்தைவெற்றிகரமாகமுடித்தபின்பு, மாணவர்களால்முடியும்விளைவுகள்		அறிவாற்றல் நிலை
CO1:	*தமிழ்மொழியின்செந்ததன்மைமற்றும்இலக்கியம்குறித்ததெரிதல்*	*புரிதல்*
CO2:	*தமிழர்களின்சிற்பக்கலை , ஓவியக்கலைமற்றும்இசைக்கருவிகள்குறித்ததெளிவு*	*புரிதல்*
CO3:	*தமிழர்களின்நாட்டுப்புரைக்கலைகள்மற்றும்வீரவிளையாட்டுகள்குறித்ததெளிவு*	*புரிதல்*
CO4:	*தமிழர்களின்திணைக்கோட்பாடுகள், சங்ககாலவணிகம்மற்றும்சோழர்களின்வெற்றிகள்குறித்ததகவல்கள் .*	*புரிதல்*
CO5:	*இந்தியதேசியஇயக்கம், சுயமரியாதைஇயக்கம்மற்றும்சித்தமருத்தவம்பற்றியபுரிதல்.*	*புரிதல்*

அலகு – I **மொழி மற்றும் இலக்கியம்** **[03]**

இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள்–தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலயக்கிகியங்கள் – சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ் காப்பியங்கள், தமிழகத்தில் சமணபௌத்த சமயங்களின் தாக்கம் – பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் – சிற்றிலகியங்கள் தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி – தமிழ் இலக்கியவளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு – II **மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை** **[03]**

நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள் – பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் – தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனியில் திருவள்ளுவர் சிலை – இசை கருவிகள் – மிருதங்கம், பறை,வீணை,யாழ்,நாதஸ்வரம் – தமிழர்களின் சமூகபொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு – III **நாட்டுப் புறக் கலைகள் மற்றும் வீர விளையாட்டுக்கள்** **[03]**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவை**க்** கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு – IV **தமிழர்களின் திணைக் கோட்பாடுகள்** **[03]**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் – தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்கக்காலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் – சங்ககால நகரங்களும் துறை முகங்களும் – சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு – V **இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு** **[03]**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறபகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் – சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில் சித்தமருத்துவத்தின் பங்கு கல்வெட்டுகள் கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு வரலாறு.

Total (L= 15, T = 0) = 15 Periods

Text Books :

தமிழகவரலாறு-மக்களும்பண்பாடும்-
1 கேகேபிள்ளை(வெளியீடுதமிழ்நாடுபாடநூல்மற்றும்கல்வியில்பணிகள்கழகம்) ,உலகத்தமிழாராய்ச்சிநிறுவனம், சென்னை, **2002**
2 கணினித்தமிழ்முனைவர்இல. சுந்தரம், விகடன்பிரசுரம், 2016

Reference Books :

1 கீழடி-வைகைநதிக்கரையில்சங்ககாலநகரநாகரிகம்.(தொல்லியல்துறைவெளியீடு)
2 பொருநை– ஆற்றங்கரைநாகரிகம் (தொல்லியல்துறைவெளியீடு)
3 Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
4 Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20GE051** **Course Name:** **தமிழர்மரபு/Heritage of Tamils**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	தமிழ்மொழியின்செந்ததன்மைமற்றும்இலக்கியம்குறித்ததெரிதல்	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2:	தமிழர்களின்சிற்பக்கலை , ஓவியக்கலைமற்றும்இசைக்கருவிகள்குறித்ததெளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3:	தமிழர்களின்நாட்டுப்புரைக்கலைகள்மற்றும்வீரவிளையாட்டுகள்குறித்ததெளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4:	தமிழர்களின்திணைக்கோட்பாடுகள், சங்ககாலவணிகம்மற்றும் சோழர்களின்வெற்றிகள் குறித்த தகவல்கள்.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5:	இந்தியதேசியஇயக்கம், சுயமரியாதைஇயக்கம்மற்றும்சித்தமருத்தவம்பற்றியபுரிதல்.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	-	-	-	-	-	-	3	3	-	2	-	3	-	-

1. சிறிது (குறைந்த)2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – I

		L	T	P	C
20CD421	**CHEMISTRY LABORATORY** (Common To All Branches)	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, $BaCl_2$ Vs. Na_2SO_4.
4. Estimation of Ferrous ion by Potentiometry – Fe^{2+} Vs $K_2Cr_2O_7$.
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.

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R2020**

SEMESTER – I

		L	T	P	C
20CD121	**PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING LABORATORY**	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. Build the knowledge of flowchart and create the fundamentals of algorithm.*	*Apply*
CO2:	*Build code segments for handling control and looping statements.*	*Apply*
CO3:	*Identify the allocation of static and dynamic memory and its utilization.*	*Understand*
CO4:	*Consume the knowledge of string handling functions.*	*Apply*
CO5:	*Demonstrate use of pointers, structures and files handling functions.*	*Understand*

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 count the digits and character of the input.
5. Design an algorithm to execute the flowchart for produce various sequence of numbers like Fibonacci.
6. Controls statements and Decision-making constructs.
7. Single and Multidimensional array.
8. String and String handling functions.
9. Functions and Recursion, call by value and call by reference
10. Pointers
11. Structures and unions
12. Files and File handling functions.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD121** **Course Name:** **PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Illustrate the basic concepts of MS Office. Build the knowledge of flowchart and create the fundamentals of algorithm.*	3	3	3	2	3	-	-	-	1	-	-	1	2	1
CO 2	*Build code segments for handling control and looping statements.*	3	2	3	1	3	-	-	-	1	-	-	1	2	1
CO 3	*Identify the allocation of static & dynamic memory and its utilization.*	3	3	3	2	3	-	-	-	1	-	-	1	3	2
CO 4	*Consume the knowledge of string handling functions.*	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO 5	*Demonstrate use of pointers, structures and files handling functions.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - I

		L	T	P	C
20AU127	**ENGINEERING GRAPHICS LABORATORY** (Common To CE, CS, CSD, EC, EE & IT)	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*	9. Understand
CO2:	*Construct various planes and do orthographic projection of lines and plane surfaces.*	10. Remember
CO3:	*Draw projections of solids and development of surfaces.*	11. Understand
CO4:	*Create the sections of solids and surfaces.*	12. Understand
CO5:	*Sketch two dimensional isometric projections of simple solids.*	13. 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.

14.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20EN251	**TECHNICAL ENGLISH – II** (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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Infer and apply the enriched vocabulary, by knowing the basic grammatical structure, in academic and professional contexts.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 2	*Identify and use Standard English in diverse situations.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 3	*Interpret by reading a text and comprehend a given text.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 4	*Organize and compose business letters.*	-	-	-	-	-	-	-	-	2	3	-	1	-	-
CO 5	*Prioritize the listening skill for academic and personal development purposes.*	-	-	-	-	-	-	-	-	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 – II

		L	T	P	C
20MA232	**DISCRETE MATHEMATICS**				
	(Common To CS, CSD, IOT & 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		***Cognitive level***
CO1:	*Solve logical problems.*	*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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Solve logical problems.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 2	*Construct algorithms and derive complexities.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 3	*Developing computational models.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 4	*Solving computational operations associated with functions.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
CO 5	*Apply the concepts of Graph theory and Combinatory in network algorithms.*	3	3	3	3	-	-	-	-	-	-	-	-	-	-
	Average	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20PH051	**ENGINEERING PHYSICS** (Common to All Branches)	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:	*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, CO_2 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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Describe the impact of engineering solutions in the constructional and designing environment.*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO 2	*Categorize the types of laser and utilize it for specific application based on their desirable requisite.*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO 3	*Utilize the conceived concepts and techniques for synthesizing novel crystals with enhanced multifunctional properties.*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO 4	*Enumerate the preambles of quantum physics and implement its concepts to tackle the cumbersome engineering problems.*	3	3	-	-	2	-	-	1	-	2		2	-	-
CO 5	*Comprehend the fundamental ideas of optoelectronic materials and to fabricate it for the potential applications*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
	Average	3	3	-	-	2	-	-	1	-	2	-	2	-	-

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

20CD211	**HUMAN COMPUTER INTERACTION**	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:	*Describe the foundations of Human Computer Interaction.*	15. Understand
CO2:	*Infer with the design technologies and software process.*	16. Understand
CO3:	*Apply the concepts of human interaction models and theories.*	17. Apply
CO4:	*Design effective HCI for individuals and persons with disabilities*	18. Apply
CO5:	*Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.*	19. Understand

UNIT – I FOUNDATIONS OF HCI [9]

The Human: I/O Channels – Memory – Reasoning and problem solving –The computer: Devices – Memory – Processing and networks – Interaction: Models – Frameworks – Ergonomics – Styles – Elements – Interactivity – Paradigms.

UNIT – II DESIGN AND SOFTWARE PROCESS [9]

Interactive Design basics – Process – Scenarios – Navigation – Screen design – Iteration and prototyping. HCI in software process – Software life cycle – Usability engineering – Prototyping in practice – Design rationale – Design rules – Principles, Standards, Guidelines, Rules – Universal Design.

UNIT – III MODELS AND THEORIES [9]

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models – Task Analysis.

UNIT – IV MOBILE HCI [9]

Mobile Ecosystem: Platforms–Application frameworks– Types of Mobile Applications: Widgets– Applications– Games– Mobile Information Architecture–Mobile 2.0.

UNIT – V WEB INTERFACE DESIGN [9]

Designing Web Interfaces – Drag and Drop– Direct Selection–Contextual Tools – Overlays – Inlays and Virtual Pages.

Total = 45 Periods

Text Books:

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, Human Computer Interaction, Pearson Education, New Delhi, Third Edition, 2004.
2. Brian Fling, Mobile Design and Development, O'Reilly Media Inc., California, First Edition, 2009.

Reference Books:

1. Bill Scott and Theresa Neil, Designing Web Interfaces, O'Reilly, California, First Edition, 2009.
2. Brian Fling, Mobile Design and Development, O'Reilly Media Inc., California, First Edition, 2009
3. Prabat K Andleigh and Kiran Thakrar, Multimedia Systems and Design, Prentice Hall, New Delhi, Second Edition, 2007.
4. https://nptel.ac.in/courses/106103115

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20CD211 **Course Name: HUMAN COMPUTER INTERACTION**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Describe the foundations of Human Computer Interaction.*	2	3	1	-	2	2	-	-	1	-	1	2	2	2
CO 2	*Infer with the design technologies and software process.*	3	3	3	-	2	1	-	-	1	-	1	3	2	2
CO 3	*Apply the concepts of human interaction models and theories .*	2	3	3	-	3	1	-	-	1	-	1	3	2	2
CO 4	*Design effective HCI for individuals and persons with disabilities*	3	3	3	-	3	1	-	-	1	-	1	2	2	2
CO 5	*Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.*	3	3	3	-	2	3	-	-	1	-	1	2	2	2
	Average	**3**	**3**	**3**	-	2	1	**-**	**-**	1	-	1	**2**	**2**	2

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20IO241	**PYTHON PROGRAMMING** (Common to CSD & IOT)	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.*	*Apply*

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 **COLLECTIONS AND EXCEPTIONS** **[9]**

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

UNIT – III **THREADING AND OBJECT ORIENTED PROGRAMMING** **[9]**

Python Multithreaded Programming: Introduction– Threads and Processes –Multithreading–Object Oriented Programming basics –Inheritance and Polymorphism – Constructors– Operator Overloading and Overriding – Get and Set Attribute Values.

UNIT – IV **GRAPHICS AND FILES** **[9]**

Software Objects – Turtle Graphics – Turtle attributes–File I/O operations – Text Files: Opening, reading and writing text files– Reading and Writing in Structured Files: CSV and JSON.

UNIT – V **WEBPROGRAMING AND DATABASES** **[9]**

UI design: Tkinter – Events – Socket Programming – Sending email – CGI: Introduction to CGI Programming, GET and POST Methods – Data manipulation using MySQL.

Total = 45 Periods

Text Books:

1 Paul Barry, Head First Python: A Learner's Guide to the Fundamentals of Python Programming, A Brain-Friendly Guide, a Shroff/O'Reilly; Third edition, 2023.

2 Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and programming, , BCS Learning & amp, Development Limited, First Edition, 2017.

References:

1 Yashwant Kanetkar, Aditya Kanetkar, Let Us Python BPB Publications, First Edition,2023.

2 Allen B. Downey, Think Python, O'Reilly Media, California, Second Edition, 2016.

3 Bill Lubanovic, Introducing Python Modern Computing in Simple Packages, O'Reilly Media, California, Second Edition, 2019

4 David Beazley, Brian K. Jones, Python Cookbook, O'Reilly Media, California, Third Edition, 2013

5 Mark Lutz, Python Pocket Reference, O'Reilly Media, California, Fifth Edition, 2014

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20IO241 **Course Name: PYTHON PROGRAMMING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Illustrate basic concepts of python programming.*	3	3	2	2	1	-	-	-	1	-	-	3	3	2
CO 2	*Apply the necessary data structures includes list, tuple and dictionary in the required fields and exception handling.*	3	3	3	2	2	-	-	-	1	-	-	3	3	2
CO 3	*Analyze, design and implement the problems using OOP concepts.*	3	3	3	2	2	-	-	-	1	-	-	3	3	2
CO 4	*Demonstrate the simple file operations and data manipulation techniques.*	3	3	3	3	2	-	-	-	1	-	-	2	3	3
CO 5	*Design web site using python GUI.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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	*Interpret the importance in conservation of resources for future generation.*	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO2	*Relate the importance of ecosystem and biodiversity.*	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO3	*Analyze the impact of pollution and hazardous waste in a global and societal context.*	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO4	*Identify the contemporary issues that result in environmental degradation that would attempt to provide solutions to overcome the problems.*	3	2	2	-	-	3	3	2	-	-	-	1	-	-
CO5	*Predict the concept of Sustainability and Green Chemistry.*	3	2	2	-	-	3	3	2	-	-	-	1	-	-
	Average	**3**	**2**	**2**	**-**	**-**	**3**	**3**	**2**	**-**	**-**	**-**	**1**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - II

		L	T	P	C
20GE052	**TAMILS AND TECHNOLOGY** (Common to All Branches)	1	0	0	1

Prerequisite(s): *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 weaving and ceramic technology of ancient Tamil People nature.*	*Understand*
CO2:	*Comprehend the construction technology, building materials in sangam Period and case studies.*	*Understand*
CO3:	*Infer the metal process, coin and beads manufacturing with relevant archeological evidence*	*Understand*
CO4:	*Realize the agriculture methods, irrigation technology and pearl diving.*	*Understand*
CO5:	*Apply the knowledge of scientific Tamil and Tamil computing.*	*Apply*

UNIT - I WEAVING AND CERAMIC TECHNOLOGY [03]

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

UNIT - II DESIGN AND CONSTRUCTION TECHNOLOGY [03]

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

UNIT - III MANUFACTURING TECHNOLOGY [03]

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

UNIT - IV AGRICULTURE AND IRRIGATION TECHNOLOGY [03]

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

UNIT - V SCIENTIFIC TAMIL & TAMIL COMPUTING [03]

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

Total (L= 15, T = 0) = 15 Periods

Text Books:

1 Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)
2 Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

Reference Books:

1 Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)
2 The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi)(Puplished by International Institute of Tamil Studies).
3 Keeladi – 'Sangam City Civilzation on the banks of river Vaigai; (Jointly Published by: Department of Archaeology &Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)
4 Studies in the History of India with Special Reference to Tamilnadu (dr.K.K.Pillay) (Published by : The Author)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20GE052** **Course Name:** **TAMILS AND TECHNOLOGY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Understand the weaving and ceramic technology of ancient Tamil People nature.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO 2	*Comprehend the construction technology, building materials in sangam Period and case studies.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO 3	*Infer the metal process, coin and beads manufacturing with relevant archeological evidence*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO 4	*Realize the agriculture methods, irrigation technology and pearl diving.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO 5	*Apply the knowledge of scientific Tamil and Tamil computing.*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - II

		L	T	P	C
20GE052	**தமிழரும் தொழில் நுட்பமும்** (**அனைத்து துறைகளுக்கும் பொதுவானது**)	1	0	0	1

முன்கூட்டியதுறைசார்அறிவு : தேவைஇல்லை

பாடம்கற்றத்தின்விளைவுகள் ***பாடத்தைவெற்றிகரகமாகமுடித்தபின்பு, மாணவர்களால்முடியும்விளைவுகள்***	:	அறிவாற்றல் நிலை
CO1:	*சங்ககாலத்தமிழிர்களின்நெசவுமற்றும்பானைவனைதல் தொழில்நுட்பம்குறித்துகற்றுணர்தல்*	*புரிதல்*
CO2:	*சங்ககாலத்தமிழிர்களின்கட்டிடதொழில்நுட்பம்கட்டுமான பொருட்கள்மற்றும்அவற்றைவிளகும்தளங்கள்குறித்துஅறிவு*	*புரிதல்*
CO3:	*சங்ககாலத்தமிழிர்களின்உலோகத்தொழில், நாணயங்கள்மற்றும்மணிகள்சார்ந்ததொல்லியல்சான்றுகள்பற்றியஅறிவு*	*புரிதல்*
CO4:	*சங்ககாலத்தமிழிர்களின்வேளாண்மை, நீர்ப்பாசனமுறைகள்மற்றும்முத்துகுளித்தல்குறித்ததெளிவு*	*புரிதல்*
CO5:	*நவீனஅறிவியல்தமிழ்மற்றும்கன்னிதமிழ்குறித்தபுரிந்துகொள்ளலும்மற்றும்பயன்படுத்தலும்*	*பகுப்பாய்வு*

அலகு – I நெசவு மற்றும் பானைத் தொழில்நுட்பம் **[03]**

சங்ககாலத்தில்நெசவுத்தொழில்–
பானைத்தொழில்நுட்பம்கருப்புசிவப்புபாண்டங்கள்– பாண்டகளில்கீறல்குறியீடுகள்

அலகு – II வடிவமைப்புமற்றும்கட்டிடத்தொழில்நுட்பம் **[03]**

சங்ககாலத்தில்வடிவமைப்புமற்றும்கட்டுமானங்கள்&சங்ககாலத்தில்வீட்டுப்பொருட்களில்வடிவமைப்பு– சங்ககாலத்தில்கட்டுமானப்பொருட்களும்நடுகல்லும்–சிலப்பதிகாரத்தில்மேடைஅமைப்புபற்றியவிவரங்கள்–மாமல்லபுரச்சிற்பங்களும், கோவில்களும்–
சோழர்காலத்துப்பெருங்கோயில்கள்மற்றும்பிறவழிபாட்டுத்தலங்கள்–நாயக்கர்காலக்கோயில்கள்–மாதிரிகட்டமைப்புகள்பற்றிஅறிதல், மதுரைமீனாட்சிஅம்மன்ஆலயம்மற்றும்திருமலைநாயக்கர்மஹால்–செட்டிநாட்டுவீடுகள்–பிரிட்டிஷ்காலத்தில்சென்னைஇந்தோ-சாரோசெனிக்கட்டிடக்கலை.

அலகு – III உற்பத்தித்தொழில்நுட்பம் **[03]**

கப்பல்கட்டும்கலை–உலோகவியல்–இரும்புத்தொழிற்சாலை–இரும்பைஉருக்குதல், எஃகு–வரலாற்றுச்சான்றுகளாகசெம்புமற்றும்தங்கநாணயங்கள்–நாணயங்கள்அச்சடித்தல்–மணிஉருவாக்கும்தொழிற்சாலைகள்–கல்மணிகள்–கண்ணாடிமணிகள்–சுடுமண்மணிகள்–சங்குமணிகள்–எலும்புத்துண்டுகள்–தொல்லியல்சான்றுகள்–சிலப்பதிகாரத்தில்மணிகளின்வகைகள்.

அலகு – IV வேளாண்மைமற்றும்நீர்ப்பாசனத்தொழில்நுட்பம் **[03]**

அணை,ஏரி,குளங்கள்,மதகு–சோழர்காலகுமிழித்தூம்பின்முக்கியத்துவம்–கால்நடைபராமரிப்பு–கால்நடைகளுக்காகவடிவமைக்கப்பட்டகிணறுகள்–வேளாண்மைமற்றும்வேளாண்மைசார்ந்தசெயல்பாடுகள்–கடல்சார்அறிவு–மீன்வளம்–முத்துமற்றும்முத்துக்குளித்தல்–பெருங்கடல்குறித்தபண்டையஅறிவு–அறிவுசார்சமூகம்.

அலகு – V அறிவியல்தமிழ்மற்றும்கணினித்தமிழ் **[03]**

அறிவியல்தமிழின்வளர்ச்சி– கணினித்தமிழ்வளர்ச்சி–தமிழ்நூல்களைமின்பதிப்புசெய்தல்–தமிழ்மென்பொருட்கள்உருவாக்கம்–தமிழ்இணையக்கல்விக்கழகம்–தமிழ்மின்நூலகம்–இணையத்தில்தமிழ்அகராதிகள்சொற்குவைத்திட்டம்.

Total (L= 15, T = 0) = 15 Periods

Text Books :

1 தமிழகவரலாறு- மக்களும்பண்பாடும்- கேகேபிள்ளை (வெளியீடுதமிழ்நாடுபாடநூல்மற்றும்கல்வியில்பணிகள்கழகம்)

2 கணினித்தமிழ் - முனைவர்இல. சுந்தரம் (விகடன்பிரசுரம்)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20GE052 **Course Name: தமிழரும்தொழில்நுட்பமும்/TAMILS AND TECHNOLOGY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	*சங்ககாலத்தமிழிர்களின்நெசவுமற்றும்பானைவனைதல்தொழில்நுட்பம்குறித்துகற்றுணர்தல்*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2:	*சங்ககாலத்தமிழிர்களின்கட்டிடதொழில்நுட்பம்கட்டுமானபொருட்கள்மற்றும்அவற்றைவிளகும்தளங்கள்குறித்துஅறிவு*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3:	*சங்ககாலத்தமிழிர்களின்உலோகத்தொழில், நாணயங்கள்மற்றும்மணிகள்சார்ந்ததொல்லியல்சான்றுகள்பற்றியஅறிவு*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4:	*சங்ககாலத்தமிழிர்களின்வேளாண்மை, நீர்ப்பாசனமுறைகள்மற்றும்முத்துகுளித்தல்குறித்ததெளிவு*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5:	*நவீனஅறிவியல்தமிழ்மற்றும்கன்னிதமிழ்குறித்தபுரிந்துகொள்ளலும்மற்றும்பயன்படுத்தலும்*	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

1. சிறிது (குறைந்த)2. மிதமான (நடுத்தர) 3. கணிசமான (உயர்)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20PH028	**PHYSICS LABORATORY** (Common to All Branches)	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 KrishnaHitech Publishing Company Pvt Ltd., Chennai, Fifth Edition, 2017.

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Comprehend the different physical parameters of optics.*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO 2	*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	-	-
CO 3	*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	-	-
CO 4	*Confer the experimental counterparts of materials properties such as modulus, solar cell, and energy gap.*	3	3	-	-	2	-	-	1	-	2	-	2	-	-
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20GE028	**MANUFACTURING PRACTICES LABORATORY** (Common to All Branches)	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		***Cognitive level***
CO1:	*Prepare green sand mould for simple patterns and carpentry components with simple joints.*	*Create*
CO2:	*Perform welding practice to join simple structures.*	*Apply*
CO3:	*Practice simple operations in lathe and drilling machine.*	*Understand*

LIST OF EXPERIMENTS

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

LIST OF EQUIPMENT

1. Fitting tools and its accessories - 15 Sets
2. Smithy tools and Open hearth furnace setup - 2 Sets
3. Foundry tools and its accessories - 5 Sets
4. Carpentry tools and its accessories - 15 Sets
5. Arc Welding equipment's and its accessories - 5 Sets
6. Oxy Acetylene welding setup and its accessories - 1 Set
7. Centre Lathe with its accessories - 2 Nos.
8. Pillar type drilling machine - 1 No.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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**
CO 1	*Prepare green sand mould for simple patterns and carpentry components with simple joints.*	2	-	-	3	-	-	-	3	1	-	-	3	3	1
CO 2	*Perform welding practice to join simple structures.*	2	-	-	3	-	-	-	3	1	-	-	3	3	1
CO 3	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20GE028	**GROUP B (ELECTRICAL & ELECTRONICS)** (Common to all Branches)	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:	*Construct different types of wiring used in house.*	*Understand*
CO2:	*Calibrate single phase Energy meter.*	*Understand*
CO3:	*Demonstrate different electronic components, logic gates and CRO.*	*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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Construct different types of wiring used in house.*	3	2	3	-	-	-	-	1	1	-	-	3	-	-
CO 2	*Calibrate single phase Energy meter.*	3	1	2	-	-	-	-	1	1	-	-	3	-	-
CO 3	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – II

		L	T	P	C
20IO227	**PYTHON PROGRAMMING LABORATORY** (Common to CSD& IOT)	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:	*Demonstrate the use of files in python.*	*Create*
CO5:	*Construct GUI applications using python programming.*	*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 implement the operation on List, Tuple and Dictionary.
5. Write a program to demonstrate the user-defined exception handling mechanism in Python
6. Write a program to perform the following
    I. Sum an array of numbers,
    II. Linear Search
    III. Binary Search
7. Create a program to implement multi-threading concept.
8. Create a program to implement Employee management system using class and objects.
9. Write a program to draw various objects using turtle object
10. Create a program for Employee Details using files.
11. Design and implement a graphical user interface to perform any arithmetic operation.
12. Write a program to implement database connectivity using MySQL.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO227** **Course Name:** **PYTHON PROGRAMMING LABORATORY**

	CO	Course Outcomes	Programme Outcomes												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO 1	*Design simple programs using conditional statements and loops.*	2	3	3	2	2	-	-	-	1	-	-	1	3	1
	CO 2	*Using python list, tuples and dictionaries.*	3	3	3	2	2	-	-	-	1	-	-	1	3	1
	CO 3	*Detecting the exception handling mechanism in python.*	3	3	3	2	2	-	-	-	1	-	-	1	3	1
	CO 4	*Demonstrate the use of files in python.*	3	3	3	1	3	-	-	-	1	-	-	1	3	1
	CO 5	*Construct GUI applications using python programming.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20MA343	**NUMERICAL COMPUTATIONAL TECHNIQUES** (Common To CS, CSD, IOT & 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	***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 $1/3^{rd}$ rule and $3/8^{th}$ 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 SukhenduDey 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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Solve polynomial, transcendental equations, simultaneous linear equations numerically.*	3	3	3	3										
CO 2	*Predict the unknown values by using Interpolation techniques.*	3	3	3	3										
CO 3	*Evaluate the problems in differentiation and integration by using numerical techniques.*	3	3	3	3										
CO 4	*Solving the initial value problems for ordinary differential equations.*	3	3	3	3										
CO 5	*Determine the numerical solutions to boundary value problems.*	3	3	3	3										
	Average	**3**	**3**	**3**	**3**										

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20IO341	**JAVA PROGRAMMING** (Common TO CSD & IOT)	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	***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 D.T. Editorial Services, Java 8 Programming Black Book, Dreamtech Press, Delhi, First Edition, 2015.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO341** **Course Name:** **JAVA PROGRAMMING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Apply java programming fundamentals to solve real world problem.*	3	3	2	3	3	-	-	-	-	-	2	3	3	3
CO 2	*Implement the concept of overloading and inheritances.*	3	3	2	3	2	-	-	-	-	-	2	3	3	**3**
CO 3	*Examine important features of java like packages, interfaces and exception handling.*	3	3	1	3	2	-	-	-	-	-	3	2	3	2
CO 4	*Illustrate the features of multithreaded programming and I/O operations.*	3	3	2	2	3	-	-	-	-	-	2	3	3	**3**
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20IO342	**DATA STRUCTURES** (Common TO CSD & IOT)	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 – 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.

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. Robert Sedgewick and Kevin Wayne, Algorithms, Pearson Education, India, Fourth Edition, 2017.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO342** **Course Name:** **DATA STRUCTURES**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Construct the different linear data structure to solve simple problems.*	3	2	3	2	2	-	-	-	-	-	3	2	3	2
CO 2	*Build the various tree structures with its operations.*	3	2	3	2	2	-	-	-	-	-	3	2	**3**	**2**
CO 3	*Analyze the concept of AVL tree, splay tree, B tree and B+ tree.*	3	3	2	2	2	-	-	-	-	-	3	2	**3**	**2**
CO 4	*Apply graph data structure to solve real time problems.*	3	2	2	2	2	-	-	-	-	-	3	2	**3**	**2**
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20EE231	**DIGITAL PRINCIPLES AND COMPUTER DESIGN** (Common TO CS,CSD & IOT)	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.*	20. Understand
CO2:	*Design and analyze the combinational circuits.*	21. Analyze
CO3:	*Construct and analyze the sequential circuits.*	22. Analyze
CO4:	*Apply the knowledge to design the processor unit.*	23. Apply
CO5:	*Summarize the simple computer design and HDL.*	24. 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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Identify the various methods used for the simplification of boolean functions.*	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 2	*Design and analyze the combinational circuits.*	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO 3	*Construct and analyze the sequential circuits.*	3	2	3	-	-	-	1	-	-	-	-	2	-	-
CO 4	*Apply the knowledge to design the processor unit.*	3	2	3	-	-	-	1	-	-	-	-	2	-	-
CO 5	*Summarize the simple computer design and HDL.*	3	2	3	-	-		1	-	-	-	-	2	-	-
	Average	**3**	**2**	**3**	-	-	-	**1**		-	-	-	**2**	**-**	-

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20CD311	**DESIGN THINKING** (Common TO CSD & IOT)	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:	*Remember the design thinking principles.*	*Remember*
CO2:	*Recognize the concepts and identify the Issues in design thinking process.*	*Understand*
CO3:	*Identify various key ideas in design thinking to different problems.*	*Understand*
CO4:	*Examine the business ideas and to implement the design.*	*Understand*
CO5:	*Apply design thinking approach to real world problems.*	*Apply*

UNIT – I BASICS OF DESIGN THINKING [9]

Introduction – Design Thinking Frameworks – Principles of Design Thinking – Process of Design Thinking – Design Iteration – Plan a Design Thinking project – Design Thinking methods – Design Thinking Tools.

UNIT – II UNDERSTAND, OBSERVE AND IDENTIFY THE ISSUES [9]

Search field determination – Problem clarification – Understanding of the problem – Problem Analysis – Reformulation of the problem – Observation Phase – Empathetic design –Tips for observing – Methods for Empathetic Design – Point-of-View Phase – Characterization of the target group – Description of customer needs.

UNIT – III ENCOURAGE IDEAS AND PROTOTYPING [9]

Ideate Phase –The creative process and creative principles – Creativity techniques – Evaluation of ideas – Prototype Phase – Lean Startup Method for Prototype Development –Visualization and presentation techniques.

UNIT – IV TEST BUSINESS IDEAS AND IMPLEMENTATION [9]

Test Phase – Tips for interviews – Tips for surveys – Kano Model – Desirability Testing – How to conduct workshops - Requirements for the space – Material requirements – Agility for Design Thinking.

UNIT – V FUTURE [9]

Spreading the Message – Human Centered – Experimental – Design Thinking Meets the corporation – The New Social Contract – Design Activism – Designing tomorrow.

Total = 45 Periods

Text Books:

1 Christian Mueller-Roterberg, Handbook of Design Thinking - Tips & Tools for how to design thinking, Kindle Direct Publishing, First Edition, 2018.

2 Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.

Reference Books:

1 Jeanne Liedtka and Tim Ogilvie, Designing for Growth: a design thinking tool kit for managers, Columbia University Press, New York, Second Edition, 2011

2 Johnny Schneider, Understanding Design Thinking, Lean and Agile, O'Reilly Media, California, First Edition, 2017

3 Roger Martin, The Design of Business: Why Design Thinking is the Next Competitive Advantage, Harvard Business Press, United States, First Edition, 2009.

4 Idris Mootee, Design Thinking for Strategic Innovation, John Wiley & Sons Inc, New Jersey, First Edition, 2013

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD311** **Course Name:** **DESIGN THINKING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Remember the design thinking principles.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO 2	*Recognize the concepts and identify the Issues in design thinking process.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO 3	*Identify various key ideas in design thinking to different problems.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO 4	*Examine the business ideas and to implement the design.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO 5	*Apply design thinking approach to real world problems.*	3	3	3	3		-	-	-	2	-	-	2	3	3
	Average	3	3	3	3	3	-	-	-	2	-	-	2	3	-

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20CD343	**COMPUTER ORGANIZATION AND ARCHITECTURE** (Common To CSD & IOT)	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:	*Examine the different ways of communicating with I/O devices and standard I/O interfaces.*	*Apply*

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, SafwatZaky 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 T.K Ghosh, Computer Organization and Architecture, Haldia Institute of Technology, West Bengal, Third Edition, 2011.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20CD343** **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
CO 1	*Identify the basics structure of computers, operations and instructions.*	3	2	2	1	1	-	-	-	2	2	2	2	3	1
CO 2	*Outline the arithmetic operations and working of hardwired micro programmed control.*	3	3	3	2	1	-	-	-	2	1	2	3	**3**	**1**
CO 3	*Comprehend pipelined execution and design control unit.*	3	2	3	2	2	-	-	-	1	1	2	3	**3**	**2**
CO 4	*Recognize the hierarchical memory system including cache memory and virtual memory*	3	3	2	1	1	-	-	-	2	1	1	3	**3**	**2**
CO 5	*Examine 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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

		L	T	P	C
20IO327	**JAVA PROGRAMMING LABORATORY** (Common To CSD & IOT)	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
4. Finding area of sphere using single inheritance
5. Calculating performance of the students using multi-level inheritance
6. Students' information manipulation using hierarchical inheritance
7. Write a program for calculating area of rectangle and triangle using interface
8. Write a program for employee management using packages.
9. Write a program for calculator operations and handle the exceptions
10. Write a program for manipulating strings.
11. Write a program using the concept of command line arguments
12. Write a program for threads (extending Threads class and implementing runnable interface)
13. Write a program to read and display the student details from the database using database connectivity

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20IO327** **COURSE NAME:** **JAVA PROGRAMMING LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Apply the features of java to find optimal solution for the real-world problems.*	3	3	2	3	3	-	-	-	2	-	2	3	3	3
CO 2	*Practically implement the concept of arrays, constructors, inheritance and overloading.*	3		2	3	2	-	-	-	2	-	2	3	3	**3**
CO 3	*Recall interface, abstract class and packages concepts.*	3	3	1	3	2	-	-	-	1	-	3	2	3	2
CO 4	*Outline the features of exception handling, string handling, threads and command line arguments practically.*	3	3	2	2	3	-	-	-	2	-	2	3	3	**3**
CO 5	*Examine the concept of database connectivity and to implement.*	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 – III

		L	T	P	C
20EE225	**DIGITAL SYSTEMS LABORATORY** (Common To CS & CSD)	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:	*Outline basic Boolean theorems and verify their functionalities.*	*Understand*
CO2:	*Implement combinational circuits using logic gates.*	*Understand*
CO3:	*Design combinational circuits using MSI devices.*	*Apply*
CO4:	*Construct sequential circuits using MSI devices.*	*Apply*
CO5:	*Develop HDL models for combinational and sequential circuits.*	*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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Outline basic Boolean theorems and verify their functionalities.*	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO 2	*Implement combinational circuits using logic gates.*	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO 3	*Design combinational circuits using MSI devices.*	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO 4	*Construct sequential circuits* using *MSI devices.*	1	-	3	-	-	-	-	2	2	-	-	1	-	-
CO 5	*Develop VHDL models for combinational and sequential circuits.*	1	-	3	-	-	-	-	2	2	-	-	1	-	-
	Average	**1**	**-**	**3**	**-**	**-**	**-**	**-**	**2**	**2**	**-**	**-**	**1**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

20IO329	**DATA STRUCTURES LABORATORY** (Common To CSD & IOT)	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:	*Apply the concepts of singly and doubly linked lists.*	*Apply*
CO2:	*Implement the applications of stack and queue.*	*Create*
CO3:	*Design the balanced tree concepts.*	*Create*
CO4:	*Demonstrate the sorting algorithm techniques.*	*Create*
CO5:	*Construct the minimum spanning tree.*	*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*
9. *ii) Postorder iii) Inorder*
10. *Implementation of Binary Search Tree.*
11. *Implementation of AVL Tree.*
12. *Write programs for implementing the following graph traversal and MST algorithms:*
13. *a) DFS Algorithm b) Prims Algorithm.*
14. *Write programs for implementing the following sorting methods to arrange a list of integers in ascending order: a) Insertion sort b) Merge sort*
15. *Implementation of Hashing.*

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO329** **Course Name:** **DATA STRUCTURES LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Apply the concepts of singly and doubly linked lists.*	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO 2	*Implement the applications of stack and queue.*	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO 3	*Design the balanced tree concepts.*	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO 4	*Demonstrate the sorting algorithm techniques.*	2	3	3	2	2	-	-	-	-	-	2	2	3	2
CO 5	*Construct the minimum spanning tree.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – III

20HR351	**CAREER DEVELOPMENT SKILLS – I**	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		***Cognitive level***
CO1:	*Have competent knowledge on grammar with an understanding of its basic rules.*	*Understand*
CO2:	*Communicate effectively and enhance interpersonal skills with renewed self – confidence*	*Apply*
CO3:	*Construct sentence in English and make correction*	*Apply*
CO4:	*Perform oral communication in any formal situation*	*Create*
CO5:	*Develop their LSRW skills.*	*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.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

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
CO 1	*Have competent knowledge on grammar with an understanding of its basic rules.*	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO 2	*Communicate effectively and enhance interpersonal skills with renewed self – confidence*	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO 3	*Construct sentence in English and make correction*	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO 4	*Perform oral communication in any formal situation*	-	-	-	-	1	-	-	-	3	3	-	3	-	-
CO 5	*Develop their LSRW skills.*	-	-	-	-	1	-	-	-	3	3	-	3	-	-
	Average	-	-	-	-	1	-	-	-	**3**	**3**	**-**	**3**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20MA441	**PROBABILITY AND DECISION MODELS** (Common To CS, CSD, IOT & IT)	3	1	0	4

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 importance of one dimensional random variables discrete and continuous distribution.*	*Understand*
CO2:	*Develop their skills in joint, marginal and conditional distributions and knowing the concept of covariance correlation & regression.*	*Apply*
CO3:	*Analyze the theory of stationary process, Markov Process and transition probabilities, and Poisson Process.*	*Analyze*
CO4:	*Illustrate the basic concept of single server and multi-server queuing models.*	*Understand*
CO5:	*Estimate Critical Path in PERT and CPM.*	*Evaluate*

UNIT – I **ONE DIMENSIONAL RANDOM VARIABLE** **[12]**

Discrete and Continuous Random Variable – Moments – Moment Generating Functions and their Properties– Standard Distributions: Binomial, Poisson, Exponential and Normal Distributions.

UNIT – II **TWO DIMENSIONAL RANDOM VARIABLES** **[12]**

Joint Distributions – Marginal and Conditional Distributions – Covariance – Correlation and Regression analysis and their properties.

UNIT – III **RANDOM PROCESSES** **[12]**

Classification – Stationary Process – Markov Process – Markov Chain – Transition Probabilities – Limiting Distributions – Poisson Process and their Properties.

UNIT – IV **QUEUEING MODELS** **[12]**

Markovian Queues – Little's formula – Single Server Models: (M/M/1) :(∞/FIFO) and (M/M/1) :(N/FIFO) – Multi Server Models: (M/M/C) :(∞/FIFO) and (M/M/C) :(N/FIFO).

UNIT – V **NETWORK MODELS** **[12]**

Network Construction – Critical Path Method (CPM) – Computations of total, free and independent floats – PERT Analysis– Computation of expected time and standard deviation.

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

Text Books:

1 P.Kandasamy, K.Thilagavathi and K.Gunavathi, Probability and Queueing Theory, S. Chand Publishers, New Delhi, Third Edition, 2016.

2 Hamdy. A.Taha, Operations Research, Pearson Education, New Delhi, Tenth Edition, 2015.

Reference Books:

1 Oliver C. Ibe, Fundamentals of Applied Probability and Random Processes, Elsevier, Third Indian Reprint, 2016.

2 M.B.K.Moorthy, K.Subramani and A. Santha, Probability and Queueing Theory, Scitech Publishers, Chennai, Fifth Edition, 2015.

3 Veerarajan. T., Probability, Statistics and Random Processes, Tata McGraw-Hill, New Delhi, Tenth Edition, 2015,

4 https://www.youtube.com/watch?v=J70dP_AECzQ

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

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	*Explain the importance of one-dimensional random variables discrete and continuous distribution.*	*3*	3	3	3	-	-	-	-	-	-	-	-	-	-
CO2	*Develop their skills in joint, marginal and conditional distributions and knowing the concept of covariance correlation &regression.*	*3*	3	3	3	-	-	-	-	-	-	-	-	-	-
CO3	*Analyze the theory of stationary process, Markov Process and transition probabilities, and Poisson Process.*	*3*	3	3	3	-	-	-	-	-	-	-	-	-	-
CO4	*Illustrate the basic concept of single server and multi-server queuing models.*	*3*	3	3	3	-	-	-	-	-	-	-	-	-	-
CO5	*Estimate Critical Path in PERT and CPM.*	*3*	3	3	3	-	-	-	-	-	-	-	-	-	-
	Average	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20CD441	**THEORY OF COMPUTATION** (Common To CSD & IOT)	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_{ij}^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 UNDECIDABLITY** **[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 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 Sipser, Michael, Theory of computation, Cengage Learning, India, First Edition,2007.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20CD441** **COURSE NAME:** **THEORY OF COMPUTATION**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Compare and analyze various finite automata and convert NFA to DFA.*	3	3	3	3	2	1	-	-	-	-	-	2	3	2
CO 2	*Construct finite automata to regular expression and identify the properties of regular language.*	3	3	3	3	3	2	-	-	-	-	-	2	**3**	**3**
CO 3	*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**
CO 4	*Construct pushdown automata and convert pushdown automata to context-free grammar.*	3	3	3	3	3	1	-	-	-	-	-	2	**3**	**2**
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20IO442	**DATABASE MANAGEMENT SYSTEMS** (Common To CSD & IOT)	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 K. Prema, A. Gowri Shankar Reddy, et al, Database Management System Concepts, Notion Press, India, First Edition, 2020.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

COURSE CODE: **20IO442** **COURSE NAME:** **DATABASE MANAGEMENT SYSTEMS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Be aware of database architecture and the relational algebra.*	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO 2	*Apply Structured query language to create and manipulate a relational database.*	3	3	3	3	2	2	-	-	2	-	-	2	**3**	**3**
CO 3	*Create functions, triggers, recursive queries and indexing.*	3	3	3	3	2	2	-	-	2	-	-	2	**3**	**3**
CO 4	*Demonstrate the purpose of ER Model and normalization.*	3	3	3	3	2	2	-	-	2	-	-	2	**3**	**3**
CO 5	*Discover about transaction, query processing and advanced database concepts.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - IV

		L	T	P	C
20CD411	**DATA ANALYTICS AND VISUALIZATION**	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:	*Realize the fundamental concepts of data analytics*	*Understand*
CO2:	*Identify Differentiate between different kinds of predictive models*	*Understand*
CO3:	*Examine the specific challenges and opportunities associated with implementing predictive analytics in various sectors*	*Understand*
CO4:	*Analyze the principles of visualizing data effectively and the importance of selecting the appropriate chart types to convey insights*	*Analyze*
CO5:	*Recognize the concept of dashboards and its types.*	*Understand*

UNIT – I DATA MANAGEMENT [9]

Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors / Signals/ GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Processing & rocessing.

UNIT – II DATA ANALYTICS [9]

Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases &Types of Data and variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT – III REGRESSION [9]

Regression–Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc. Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT – IV OBJECT SEGMENTATION [9]

Regression Vs Segmentation– Supervised and Unsupervised Learning, Tree Building–Regression, Classification, Over fitting, Pruning and Complexity, Multiple Decision Trees etc. Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT – V DATA VISUALIZATION [9]

Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

Total = 45 Periods

Text Books:

1 Student's Handbook for Associate Analytics– II,

2 Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers

Reference Books:

1 Introduction to Data Mining, Tan, Steinbach and Kumar, AddisionWisley, 2006.

2 Purna Chander Rao. Kathula, Hands-on Data Analysis and Visualization with Pandas, BPB Publications, Delhi, First Edition ,2020

3 Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford University.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD411** **Course Name:** **DATA ANALYTICS AND VISUALIZATION**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Realize the fundamental concepts of data analytics*	3	1	2	1	2	1	-	-	2	2	2	3	1	3
CO 2	*Identify Differentiate between different kinds of predictive models*	2	2	3	2	3	1	-	-	1	2	2	3	2	2
CO 3	*Examine the specific challenges and opportunities associated with implementing predictive analytics in various sectors*	2	1	2	1	2	1	-	-	2	2	2	2	1	2
CO 4	*Analyze the principles of visualizing data effectively and the importance of selecting the appropriate chart types to convey insights*	3	2	3	2	2	1	-	-	1	1	1	2	3	3
CO 5	*Recognize the concept of dashboards and its types.*	2	1	2	2	2	1	-	-	2	2	1	1	1	2
	Average	2.4	2.4	1.4	2.5	1.6	2.5	1	-	-	1.6	1.8	1.6	2.2	1.6

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20CD443	**DESIGN AND ANALYSIS OF ALGORITHMS** (Common To CSD & IOT)	3	0	0	3

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 – 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: 4-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 R) = 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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD443** **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
CO 1	*Analyze the efficiency of algorithms.*	3	3	2	3	2	-	-	-	1	-	-	1	3	2
CO 2	*Design and analyze problems using decrease, transform and conquer techniques.*	3	3	3	3	2	-	-	-	1	-	-	1	3	2
CO 3	*Identify optimal solution by applying dynamic techniques.*	3	3	3	3	1	-	-	-	1	-	-	1	3	2
CO 4	*Evaluate various backtracking, branch and bound techniques.*	3	3	3	3	1	-	-	-	1	-	-	1	3	1
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20IO444	**OPERATING SYSTEMS** (Common To CSD & IOT)	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. 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.

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. Dhamdhere, 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 Tanenbaum, Modern Operating Systems, Pearson Education, India, Fourth Edition, 2016.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO444** **Course Name:** **OPERATING SYSTEMS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Identify the components and their functionalities in the operating system.*	3	2	2	1	1	-	-	-	-	1	-	1	3	2
CO 2	*Apply various CPU scheduling algorithms and synchronization Techniques.*	3	2	2	1	1	-	-	-	-	1	-	1	3	2
CO 3	*Examine the performance of various memory management techniques.*	3	2	1	1	1	-	-	-	-	1	-	1	3	2
CO 4	*Summarize the virtual memory concepts and file access methods.*	3	2	1	1	1	-	-	-	-	1	-	1	3	2
CO 5	*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 – IV

		L	T	P	C
20IO427	**DATABASE MANAGEMENT SYSTEMS LABORATORY** (Common To CSD & IOT)	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

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO427** **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
CO 1	*Design and implement a database schema for real time applications.*	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO 2	*Populate and query a database.*	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO 3	*Create and maintain tables using PL/SQL.*	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO 4	*Utilize function and procedures on any application.*	3	3	3	3	3	1	-	-	2	-	-	3	3	3
CO 5	*Apply trigger and generate report.*	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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

20CD421 **DATA ANALYTICS AND VISUALIZATION 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:	*Building machine learning models using data processed with Pandas.*	*Understand*
CO2:	*Acquire how to combine multiple datasets using concatenation, merging, and joining operations.*	*Understand*
CO3:	*Using python list, tuples and dictionaries.*	*Understand*
CO4:	*Implement simple linear regression and logistic regression algorithms from scratch using libraries like NumPy.*	*Understand*
CO5:	*Implementing clustering algorithms using Python libraries like Scikit-learn and exploring different datasets to apply clustering techniques.*	*Remember*

LIST OF EXPERIMENTS:

1. Working with Python Pandas Data Science Library
2. Working with Python Numpy and Lambdas Library
3. Data cleaning and manipulation
4. Data Wrangling
5. Plots in Python.
6. Creation, manipulation of list, dictionaries, Tuples, Series, Data Frames
7. Linear Regression with Python
8. Logistic Regression with Python
9. Clustering with Python

Total: 30 Periods

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD421** **Course Name:** **DATA ANALYTICS AND VISUALIZATION LABORATORY**

	CO	Course Outcomes	Programme Outcomes												
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
	CO 1	*Building machine learning models using data processed with Pandas.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
	CO 2	*Acquire how to combine multiple datasets using concatenation, merging, and joining operations*	2	2	2	2	3	-	-	-	2	-	3	-	2	2
	CO 3	*Using python list, tuples and dictionaries.*	2	2	2	2	2	-	-	-	2	-	3	-	2	2
	CO 4	*Implement simple linear regression and logistic regression algorithms from scratch using libraries like NumPy.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
	CO 5	*Implementing clustering algorithms using Python libraries like Scikit-learn and exploring different datasets to apply clustering techniques.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
		Average	**3**	**3**	**3**	**3**	**3**	**-**	**-**	**-**	**2**	**-**	**3**	**-**	**2**	**2**

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – IV

		L	T	P	C
20IO429	**OPERATING SYSTEMS LABORATORY** (Common To CSD & IOT)	0	0	3	1

Prerequisite *Basic knowledge about the C Programming.*

Course Outcomes: On Completion of this course, the student will be able to		***Cognitive level***
CO1:	*Implement the commands in Linux OS.*	*Understand*
CO2:	*Evaluate the performance of various CPU scheduling algorithms.*	*Evaluate*
CO3:	*Create process and Implement IPC, deadlock avoidance and detection Algorithms.*	*Create*
CO4:	*Analyze the performance of the various page replacement Algorithms.*	*Analyze*
CO5:	*Examine file organization and file allocation strategies.*	*Analyze*

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO429** **Course Name:** **OPERATING SYSTEMS LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	*Implement the commands in Linux OS.*	2	3	2	1	1	-	-	-	-	1	-	1	2	1
CO 2	*Evaluate the performance of various CPU scheduling algorithms.*	2	3	2	1	1	-	-	-	-	1	-	1	2	1
CO 3	*Create process and Implement IPC, deadlock avoidance and detection Algorithms.*	2	3	2	1	1	-	-	-	-	1	-	1	3	2
CO 4	*Analyze the performance of the various page replacement Algorithms.*	2	3	1	1	1	-	-	-	-	1	-	1	3	2
CO 5	*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)

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - IV

		L	T	P	C
20HR432	**CAREER DEVELOPMENT SKILLS - II**	0	2	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:	*Speak and write appropriately by understanding verbal and logical reasoning*	*Apply*
CO2:	*Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions*	*Apply*
CO3:	*Enhance their skills on quantitative aptitude*	*Understand*
CO4:	*Speak and write appropriately by understanding and applying the basic grammatical rules*	*Create*
CO5:	*Critically evaluate problems related to quantitative aptitude*	*Apply*

UNIT - I VERBAL AND LOGICAL REASONING – PART 1 [06]

Alphabet Test – Synonyms & Antonyms – Idioms & Phrases – Analogies - Theme Detection – Odd Words – Statement & Conclusions - Family Tree – Blood Relations – Coding & Decoding – Syllogism – Odd Man Out.

UNIT - II QUANTITATIVE APTITUDE – PART 1 [06]

Numbers: Number system - Squaring of Numbers – Square Roots – Cube Roots – Divisibility – HCF, LCM – Decimals.

UNIT - III QUANTITATIVE APTITUDE – PART 2 [06]

Percentages – Averages – Ratio & Proportion – Mixtures and Allegations – logarithms.

UNIT - IV READING COMPREHENSION & WRITTEN COMMUNICATION – PART 3 [06]

READING SKILLS: Importance of Reading – Definition of Reading – Levels of Reading – Requirements of Reading – Types of Reading – Techniques of Reading - Academic Reading Tips.

UNIT - V QUANTITATIVE APTITUDE – PART 3 [06]

Profit and Loss – Simple Interest & Compound Interest – Problem on Ages – Calendar.

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

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code 20HR432 **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
	CO 1	*Speak and write appropriately by understanding verbal and logical reasoning*	-	-	-	-	-	-	-	-	2	3	-	3	-	-
	CO 2	*Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions*	-	-	-	-	-	-	-	-	2	3	-	3	-	-
	CO 3	*Enhance their skills on quantitative aptitude*	-	-	-	-	-	-	-	-	2	3	-	3	-	-
	CO 4	*Speak and write appropriately by understanding and applying the basic grammatical rules*	-	-	-	-	-	-	-	-	2	3	-	3	-	-
	CO 5	*Critically evaluate problems related to quantitative aptitude*	-	-	-	-	-	-	-	-	2	3	-	3	-	-
		Average	-	-	-	-	-	-	-	-	**2**	**3**	**-**	**3**	**-**	-

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

K.S.R. COLLEGE OF ENGINEERING **R 2020**

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SEMESTER– V

20CD511 **PRINCIPLES OF COMPILER DESIGN**

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:	*To learn the various phases of compiler.*	*Understanding*
CO2:	*To learn the various parsing techniques.*	*Applying*
CO3:	*To understand syntax directed translation and intermediate code generation.*	*Applying*
CO4:	*To learn to implement run-time environment and code generation*	*Understanding*
CO5:	*To learn to implement code optimization.*	*Applying*

UNIT–I INTRODUCTION TO COMPILERS & AUTOMATA **[9]**

Translators - Compilation and Interpretation - The Phases of Compiler – Errors-Encountered in Different Phases - The Grouping of Phases - Compiler Construction Tools-.Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Finite Automata –Regular Expressions to Automata NFA, DFA – Minimizing DFA - Language for Specifying Lexical Analyzers – Lex tool.

UNIT–II SYNTAX ANALYSIS– PARSING **[9]**

Role of Parser – Grammars – Context-free grammars –- Top Down Parsing: Recursive Descent Parser-Predictive Parser-Operator Predictive Parsing. Bottom Up Parsers: Shift Reduce Parser - LR Parser – LR(0) Item - Construction Of SLR Parsing Table -CLR Parser - LALR Parser. Error Handling and Recovery in Syntax Analyzer – YACC Tool: Structure of YACC Program –Communication between LEX and YACC.

UNIT–III SYNTAX DIRECTED TRANSLATION & INTERMEDIATE CODE GENERATION **[9]**

Syntax directed Definitions-Construction of Syntax Tree-Bottom-up Evaluation of S-Attribute. Intermediate Languages - Generation of Three Address Code - prefix - postfix - Quadruple - triple -indirect triples. Declarations- Assignment Statements - Arrays - Boolean Expressions - Backpatching -Flow of Control Statements – Procedure calls.

UNIT–IV RUN-TIME ENVIRONMENT AND CODE GENERATION **[9]**

Runtime Environments – source language issues – Storage organization – Storage Allocation Strategies: Parameter Passing-Symbol Tables - Dynamic Storage Allocation - Issues in the Design of a code generator– Design of a simple Code Generator - Optimal Code Generation for Expressions.

UNIT–V CODE OPTIMIZATION **[9]**

Principal Sources of Optimization – Peep-hole optimization - DAG- Optimization of Basic Blocks - Global Data Flow Analysis - Efficient Data Flow Algorithm – Recent trends in Compiler Design.

Total : 45 Periods

Text Books:

1 Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques and Tools", Second Edition, Pearson Education, 2009.

References:

1 Randy Allen, Ken Kennedy, Optimizing Compilers for Modern Architectures: A Dependence based Approach, Morgan Kaufmann Publishers, 2002.

2 Steven S. Muchnick, Advanced Compiler Design and Implementationl, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

Regulation : R2020

Course Code : 20CD511 **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	Understand the techniques in different phases of a compiler.	3	-	-	-	2	-	-	1	1	-	1	2	2	-
CO2	Design a lexical analyzer for a sample language and learn to use the LEX tool.	2	1	3	2	3	-	1	1	1	3	2	1	-	3
CO3	Apply different parsing algorithms to develop a parser and learn to use YACC tool	3	-	-	-	3	-	-	1	-	1	1	1	-	-
CO4	Understand semantics rules (SDT), intermediate code generation and run-time environment.	2	3	-	3	1	-	-	-	-	-	-	-	-	-
CO5	Implement code generation and apply code optimization techniques.	2	3	-	3	-	-	-	-	-	-	-	1	-	2
	Average	**3**	**3**	**-**	**3**	**3**	**-**	**1**	**1**	**1**	**3**	**2**	**2**	**2**	**3**

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

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

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SEMESTER– V

20CD512 **INTERNET PROGRAMMING**

L	T	P	C
3	0	0	3

Prerequisite: *No prerequisites are needed for enrolling in to the course*

Course Outcomes: On Completion of this course, the student will be able to		***Cognitive Level***
CO1:	*Understand various service providers.*	*Understanding*
CO2:	*Apply various elements of HTML.*	*Applying*
CO3:	*Apply various elements of CSS.*	*Applying*
CO4:	*Design interactive web pages using JavaScript.*	*Designing*
CO5:	*Create Dynamic Web Applications using ReactJS.*	*Creating*

UNIT–I INTRODUCTION **[9]**

World wide web and its evolution - E-mail, Telnet, FTP, E–commerce, Cloud Computing, Video conferencing - Internet service providers, IP Address, URL, Domain Name Servers - Web Browsers, Search Engine -Web Server vs Application Server.

UNIT–II HYPERTEXT MARKUP LANGUAGE **[9]**

HTML Tags, Structure, HTML Coding Conventions - Block Elements, Text Elements, Code Related Elements, Character References - Lists, Images, section, article, and aside Elements - nav and a Elements - header and footer Elements.

UNIT–III CASCADING STYLE SHEETS **[9]**

CSS Overview - CSS Rules, CSS Syntax and Style - Class Selectors, ID Selectors, span and div Elements - Cascading, style Attribute, style Container, External CSS Files - CSS Properties: Color Properties, Font Properties, line-height Property, Text Properties, Border Properties. Element Box, padding Property, margin Property - Hosting a Website and GIT.

UNIT–IV JAVASCRIPT **[9]**

Hello World Web Page - Buttons, Functions, Variables, Identifiers - Assignment Statements and Objects - Document Object Model, Forms: form Element, Controls, Text Control Accessing a Form's Control Values, reset and focus Methods – Event Handler Attributes: onchange, onmouseover, onmouseout.

UNIT–V REACTJS **[9]**

React Environment Setup - ReactJS Basics - React JSX - React Components: React Component API - React Component Life Cycle - React Constructors - React Dev Tools - React Native vs ReactJS.

Total : 45 Periods

Text Books:

1 Dean, J., Web Programming with HTML5, CSS, and JavaScript. Jones & Bartlett Learning, 2018.

2 Minnick, C. Beginning ReactJS foundations building user interfaces with ReactJS: An Approachable Guide, OReillly, 2022.

References:

1 Harvey M Deitel, Paul J Deitel and Tem R Nieto, Internet and World Wide Web How to Program, Pearson, 6th Edition, 2020.

2 Rebah, H.B., Boukthir, H. and Chedebois, A., Website Design and Development with HTML5 and CSS3. John Wiley & Sons, 2022.

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B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

Regulation: **R2020**

Course Code : 20CD512 **Course Name:** **INTERNET PROGRAMMING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Understand various service providers.*	3	3	3	-	-	-	-	1	2	2	-	3	3	1
CO2	*Apply various elements of HTML.*	3	3	3	-	-	-	-	1	2	2	-	3	3	2
CO3	*Apply various elements of CSS.*	3	3	3	-	-	-	-	1	2	2	-	3	3	2
CO4	*Design interactive web pages using JavaScript.*	3	3	3	-	-	-	-	1	2	2	-	3	3	2
CO5	*Create Dynamic Web Applications using ReactJS.*	3	3	3	-	-	-	-	1	2	2	-	3	3	2
	Average	**3**	**3**	**3**	**-**	**-**	**-**	**-**	**1**	**2**	**2**	**-**	**3**	**3**	**1.8**

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

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

(Autonomous)

SEMESTER– V

20CD513 **OBJECT ORIENTED ANALYSIS AND 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:	*Express software design with UML diagrams*	*Remembering*
CO2:	*Demonstrate the uses of UML diagrams to develop a software product.*	*Understanding*
CO3:	*Apply UML diagrams to design a software for an application*	*Applying*
CO4:	*Analyze the strengths and weakness of the design specification*	*Analyzing*
CO5:	*Understand the various testing methodologies for OO software*	*Understanding*

UNIT–I UNIFIED PROCESS AND USE CASE DIAGRAMS **[9]**

Introduction to OOAD with OO Basics - Unified Process – UML diagrams – Use Case –Case study – the Next Gen POS system, Inception -Use case Modelling – Relating Use cases – include, extend and generalization – When to use Use-cases.

UNIT–II STATIC UML DIAGRAMS **[9]**

Class Diagram— Elaboration – Domain Model – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition - Relationship between sequence diagrams and use cases – When to use Class Diagrams.

UNIT–III DYNAMIC AND IMPLEMENTATION UML DIAGRAMS **[9]**

Dynamic Diagrams – UML interaction diagrams - System sequence diagram – Collaboration diagram – When to use Communication Diagrams - State machine diagram and Modelling – When to use State Diagrams - Activity diagram – When to use activity diagrams Implementation Diagrams - UML package diagram - When to use package diagrams – Component and Deployment Diagrams – When to use Component and Deployment diagrams.

UNIT–IV DESIGN PATTERNS **[9]**

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioral – Strategy – observer –Applying GoF design patterns – Mapping design to code.

UNIT–V TESTING **[9]**

Object Oriented Methodologies – Software Quality Assurance – Impact of object orientation on Testing – Develop Test Cases and Test Plans.

Total : 45 Periods

Text Books:

1 Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.

2 Ali Bahrami - Object Oriented Systems Development - McGraw Hill International Edition – 1999.

References:

1 Erich Gamma, a n d Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software", Addison-Wesley, 1995.

2 Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

Regulation : R2020
Course Code : 20CD513 **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	Express software design with UML diagrams	3	2	1	-	-	-	-	1		-	2		3	2
CO2	Demonstrate the uses of UML diagrams to develop a software product.	3	3	2	3	-	-	-	-	2	-	-	-	3	2
CO3	Apply UML diagrams to design a software for an application	3	3	1	-	-	-	-	-	2	-	2	-	3	2
CO4	Analyze the strengths and weakness of the design specification	3	3	2	3	-	-	-	-	-	-	-	-	3	2
CO5	Understand the various testing methodologies for OO software	3	3	3	-	-	-	-	-	-	-	3	-	3	2
	Average	**3**	**3**	**2**	**3**				**1**	**2**		**2**		**3**	**2**

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

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K.S.R. COLLEGE OF ENGINEERING **R 2020**
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SEMESTER– V

20CD514 **COMPUTER NETWORKS**

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:	*Understand fundamental concepts of computer networks and communication*	*Understanding*
CO2:	*Carry out the concepts of error detection and correction, and implement protocols like Ethernet and MAC addressing*	*Understanding*
CO3:	*Carry out routing algorithms and protocols like RIP, OSPF, and BGP for determining optimal paths in a network*	*Understanding*
CO4:	*Implement transport layer protocols like TCP and UDP, focusing on connection management, reliability, and flow control.*	*Applying*
CO5:	*Understand various application protocols like HTTP, FTP, DNS, and SMTP for data exchange*	*Understanding*

UNIT–I INTRODUCTION **[9]**

Data Communication – Data Flow – The Internet – Protocols and standards – Network Models: Layered Tasks – The OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media –Connecting Devices-Signal transmission and encoding-Switching techniques and Multiplexing.

UNIT–II DATA LINK LAYER **[9]**

Error Detection and Correction – Parity Checking – Cyclic Redundancy Check (CRC) – Hamming Code – Forward Error Correction (FEC) - Ethernet – IEEE 802.3 Standards – Ethernet Frame Structure – CSMA/CD (Carrier Sense Multiple Access with Collision Detection) – Full Duplex vs Half Duplex – VLANs (Virtual LANs) -MAC Addressing – MAC Address Structure – ARP (Address Resolution Protocol) – MAC Address Assignment – MAC Address Filtering.

UNIT–III NETWORK LAYER **[9]**

IPV4 Addresses – IPV6 Addresses – Transition from IPV4 to IPV6 – Network layer: Delivery. Forwarding, and Routing: Address Mapping – Internet Control Message Protocol (ICMP) - Internet Group Management Protocol (IGMP) – Unicast Routing Protocol – Multicast Routing Protocols.

UNIT–IV TRANSPORT LAYER **[9]**

Process- to – Process Delivery – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Connection Management–Window Management– Stream Control Protocol (SCTP) – TCP Congestion Control – Quality of Service: Data Traffic –Techniques to improve QoS – Integrated Services – Differentiated Services.

UNIT–V APPLICATION LAYER **[9]**

Domain Name System (DNS): Domain Name Space – Distribution of Name Space – DNS in the Internet – WWW and HTTP – Network Management: Simple Network Management Protocol (SNMP) –Remote Login–Basics of Cryptography.

Total : 45 Periods

Text Books:

1 James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Eighth Edition, Pearson Education, 2021.

2 Behrouz A. Forouzan, Data Communications and Networking with TCP/IP Protocol Suite, Sixth Edition TMH, 2022.

References:

1 Behrouz A. Forouzan, Data Communications and Networking with TCP/IP Protocol Suite, Sixth Edition TMH, 2022

2 William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.

3 Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.

4 Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGraw Hill, 2012.

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CO-POMAPPING

Regulation: **R2020**

Course Code : 20CD514 **Course Name: COMPUTER NETWORKS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand fundamental networking concepts, OSI Layers and communication principles	2	2	1	-	2	-	-	-	-	1	-	-	3	2
CO2	Implement error detection, correction, and configure Ethernet/MAC protocols	2	1	-	1	2	-	-	-	-	1	-	2	-	2
CO3	Configure and apply routing protocols like RIP, OSPF, and BGP	2	2	1	-	3	-	-	-	-	1	-	1	-	2
CO4	Manage and optimize TCP/UDP protocols for connection reliability and flow control	2	-	1	1	2	-	-	-	-	1	-	-	-	2
CO5	Utilize application protocols like HTTP, FTP, DNS, and SMTP for network communication	2	3	2	-	-	-	-	-	-	1	-	1	-	2
	Average	**2**	**2**	**1**	**1**	**2**	**-**	**-**	**-**	**-**	**1**	**-**	**1**	**3**	**2**

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

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

R 2020

SEMESTER – V

20CD515	**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 ENTRPRENUERSHIP 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 – Sickness 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

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

Regulation: **R 2020**

Course Code: **20CD515** **Course Name:** **ENTREPRENEURSHIP DEVELOPMENT**

CO	Course Outcomes	Programme Outcomes												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	Explain the fundamentals of entrepreneurial activities.	2	2	1	-	1	-	1	1	-	3	1	1	2	2
CO 2	Describe the various practical exposure about the preparation of the business plan	2	2	3	-	2	-	2	1	-	3	1	1	**3**	**3**
CO 3	Discuss the various supports from Government and other non-governmental organizations while starting an enterprise.	1	1	2	-	1	-	1	2	-	2	3	2	**3**	**2**
CO 4	Explain the fundamental concepts in the management of small Enterprises.	2	2	2	-	2	-	2	2	-	3	1	2	**2**	**2**
CO 5	Illustrate various Entrepreneurial Development Strategies	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)

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

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SEMESTER– V

20CD521 **INTERNET PROGRAMMING 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: Be familiar with Understanding of Web Technologies.	*Understanding*
CO2: Learn to Develop Static Web Pages Using HTML and CSS.	*Applying*
CO3: Learn to Apply JavaScript for Dynamic Web Functionality.	*Applying*
CO4: Be familiar with Build and Manage React Applications.	*Creating*
CO5: Be exposed to Design and Deploy Dynamic Web Applications	*Designing*

LIST OF EXPERIMENTS:

1. Explore various terminologies related to Internet (ISP, Email, Telnet, FTP, Web browsers, Search Engines).
2. Experiment the use of basic HTML elements.
3. Demonstrate the applications of Lists, Tables, Images, Section, article and aside elements.
4. Investigate the various components of CSS.
5. Develop web pages using HTML and various elements of CSS.
6. Designing simple dynamic webpages using Javascript.
7. Build web pages using While Loop, External JavaScript Files, do Loop, Radio Buttons, Checkboxes, for Loop - fieldset and legend Elements.
8. React Environment Setup - ReactJS Basics - React JSX - React Components: React Component API.
9. Understand React Component Life Cycle and apply React Constructors - React Dev Tools - React Native vs ReactJS.
10. Deploying React - Case Studies for building dynamic web applications.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: **R2020**

Course Code : 20CD521 **Course Name:** **INTERNET PROGRAMMING LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Be familiar with Web page design using HTML/XML and style sheets.	3	3	3	2	3	-	-	-	1	-	-	1	2	1
CO2	Learn to create dynamic web pages using server side scripting.	3	2	3	1	3	-	-	-	1	-	-	1	2	1
CO3	Learn to write Client Server applications.	3	3	3	2	3	-	-	-	1	-	-	1	3	2
CO4	Be familiar with the PHP programming.	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO5	Be exposed to creating applications with XML.	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)

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

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SEMESTER– V

20CD522 **COMPUTER NETWORKS 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:	*Understand and implement reliable data transmission protocols*	*Understanding*
CO2:	*Implement insights into address resolution and reverse address resolution processes*	*Applying*
CO3:	*Understand packet routing and network latency measurement techniques*	*Understanding*
CO4:	*Build IP address management techniques*	*Applying*
CO5:	*Explore various routing algorithms*	*Understanding*

LIST OF EXPERIMENTS:

1. Implement a basic client-server communication model using TCP/IP.
2. Simulate and implement IPv4 and IPv6 addressing schemes.
3. Implement error detection using checksum and cyclic redundancy checks (CRC).
4. Develop a program to simulate Hamming Code for error correction.
5. Configure and simulate media access control protocols in a Local Area Network (LAN).
6. Simulate routing and forwarding in the network layer using a simple router program.
7. Implement ICMP protocol for error reporting (e.g., ping simulation).
8. Create a program to simulate process-to-process communication using UDP.
9. Implement a program to demonstrate TCP connection establishment and congestion control.
10. Develop a basic DNS server and client to resolve domain names to IP addresses.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: **R2020**

Course Code : 20CD522 **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	Illustrate the basic concepts of MS Office. Build the knowledge of flowchart and create the fundamentals of algorithm.	3	3	3	2	3	-	-	-	1	-	-	1	2	1
CO2	Build code segments for handling control and looping statements.	3	2	3	1	3	-	-	-	1	-	-	1	2	1
CO3	Identify the allocation of static & dynamic memory and its utilization.	3	3	3	2	3	-	-	-	1	-	-	1	3	2
CO4	Consume the knowledge of string handling functions.	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO5	Demonstrate use of pointers, structures and files handling functions.	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)

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K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - V

		L	T	P	C
20HR533	**CAREER DEVELOPMENT SKILLS - III**	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.

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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	*Understand the nearness of leading various texts.*	-	-	-	-	-	-	-	1	3	3	-	-	-	-
CO2	*Perform well in verbal and logical reasoning.*	-	-	-	-	-	-	-	1	3	3	-	2	-	-
CO3	*Understand and develop the etiquette necessary to present oneself in a professional setting.*	-	-	-	-	-	-	-	1	3	3	-	1	-	
CO4	*Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.*	-	-	-	-	-	-	-	1	3	3	-	2	-	-
CO5	*Enhance the comprehension Skills in core subjects.*	-	-	-	-	-	-	-	1	3	3	-	-	-	-
	Average	-	-	-	-	-	-	-	1	**3**	**3**	**-**	**2**	**-**	**-**

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

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K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

20HS051	**UNIVERSAL HUMAN VALUES AND UNDERSTANDING HARMONY**	L	T	P	C
		3	0	0	3

(Common To CSD & IOT)

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:	*Discuss the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.*	*Understand*
CO2:	*Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Coexistence of Self and Body.*	*Understand*
CO3:	*Interpret the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human–human relationships and explore their role in ensuring a harmonious society.*	*Understand*
CO4:	*Describe the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.*	*Understand*
CO5:	*Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.*	*Understand*

Unit - I **INTRODUCTION** **[9]**

Need and Basic Guidelines of Value Education – Content and Process of Value Education – Self Exploration – purpose of self Exploration – Content and Process of Self exploration – Natural Acceptance – Realization and Understanding – Basic Human Aspirations – Continuous Happiness and Prosperity – Exploring Happiness and Prosperity – Basic Requirement for Fulfillment of Human Aspirations – Relationships – Physical Facilities – Right Understanding.

Unit - II **HARMONY IN THE SELF AND BODY** **[9]**

Human Begin and Body – Understanding Myself as Co–existence of Self ('I') and Body, Needs of the Self and Body, Activities in the Self and Body, Self ('I') as the Conscious Entity, the Body as the Material Entity – Exercise – Body as an Instrument– Harmony in the Self ('I) – Understanding Myself – Harmony with Body.

Unit – III **HARMONY IN THE FAMILY AND SOCIETY** **[9]**

Harmony in the Family – Justice – Feelings (Values) in Human Relationships – Relationship from Family to Society – Identification of Human Goal – Five dimensions of Human Endeavour.

Unit – IV **HARMONY IN NATURE AND EXISTENCE** **[9]**

Order of Nature – Interconnectedness – Understanding the Four order – Innateness – Natural Characteristic – Basic Activity – Conformance – Introduction to Space – Co–existence of units of Space – Limited and unlimited – Active and No–activity – Existence is Co–existence.

Unit - V **IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS:** **[9]**

Values in different dimensions of Human Living – Definitiveness of Ethical Human Conduct – Implications of Value based Living – Identification of Comprehensive Human Goal – Humanistic Education – Universal Human Order – Competence and Issues in Professional Ethics.

Total = 45 Periods

Text Books:

1. Gaur R.R., Sangal R., Bagaria G.P., "A Foundation Course in Human Values and Professional Ethics", 1st Edition, Excell Books Pvt. Ltd., New Delhi, 2016.

Reference Books:

1. Ivan Illich, "Energy & Equity", The Trinity Press, USA, 1974.
2. Schumacher E.F., "Small is Beautiful: a study of economics as if people mattered", Britain, 1973.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20HS051 **Course Name: UNIVERSAL HUMAN VALUES AND UNDERSTANDING HARMONY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Discuss the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society.*	-	-	-	-	-	1	-	3	-	-	-	-	-	-
CO2	*Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Coexistence of Self and Body.*	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	*Interpret the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human–human relationships and explore their role in ensuring a harmonious society.*	-	-	-	-	-	1	-	3	-	-	-	-	-	-
CO4	*Describe the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.*	-	-	-	-	-	-	-	2	-	-	-	-	-	-
CO5	*Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.*	-	-	-	-	-	-	-	3	-	-	-	-	-	-
	Average	**-**	**-**	**-**	**-**	**-**	**0.4**	-	**2.6**	**-**	**-**	**-**	**-**	**-**	**-**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CD611	**USER EXPERIENCE DESIGN**	3	0	0	3

Prerequisite: Students should have the Design Thinking knowledge.

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Utilize the UX design process on product or service.*	*Apply*
CO2:	*Apply principles and procedures to conduct user research and create user personas.*	*Apply*
CO3:	*Construct affinity diagram for the product or service and design information architecture based on various visual design principles.*	*Apply*
CO4:	*Develop wireframes and prototypes for the product or service by using various tools and software.*	*Apply*
CO5:	*Illustrate various post-launch UX activities to get feedback from the users.*	*Apply*

Unit - I **UX DESIGN PROCESS** **[9]**

What is UX? – UX Design Vs UI Design – Why is UX so Important – Full Stack Design – UX Design Process – Discovery and Planning – The UX Strategy – UX Research: Discover – Explore – Test – Listen – UX Analysis – Design – Production.

Unit - II **USER RESEARCH AND USER PERSONAS** **[9]**

User Behavior Basics – The Gestalt Theory – Psychology in UX – User Research – Market Research Vs User Research – Benefits of User Research – Getting to Know Your Users – Grouping Customer Information – How to Conduct User Interviews? – User Personas: What are User Personas? – Creating a Persona – Four Different Perspectives on Personas – Benefits of Personas.

Unit – III **AFFINITY DIAGRAM, INFORMATION ARCHITECTURE AND VISUAL DESIGN PRINCIPLES** **[9]**

Affinity Diagrams: Affinity Diagram – Work Activity Affinity Diagram – Capture, Grouping and Labeling. Information Architecture: Navigation – Task Flow – Content Strategy – Site Map – Gestures – Basics of Visual Design – Lines – Shapes – Colors – Font/Typography – Textures – Forms – Design Principles – Alignment – Hierarchy – Contrast – Repetition – Proximity – Balance – Space – Visual Design Tools.

Unit – IV **WIREFRAMES AND PROTOTYPING** **[9]**

What is Wireframe? – How to Create Wireframes? – Types of Wireframes – Wireframing Tools: Sketch Wireframes – Stenciling and Paper cutouts – Wireframing Software – What is Prototyping – Prototyping Methods – Paper Prototypes – Digital Prototypes – Coding Prototypes – The process of Creating Prototypes – Prototyping Tools.

Unit - V **POST-LAUNCH UX ACTIVITIES** **[9]**

Post-launch UX Activities – Collecting the Correct User Feedback: Customer Feedback Surveys – Emails and Contact Forms – Feedback through Social Media – User Accessibility Testing – A/B Testing – Tracking and Recording User UI Sessions – Creating and Analyzing Conversion Funnels.

Total = 45 Periods

Text Books:

1. Elvis Canziba “Hands-On UX Design for Developers: Design, Prototype, and Implement Compelling User Experiences from Scratch”, First Edition, Packet Publishing, 2018 for unit I-V
2. Rex Hartson, Pardha S. Pyla, “The UX BookProcess and Guidelines for Ensuringa Quality UserExperience”, 1st Edition, Morgan Kaufmann Publisher, Elsevier, 2012 for unit II

Reference Books:

3. https://www.netsolutions.com/insights/information-architecture/ for unit III.
1. https://boldist.co/design/gesture-based-interfaces/ for unit III.
2. https://www.usertesting.com/blog/affinity-mapping for unit III.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CD611 **Course Name: USER EXPERIENCE DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Utilize the UX design process on product or service.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO2	*Apply principles and procedures to conduct user research and create user personas.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO3	*Construct affinity diagram for the product or service and design information architecture based on various visual design principles.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO4	*Develop wireframes and prototypes for the product or service by using various tools and software.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO5	*Illustrate various post-launch UX activities to get feedback from the users.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
	Average	**3**	**3**	**2**	**1**	**2**	**-**	1	**1**	**1**	**-**	**-**	**-**	**3**	**3**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CD612	**GAME DESIGN**	3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Describe the most important platforms, structure and roles for develop game.*	*Understand*
CO2:	*Explain the design process of games and editing of games.*	*Understand*
CO3:	*Interpret the basic prototype of game and its controls along with the UI creation.*	*Understand*
CO4:	*Discuss the Techniques used to prototype and achieve to develop a balanced game.*	*Understand*
CO5:	*Discuss about the new game industry and selling your ideas into game industry.*	*Understand*

Unit - I **GAMES DESIGN BASICS** **[9]**

The role of the game designer, Passions and skills, A play centric design process. structure of games-go fish versus quake, puzzles, puzzles vs games, players, roles of players, Player interaction patterns, rules, resources.

Unit - II **DESIGNING AND EDITING GAMES** **[9]**

Working with dramatic elements challenge, play, working with system dynamics-games as systems, system dynamics, interacting with systems, designing a game-conceptualization – brainstorming, Alternative methods, editing and refining, Turning ideas into game, Ideas vs Designs.

Unit – III **GAME PROTOTYPING** **[9]**

Methods of prototyping, prototyping your original idea, Digital Prototyping-types of digital prototypes, selecting viewpoints, effective interface Design, playtesting-recruiting Playtesters, Basic usability techniques, data gathering, functionality, completeness and balance what you are testing for –game internal solutions.

Unit – IV **ACCESSIBILITY OF GAMING** **[9]**

Improving player choices, Fun killers, working as a game designer, developers Team, publisher's team, stages and methods of development-stages confined, using agile development, agile project planning and communicating designs.

Unit - V **UNDERSTANDING GAME INDUSTRY** **[9]**

Understanding the new game Industry-Platforms for distribution, Genres of gameplay, Publishers, Business game publishing, Selling yourself and your ideas to the game industry-Getting a job at a publisher or Developer pitching your original ideas.

Total = 45 Periods

Text Books:

1. Taylor & Francis," Game Design Workshop A Play centric Approach to creating Innovative Game", Fourth edition, CRC press, London, Newyork (Unit I to V).

Reference Books:

1. Manning, J., & Buttfield-Addison, P. (2017). Mobile Game Development with Unity: Build Once, Deploy Anywhere. "O'Reilly Media, Inc.".
2. Ultimate Game design; Prototyping & Publishing.

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

Regulation: R 2020

Course Code: 20CD612 **Course Name: GAME DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Describe the most important platforms, structure and roles for develop game.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO2	*Explain the design process of games and editing of games.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO3	*Interpret the basic prototype of game and its controls along with the UI creation.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO4	*Discuss the Techniques used to prototype and achieve to develop a balanced game.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO5	*Discuss about the new game industry and selling your ideas into game industry.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
	Average	**3**	**2**	**1**	**2**	**1**	**-**	1	**2**	**1**	**-**	**-**	**-**	**2**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CD613	**CRYPTOGRAPHY AND NETWORK SECURITY**	3	0	0	3

Prerequisite: Students should have basic knowledge of networks.

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Describe the fundamentals of network security, security architecture, threats and vulnerabilities*	*Understand*
CO2:	*Apply the different cryptographic operations of symmetric cryptographic algorithms*	*Apply*
CO3:	*Apply the different cryptographic operations of public key cryptography*	*Apply*
CO4:	*Apply the various Authentication schemes to simulate different applications.*	*Apply*
CO5:	*Interpret the various Security practices and System security standards*	*Understand*

Unit - I **INTRODUCTION-ENCRYPTION TECHNIQUES** **[9]**

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms– OSI security architecture–Classical encryption techniques: substitution techniques, transposition techniques, steganography. Foundations of modern cryptography: perfect security – information theory – product cryptosystem – Cryptanalysis.

Unit - II **SYMMETRIC CRYPTOGRAPHY** **[9]**

SYMMETRIC KEY CIPHERS: DES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation–Evaluation criteria for AES –Advanced Encryption Standard -RC5– Key distribution.

Unit – III **ASYMMETRIC CRYPTOGRAPHY** **[9]**

ASYMMETRIC KEY CIPHERS: RSA cryptosystem–Key distribution–Key management–Diffie Hellman key exchange - Elliptic curve arithmetic-Elliptic curve cryptography.

Unit – IV **MESSAGE AUTHENTICATION AND INTEGRITY** **[9]**

Authentication requirement– Authentication function– MAC – Hash function– Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Kerberos, X.509.

Unit - V **SECURITY PRACTICE AND SYSTEM SECURITY** **[9]**

Electronic Mail security–PGP, S/MIME–IP security–Web Security-SYSTEM SECURITY: Intruders –Malicious software – viruses – Firewalls.

Total = 45 Periods

Text Books:

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

Reference Books:

1. CK Shyamala, N Hariniand Dr.T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd
2. Behrouz A. Foruzan, Cryptography and Network Security, Tata Mc GrawHill2007.
3. Charlie Kaufman, Radia Perlman ,and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CD613 **Course Name: CRYPTOGRAPHY AND NETWORK SECURITY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Describe the fundamentals of network security, security architecture, threats and vulnerabilities*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO2	*Apply the different cryptographic operations of symmetric cryptographic algorithms*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO3	*Apply the different cryptographic operations of public key cryptography*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO4	*Apply the various Authentication schemes to simulate different applications.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO5	*Interpret the various Security practices and System security standards*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
	Average	**3**	**2.6**	**1.6**	**1.4**	**1.6**	**-**	1	**1.4**	**1**	**-**	**-**	**-**	**2**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CD611	**USER EXPERIENCE DESIGN LABORATORY**	0	0	3	1

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Utilize the UX design process on product or service.*	*Apply*
CO2:	*Apply principles and procedures to conduct user research and create user personas.*	*Apply*
CO3:	*Construct affinity diagram for the product or service and design information architecture based on various visual design principles.*	*Apply*
CO4:	*Develop wireframes and prototypes for the product or service by using various tools and software.*	*Apply*
CO5:	*Illustrate various post-launch UX activities to get feedback from the users.*	*Apply*

List of Experiments:

1. Perform user research to define the problem for your product or service.
2. Group customer information data for your product or service.
3. Conduct an interview with your customer.
4. Create user personas for your product or service.
5. Create user scenario/story telling for your product or service.
6. Create affinity diagram for your product or service by using Sticky Notes, White Board and Figjam.
7. Create low-fidelity wireframes for your product or service by using Pen and Paper/Stenciling or Paper cutouts.
8. Create medium-fidelity wireframes for your product or service by using Figma.
9. Create low-fidelity prototypes (paper prototypes) for your product or service by using pencil and paper.
10. Create medium-fidelity prototypes (digital prototypes) for your product or service by using Figma.

Total = 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CD611 **Course Name: USER EXPERIENCE DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Utilize the UX design process on product or service.*	3	3	2	1	2	-	3	2	2	1	-	-	3	2
CO2	*Apply principles and procedures to conduct user research and create user personas.*	3	3	2	1	2	-	3	2	2	1	-	-	3	2
CO3	*Construct affinity diagram for the product or service and design information architecture based on various visual design principles.*	3	3	2	1	2	-	3	2	2	1	-	-	3	2
CO4	*Develop wireframes and prototypes for the product or service by using various tools and software.*	3	3	2	1	2	-	3	2	2	1	-	-	3	2
CO5	*Illustrate various post-launch UX activities to get feedback from the users.*	3	3	2	1	2	-	3	2	2	1	-	-	3	2
	Average	**3**	**3**	**2**	**1**	**2**	**-**	**3**	2	**2**	**1**	**-**	**-**	**3**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER – VI

		L	T	P	C
20HR634	**CAREER DEVELOPMENT SKILLS – IV**	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:	*Employ critical thinking in personal interviews type situations.*	*Apply*
CO2:	*Understand the Quantitative Aptitude problems in geometry.*	*Understand*
CO3:	*Understand the data interpretation and analysis by using various graphs.*	*Understand*
CO4:	*Enhance the skills in resume writing and presentation.*	*Create*
CO5:	*Enhance the comprehension Skills in core subjects.*	*Apply*

UNIT - I WRITTEN AND ORAL COMMUNICATION – PART 2 [6]

Self-Introduction – GD – Personal Interview Skills Practices on Reading Comprehension Level 2 – Paragraph Writing – Newspaper and Book Review Writing – Skimming and Scanning – Interpretation of Pictorial Representations – Sentence Completion – Sentence Correction – Jumbled Sentences – Synonyms& Antonyms – Using the Same Word as Different Parts of Speech – Editing.

UNIT - II QUANTITATIVE APTITUDE [6]

Geometry – Straight Line – Triangles – Quadrilaterals – Circles – Co-ordinate Geometry – Cube – Cone – Sphere.

UNIT - III DATA INTERPRETATION AND ANALYSIS [6]

Data Interpretation based on Text – Data Interpretation based on Graphs and Tables. Graphs Column Graphs, Bar Graphs, Line Charts, Pie Chart, Graphs representing Area, Venn Diagram & Flow Charts.

UNIT - IV RESUME WRITING & PRESENTATION SKILLS [6]

An Introduction to the Resume – Types of Resumes – Common Resume Errors – Anatomy of a Resume – What is a Cover Letter? – Types of Cover Letters – Enhancing the Language and Style of Your Resume and Cover Letter – Assessment.

Presentation Skills: Oral presentation and public speaking skills; business presentations. – Understand the Situation – Know Your Tools – Know Yourself – Organize it, Write the Script – Practice – Delivering a Presentation.

UNIT - V DOMAIN PROFICIENCY [6]

JAVA: Java Buzzwords – Access Control – Inheritance – Packages – Exceptions – String – Threads.

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

Text Books:

1 Anne Laws, Writing Skills, Orient Black Swan, Hyderabad, 2011.

2 AbhijitGuha, 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 V.K. Mehta &Rohit Mehta, Objective Electrical Technology, S Chand publications, First Edition, 2012.

5 Herbert Schildt, Java - The Complete Reference, Oracle Press, McGraw-Hill Education, New Delhi, Tenth Edition, 2018.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
CO-PO MAPPING

Regulation: R 2020

Course Code: 20HR634 **Course Name: CAREER DEVELOPMENT SKILLS - IV**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Employ critical thinking in personal interviews type situations.*	-	-	-	-	2	-	-	-	1	3	-	2	-	-
CO2	*Understand the Quantitative Aptitude problems in geometry.*	-	-	-	-	2	-	-	-	1	3	-	2	-	-
CO3	*Understand the data interpretation and analysis by using various graphs.*	-	-	-	-	2	-	-	-	1	3	-	2	-	-
CO4	*Enhance the skills in resume writing and presentation.*	-	-	-	-	2	-	-	-	1	3	-	2	-	-
CO5	*Enhance the comprehension Skills in core subjects.*	-	-	-	-	2	-	-	-	1	3	-	2	-	-
	Average	-	-	-	-	2	-	-	-	**1**	**3**	**-**	**2**	**-**	-

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

K.S.R. COLLEGE OF ENGINEERING **R 2020**

(Autonomous)

PROFESSIONAL ELECTIVE - I

20CDE01 **DATA SCIENCE**

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:	*Apply pre-processing techniques to clean, and prepare data and visualize*	*Applying*
CO2:	*Utilize the data analysis techniques for applications handling large data*	*Applying*
CO3:	*Determine the probability density function of random variables*	*Applying*
CO4:	*Make use of the statistical foundations and analyze the degree of certainty of predictions using statistical test and models*	*Applying*
CO5:	*Apply the concept of testing of hypothesis of various parameters, goodness of fit tests and non parametric tests to engineering problems*	*Applying*

UNIT–I DATA SCIENCE **[9]**

Introduction – Data Science – Data Science Relate to Other Fields - The Relationship between Data Science and Information Science – Computational Thinking – Issues of Ethics, Bias, and Privacy in Data Science – Data Types – Data Collections – Data Pre-processing. Techniques: Data Analysis and Data Analytics – Descriptive Analysis – Diagnostic Analytics – Predictive Analytics Prescriptive Analytics – Exploratory Analysis – Mechanistic Analysis.

UNIT–II APPLICATIONS, EVALUATIONS AND METHODS **[9]**

Solving Data Problems: Collecting and Analyzing social media data. Data Collection Methods – Picking Data Collection and Analysis Method: Quantitative Methods – Qualitative Methods – Evaluation: Comparing Models – Cross-Validation.

UNIT–III PROBABILITY **[9]**

Probability Concepts – Axioms of Probability – Conditional Probability and Independence – Bayes Theorem –Random Variables– Mean and Variance of a Discrete and Continuous Random Variable – Common Distributions: Binomial - Poisson – Uniform Normal - Exponential - Gamma -Chi-Square - Weibull – Beta.

UNIT–IV STATISTICS **[9]**

Role to Statistics - Estimation of Parameter and Sampling Distribution: Point Estimation – Sampling Distributions and the Central Limit Theorem. Statistical Intervals for a Single Sample: Confidence Interval on Mean – variance and Standard Deviation Population Proportion – Guidelines – Bootstrap – Tolerance and Prediction Intervals.

UNIT–V EVALUATION **[9]**

Hypothesis Testing –Tests on the Mean, Variance and Standard – Tests on a Population Proportion – Summary –Testing for Goodness of Fit – Contingency Table Tests – Nonparametric Procedures – Equivalence Testing – Combining P -Values. A/B testing concepts – T-test and p-value – Measuring t-statistics and p-values.

Total : 45 Periods

Text Books:

1 Chirag Shah, "A Hands-On Introduction to Data Science", 1st Edition, Kindle Edition, 2020, for Units I & II.

2 Douglas C. Montgomery, George C. Ranger, Applied Statistics and Probability for Engineers, Sixth Edition, Wiley, 2013 for Units I, III, IV, V.

References:

1 Joel Grus, "Data Science from the Scratch", NA Edition, O'Reilly, NA, 2015.

2 Frank Kane, "Hands-On Data Science and Python Machine Learning", First edition, Packt Publication, 2017.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

Regulation: R2020

Course Code : 20CDE01 **Course Name: DATA SCIENCE**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply pre-processing techniques to clean, and prepare data and visualize	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO2	Utilize the data analysis techniques for applications handling large data	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO3	Determine the probability density function of random variables	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO4	Make use of the statistical foundations and analyze the degree of certainty of predictions using statistical test and models	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO5	Apply the concept of testing of hypothesis of various parameters, goodness of fit tests and non-parametric tests to engineering problems	3	2	1	-	-	-	-	-	-	-	-	-	3	1
	Average	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**

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

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

(Autonomous)

PROFESSIONAL ELECTIVE - I

20CDE02 **ARTIFICIAL INTELLIGENCE**

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:	*Paraphrase Artificial Intelligence, intelligent agents, and apply blind search to solve problems.*	*Applying*
CO2:	*Demonstrate the effectiveness of heuristics in informed search methods.*	*Applying*
CO3:	*Determine optimal solutions using A* and randomized search methods.*	*Applying*
CO4:	*Apply game playing and planning in problem solving.*	*Applying*
CO5:	*Make use of propositional logic and first order logic in knowledge-based reasoning.*	*Applying*

UNIT–I INTELLIGENT AGENTS AND BLIND SEARCH **[9]**

Definition – History – Agents and Environments – Good behavior and the concepts of rationality – Nature of environments Structure of intelligent agents. State space search: Generate and Test – Simple search – Depth First Search (DFS) – Breadth First Search (BFS) - Comparison of DFS and BFS – Depth Bounded DFS

UNIT–II INFORMED SEARCH METHODS **[9]**

Informed Search Methods: Heuristic Search: Heuristic functions – Best First Search – Hill Climbing – Local maxima –Solution state space – Variable neighbor-hood descent – Beam search – Taboo search. Peak to Peak Methods. Brute force – Branch and Bound –Refinement search

UNIT–III A* AND RANDOMIZED SEARCH METHODS **[9]**

Algorithm A* - Admissibility of A *– Recursive Best First Search. Escaping local maxima: Iterated hill climbing – Simulated annealing – Genetic algorithms (GA) – Travelling Salesman Problem (TSP) – GA based methods for TSP

UNIT–IV GAME PLAYING, PLANNING AND CONSTRAINT SATISFACTION **[9]**

Board games – Game playing algorithms: Algorithm Minimax – Algorithm Alpha Beta – B* Search –Limitations of search. The STRIPS domain – Forward state space planning – Backward state space planning – Goal stack planning – Plan space planning –Introduction to Constraint satisfaction Problem - N-Queens

UNIT–V PREPOSITIONAL LOGIC, FIRST ORDER LOGIC AND INFERENCING **[9]**

Formal logic – Propositional logic – Resolution in propositional logic – First Order Logic (FOL) – Incompleteness of forward chaining – Resolution refutation in FOL – Horn clauses and SLD resolution – Backward chaining

Total : 45 Periods

Text Books:

1 Khemani D.,"A First Course in ArtificialIntelligence",1stEdition,9 th reprint, McGraw Hill Education(India) Private Limited, 2019. (2nd half of 1stUnit, for Unit II, III, IV & V.

2 Stuart Russell and Peter Norvig," Artificial Intelligence: A Modern Approach", 3rdEdition, Pearson Education, 2013. (First half of 1stUnit)

References:

1 http://www.builtin.com/artificial-intelligence

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: **R2020**

Course Code : 20CDE02 **Course Name:** **ARTIFICIAL INTELLIGENCE**

CO	Course Outcomes	Programme Outcomes												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Paraphrase Artificial Intelligence, intelligent agents, and apply blind search to solve problems.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO2	Demonstrate the effectiveness of heuristics in informed search methods.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO3	Determine optimal solutions using A* and randomized search methods.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO4	Apply game playing and planning in problem solving.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO5	Make use of propositional logic and first order logic in knowledge-based reasoning.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
	Average	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**

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

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K.S.R. COLLEGE OF ENGINEERING **R 2020**

(Autonomous)

PROFESSIONAL ELECTIVE - I

20CDE03 **INTRODUCTION TO 3D DESIGN**

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:	*Describe the fundamentals of 3D design.*	*Applying*
CO2:	*Utilize the elements and principles of 3D design*	*Applying*
CO3:	*Make use of the structures, functions, forming and fabrications of 3D design*	*Applying*
CO4:	*Apply various 3D object representations and methods*	*Applying*
CO5:	*Manipulate 3D objects by applying transformation, clipping and viewing operations.*	*Applying*

UNIT–I INTRODUCTION TO 3D DESIGN **[9]**

Introduction – Form Organization – Design definition – Looking: Attentive observation, comparison, connections – Touch: Tactile sensation – Context: Shaping force, site specific – Learning – Ideas and Approaches: Process – Tools – Transformation – variation and deformation – Conceptual strategies – Problem solving – Sketching, Model making and prototyping.

UNIT–II ELEMENTS OF 3D DESIGN & PRINCIPLES **[9]**

Form – Cube – Mass and Space – Line – Plane: 2D Element – Convention of 2D to 3D – Surface Qualities: Texture, Color – Chromatic Luminosity – Time and Motion. 3D Design Principles: Unity and Variety – Repetition: Visual and structural, Modularity – Pattern - Rhythm – Illusion of Motion – Balance - Symmetry and Asymmetry – Harmony – Proximity – Emphasis – Proportion – Scale.

UNIT–III STRUCTURE, FUNCTIONS, FORMING AND FABRICATION OF 3D DESIGN **[9]**

Structure: Structural Principles – Structural Economy – Tension and Compression – Joinery – Transformers-Functions: Utility – Design and compared art – Form and Functions – Style: Signature and Typology. Basic forming: Additive, Subtractive, constructive – The Found Object: Readymade – Bridging Art and Life – Hybrid Form – Industrial Methods: The Machine Aesthetic – Replication Technologies.

UNIT–IV THREE DIMENSIONAL CONCEPTS AND OBJECT REPRESENTATIONS **[9]**

Three Dimensional Concepts - Three-Dimensional Object Representations – Polygon Surfaces - Curved lines and surfaces, Quadric surfaces, Blobby objects, Spline Representations and Interpolation methods, Bezier and B-Spline curves and surfaces, Beta and Rational Splines, Conversion and Display. Sweep Representations - Constructive solid Geometry methods - Fractal Geometry methods.

UNIT–V THREE DIMENSIONAL TRANSFORMATIONS AND VIEWING **[9]**

Three Dimensional Geometric Transformations – Translation, Rotation, Scaling, Reflection, Shear, Composite Transformations, Transformation functions, Coordinate Transformations. Three-Dimensional Viewing – pipeline, coordinates, projections, volumes and projection transformations, Clipping, Viewing Functions.

Total : 45 Periods

Text Books:

1 Stephen Pentak, Richard Roth, "Design Basics 3D", Cengage Learning, 8th Edition, 2013 for Units I,II, III.

2 Hearn Donald and Baker M. Pauline, Computer Graphics C Version‖, 2nd Edition, Pearson Education, 2010, for Units IV & V.

References:

1 Samit Bhattacharya, "Computer Graphics, 2015. Oxford University Press, ISBN13:978-0-19-809619-1

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

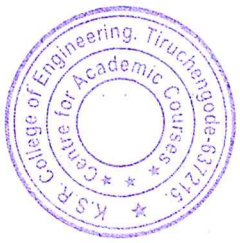
Regulation: **R2020**

Course Code : 20CDE03 **Course Name:** **INTRODUCTION TO 3D DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the techniques in different phases of a compiler.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO2	Design a lexical analyzer for a sample language and learn to use the LEX tool.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO3	Apply different parsing algorithms to develop a parser and learn to use YACC tool	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO4	Understand semantics rules (SDT), intermediate code generation andrun-time environment.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO5	Implement code generation and apply code optimization techniques.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
	Average	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**

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

Chairman (BoS)



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

PROFESSIONAL ELECTIVE - I

20CDE04 **ANIMATION BASICS**

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:	*Surveys the technical background of computer graphics relevant to computer animation*	*Applying*
CO2:	*Cover various computer animation algorithms and techniques*	*Applying*
CO3:	*Apply how the images are processed to reconstruct articulated figure kinematics*	*Applying*
CO4:	*Understand physics-based animation and modeling of fluids*	*Applying*
CO5:	*Cover Human figure animation, facial animation and behavioral animation*	*Applying*

UNIT–I INTRODUCTION AND BACKGROUND **[9]**

Introduction: Perception - Heritage of Animation - Animation Production - History of Computer Animation. Background: Spaces and Transformations - Orientation Representation - Fixed Angle Representation, Euler Angle Representation, Angle and Axis, Quaternions, Exponential Map.

UNIT–II INTERPOLATION-BASED ANIMATION **[9]**

Interpolation: Appropriate Function-Controlling the Motion Alonga Curve-Interpolation of orientations – Working with paths - Interpolation – Based Animation:Key-framesystems-Animationlanguages-Deformingobjects-Three-dimensionalshape interpolation -Morphing

UNIT–III MOTION CAPTURE TECHNIQUES **[9]**

Kinematic Linkages: Hierarchical Modeling - Forward Kinematics-Inverse kinematics. Motion Capture: Motion capture technologies – Processing the images – Camera calibration -Three-dimensional position reconstruction –Fitting to the skeleton – Output from motion capture systems - Manipulating motion capture data.

UNIT–IV PHYSICALLY BASED ANIMATION **[9]**

Physically Based Animation: Basic physics – Spring animation examples – Particle systems – Rigid body – simulation – Cloth- Enforcing soft and hard constraints - Fluids: Liquids and Gases - Specific fluid models - Computational fluid dynamics.

UNIT–V MODELING AND ANIMATING HUMAN FIGURES **[9]**

Modeling and Animating Human Figures: Overview of virtual human representation - Reaching and grasping –Walking-Coverings. Facial Animation: The human face - Facial models - Animating the face - Lip-sync animation. Behavioral Animation: Primitive and Modeling intelligent behaviors - Knowledge of the environment - Crowds.

Total : 45 Periods

Text Books:

1 Rick Parent., "Computer Animation Algorithms and Techniques",3rd edition, Morgan Kaufmann, 2012.

References:

1 Theoharis,T., Papaioannou, G. Platis, N. & Patrikalakis, N.M.(2008).Graphics and visualization: principles & algorithms. CrC Press.

2 Parent,R. Ebert, D.S.,Gould,D.,Gross,M.,Kazmier,C., Lumsden,C.J.& Worley,S. (2009). Computer animation complete: all-in-one: learn motion capture, characteristic, point-based, and Maya winning techniques. Morgan Kaufmann.

Chairman (BoS)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

Regulation: **R2020**

Course Code : 20CDE04 **Course Name:** **ANIMATION BASICS**

CO	Course Outcomes	Programme Outcomes												
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Surveys the technical background of computer graphics relevant to computer animation	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO2	Cover various computer animation algorithms and techniques	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO3	Apply how the images are processed to reconstruct articulated figure kinematics	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO4	Understand physics-based animation and modeling of fluids	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO5	Cover Human figure animation, facial animation and behavioral animation	3	2	1	-	-	-	-	-	-	-	-	-	3	1
	Average	**3**	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**

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

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K.S.R. COLLEGE OF ENGINEERING
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R 2020

PROFESSIONAL ELECTIVE - I

20CDE05 **DESIGNING HUMAN CENTERED SYSTEMS**

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:*** *Apply the psychological matters of everyday things and actions in addition to that emotional design.* — *Applying*
- ***CO2:*** *Apply the design knowledge in developing products and also understand the natural mappings and culture views.* — *Applying*
- ***CO3:*** *Illustrate how change can be extremely disconcerting, even to professionals, even if the change is for the better.* — *Applying*
- ***CO4:*** *Make use of the approaches deal with design to eliminate or minimize the human errors.* — *Applying*
- ***CO5:*** *Summarize the general design guidelines based on the views on human centered design.* — *Applying*

UNIT–I PSYCHOPATHOLOGY AND PSYCHOLOGY OF EVERYDAY THINGS AND ACTIONS **[9]**

The Complexity of Modern Devices - Human-Centered Design – Fundamental Principles of Interaction –The System Image–The Paradox of Technology – The Design Challenge – How People Do Things: The Gulfs of Execution and Evaluation – The Seven Stages of Action –Human Thought: Mostly Subconscious –Human Cognition and Emotion –The Seven Stages of Action and the Three Levels of Processing - People as Storytellers - Blaming the Wrong Things - Falsely Blaming Yourself - The Seven Stages of Action: Seven Fundamental Design Principles.

UNIT–II KNOWLEDGE IN THE HEAD AND IN THE WORLD **[9]**

Precise Behavior from Imprecise Knowledge- Memory Is Knowledge in the Head- The Structure of Memory – Approximate Models: Memory in the Real World - Knowledge in the Head - The Tradeoff Between Knowledge in the World and in the Head- Memory in Multiple Heads, Multiple Devices - Natural Mapping - Culture and Design: Natural Mappings Can Vary with Culture.

UNIT–III CONSTRAINTS,DISCOVERABILITY AND FEEDBACK **[9]**

Four Kinds of Constraints: Physical, Cultural, Semantic and Logical – Applying Affordances, Signifiers and Constraintst Everyday Objects - Constraints That Force the Desired Behavior -Conventions, Constraints and Affordances – The Faucet: A Case History of Design –Using Sound as Signifiers.

UNIT–IV CLASSIFICATION OF ERRORS,SLIPS AND MISTAKES **[9]**

Understanding Why There Is Error – Deliberate Violations - Two Types of Errors: Slips and Mistakes– The Classification of Slips – The Classification of Mistakes – Social and Institutional Pressures – Reporting Error – Detecting Error – Designing for Error - When Good Design Is n't Enough –Resilience Engineering – The Paradox of Automation – Design Principles for Dealing with Error.

UNIT–V VIEWS OF HUMAN CENTERED DESIGN **[9]**

Solving the Correct Problem – The Double – Diamond Model of Design – The Human – Centered Design Process – What I Just Told You? It Doesn't Really Work That Way – The Design Challenge - Complexity Is Good; It Is Confusion That Is Bad – Standardization and Technology - Deliberately Making Things Difficult - Design: Developing Technology for People – Competitive Forces - New Technologies Force Change –How Long Does It Take to Introduce a New Product? – Two Forms of Innovation: Incremental and Radical – The Design of Everyday Things – The Future of Books –The Moral Obligations of Design.

Total : 45 Periods

Text Books:

1 Don Norman, "The Design of Everyday Things: Revised and Expanded Edition", 2nd Edition, Basic Books Publication, ISBN: 978-0465050659, 2013.

References:

1 Bill Buxton, "Sketching User Experiences: Getting the Design Right and the Right Design", Illustrated Edition, Morgan Kaufmann Publication, ISBN: 978-0123740373, 2007.

2 Jon Yablonski,"Laws of UX: Using Psychology to Design Better Products & Services",1st Edition, Shroff/O' Reilly Publication, ISBN:978-9352139989, 2020.

Chairman (BOS)

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B.E – COMPUTER SCIENCE AND DESIGN
CO-POMAPPING

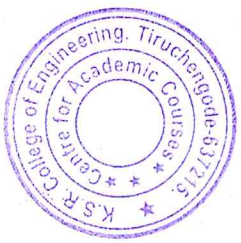
Regulation: **R2020**

Course Code : 20CDE05 **Course Name:** **DESIGNING HUMAN CENTERED SYSTEMS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Apply the psychological matters of everyday things and actions in addition to that emotional design.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO2	Apply the design knowledge in developing products and also understand the natural mappings and culture views.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO3	Illustrate how change can be extremely disconcerting, even to professionals, even if the change is for the better.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO4	Make use of the approaches deal with design to eliminate or minimize the human errors.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
CO5	Summarize the general design guidelines based on the views on human centered design.	3	2	1	-	-	-	-	-	-	-	-	-	3	1
	Average	**3**	**3**	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**1**

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

Chairman (BoS)



R 2020

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

PROFESSIONAL ELECTIVE – II

Semester - VI

		L	T	P	C
20CDE06	**DEEP LEARNING**	3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Apply the concepts of machine learning algorithms to solve simple problems.*	*Apply*
CO2:	*solve simple problems using the concepts of deep neural networks.*	*Apply*
CO3:	*Make use of different regularization methods for Deep learning.*	*Apply*
CO4:	*Illustrate the concepts of CNN models and apply it for solving computer vision related problems.*	*Understand*
CO5:	*Explain the concepts of RNN models and apply it for solving Natural Language problems.*	*Apply*

Unit - I **INTRODUCTION** **[9]**

Learning Algorithms – Capacity, Over fitting and Under fitting – Hyper parameters and Validation Sets – Estimators, Bias and Variance – Maximum Likelihood Estimation – Bayesian Statistics – Linear Regression – Supervised Learning Algorithms – Unsupervised Learning Algorithms – Building a Machine Learning Algorithm – Challenges Motivating Deep Learning.

Unit - II **DEEP FEED FORWARD NETWORKS** **[9]**

Example: Learning XOR – Gradient–Based Learning – Stochastic Gradient Descent – Hidden Units – Architecture Design – Back-Propagation and Other Differentiation Algorithms.

Unit – III **REGULARIZATION FOR DEEP LEARNING** **[9]**

Parameter Norm Penalties – Dataset Augmentation – Noise Robustness – Semi-Supervised Learning – Multi-Task Learning Early Stopping – Parameter Tying and Parameter Sharing – Bagging and Other Ensemble Methods – Drop out – Adversarial Training.

Unit – IV **CONVOLUTIONAL NETWORKS** **[9]**

The Convolution Operation – Motivation – Pooling – Variants of the Basic Convolution Function – Structured Outputs Efficient Convolution Algorithms –Transfer Learning - Applications: Computer Vision.

Unit - V **SEQUENCE MODELING: RECURRENT AND RECURSIVE NETS** **[9]**

Recurrent Neural Networks – Bidirectional RNNs – Encoder – Decoder Sequence-to-Sequence Architectures – Deep Recurrent Networks – Recursive Neural Networks – The Long Short-Term Memory and other Gated RNN – Transformers. Applications: Natural Language Processing.

Total = 45 Periods

Text Books:

1. Ian Good fellow, YoshuaBengio, and Aaron Courvill, “Deep Learning”,MITPress,1stEdition,2016.

Reference Books:

1. Josh Patterson and Adam Gibson, “Deep Learning–APractitioner’sApproach”,1stEdition,O’Reilly Series,2017
2. Jupiter Notebook,Tensor flow,Keras,Pytorch

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B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CDE06 **Course Name: DEEP LEARNING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Apply the concepts of machine learning algorithms to solve simple problems.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO2	*solve simple problems using the concepts of deep neural networks.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO3	*Make use of different regularization methods for Deep learning.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO4	*Illustrate the concepts of CNN models and apply it for solving computer vision related problems.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO5	*Explain the concepts of RNN models and apply it for solving Natural Language problems.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
	Average	**3**	**3**	**1.8**	**1.2**	**1.8**	**-**	1	**1.2**	**1**	**-**	**-**	**-**	**2**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CDE07	**BIG DATA ANALYTICS**	3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Describe the characteristics of big data and use it for identifying the types of digital data*	*Understand*
CO2:	*Implement MapReduce programs in Hadoop framework.*	*Apply*
CO3:	*Apply MongoDB and Cassandra to develop database applications*	*Apply*
CO4:	*Develop solutions for big data problems using Hive and Pig.*	*Apply*
CO5:	*Interpret the need for stream processing and use of Spark and Kafka.*	*Understand*

Unit - I **BIGDATA** **[9]**

Introduction–Types of Digital Data –characteristics–evolution–definition–challenges–Big Data–Big Data Analytics–importance data science–terminologies used in Big Data environments–Analytics Tools.

Unit - II **HADOOP** **[9]**

Hadoop Introduction – RDBMS Vs Hadoop – Distributed computing challenges – Hadoop Overview – HDFS – Processing data with Hadoop–Interacting with Hadoop Ecosystem. Introduction to MapReduce Programming-Mapper–Reducer–Combiner partitioner–Searching-Sorting–Compression – Hadoop File System.

Unit – III **MONGODB AND CASSANDRA** **[9]**

Introduction to MongoDB–Terms used in Mongo DB–Data types in MongoDB–MongoDB Query Language. Introduction to Cassandra –Features of Cassandra–CQL Datatypes–CQLSH–CRUD operations–Collections–Alter commands–Import and Export Querying System tables.

Unit – IV **HIVE AND PIG** **[9]**

Introduction to Hive – Architecture – Data types – File format – Hive Query Language – RC File implementation. Introduction to Pig–Pig on Hadoop–Datatypes–Running Pig–Execution modes of Pig–HDFS commands–Relational Operators–Eval function–Complex Datatypes.

Unit - V **APACHE SPARK AND KAFKA** **[9]**

Introduction–SPARKarchitecture–SPARKSQL–SPARKStreaming–SPARKEcosystem–SPARK for Big Data Processing–SPARK applications–Apache KAFKA–KAFKA Architecture–Use cases.

Total = 45 Periods

Text Books:

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, 2nd Edition, Wiley, 2019.

Reference Books:

1. Dr.Anil Maheshwari,“Big Data”, 2ndEdition, McGrawHill Education, 2019
2. EMC Education Services,”Data science and Big data Analytics: Discovering, Analyzing, Visualizing and Presenting Data”, JohnWileyandSons,2015.
3. https://spark.apache.org/docs/latest/
4. Mongo DB, Apache Hadoop, Spark, KAFKA

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CDE07 **Course Name: BIG DATA ANALYTICS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Describe the characteristics of big data and use it for identifying the types of digital data*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO2	*Implement MapReduce programs in Hadoop framework.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO3	*Apply MongoDB and Cassandra to develop database applications*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO4	*Develop solutions for big data problems using Hive and Pig.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO5	*Interpret the need for stream processing and use of Spark and Kafka.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
	Average	**3**	**2.6**	**1.6**	**1.4**	**1.6**	**-**	1	**1.4**	**1**	**-**	**-**	**-**	**2**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

20CDE08	**INFORMATION DESIGN**	L	T	P	C
		3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Identify the audience and their requirements about information design.*	*Understand*
CO2:	*Establish an information in sequence using grid.*	*Understand*
CO3:	*Illustrate the color and graphic elements in design.*	*Understand*
CO4:	*Experiment with lateral thinking and inspiration of design.*	*Apply*
CO5:	*Integrate the concepts of digital design through media.*	*Apply*

Unit - I **INCEPTION OF INFORMATION DESIGN** **[9]**

Introduction – Definition – History of Information Design – Need of Information Design – Types – Identifying audience – Defining the audience and their needs – Inclusivity – Visual impairment – Case study.

Unit - II **ORGANIZING INFORMATION** **[9]**

Hierarchy of information – Dynamic composition and gesture – Sequence of information – Organizing information – Using a grid – Setting up the grid – Structure of grid – Hierarchy of grid.

Unit – III **LEGIBILITY AND READABILITY** **[9]**

Readability: Colour – Tint and Tone – Legibility, readability and contrast – Weight, Size and Scale – Typographic elements – Graphic elements – Imagery – Visibility and contrast – Colour-coding – Choice of typeface, weight and scale – Case study:Illustration and Graphics in information design.

Unit – IV **EXPERIMENTATION AND INSPIRATION FOR THE DESIGN PROCESS** **[9]**

Importance of experimentation and inspiration – Lateral thinking – Inspiration for design – Editing data for inspiration – Inspiration from world – Visual mapping – case study.

Unit - V **DESIGN THROUGH MEDIA** **[9]**

Choosing appropriate media – compare print and digital – Designing digital platforms – computer data visualization – Inspiration design in practice: Design outcomes – Routes for print-based, interactive and environmental information design – case study.

Total = 45 Periods

Text Books:

1. Andy Ellison, Kathryn Coates, "An Introduction to Information Design", Orion Publishing Co, 2014

Reference Books:

1. Rune Pettersson, “Information Design An Introduction”, John Benjamins Publishing Company, 2002
2. Courtney Marchese, “Information Design for the Common Good Human-centric Approaches to Contemporary Design Challenges”, Bloomsbury Publishing, 2021.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CDE08 **Course Name: INFORMATION DESIGN**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Identify the audience and their requirements about information design.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO2	*Establish an information in sequence using grid.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO3	*Illustrate the color and graphic elements in design.*	3	2	1	2	1	-	1	2	1	-	-	-	2	2
CO4	*Experiment with lateral thinking and inspiration of design.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
CO5	*Integrate the concepts of digital design through media.*	3	3	2	1	2	-	1	1	1	-	-	-	2	2
	Average	**3**	**2.4**	**1.4**	**1.6**	**1.4**	**-**	1	**1.6**	**1**	**-**	**-**	**-**	**2**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

20CDE09	**INTERACTIVE VISUAL DATA ANALYSIS FOR DESIGNERS**	L	T	P	C
		3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Explain the principles of visual perception and data visualization best practices*	*Understand*
CO2:	*Interpret the basic chart types used for Comparing Categories, Time and Distribution.*	*Understand*
CO3:	*Illustrate the chart types for Geospatial, Relationship, Part-To-Whole, Qualitative and Tables.*	*Understand*
CO4:	*Apply the steps involved in designing and redesigning of Data Visualization*	*Apply*
CO5:	*Demonstrate how to perform data Visualization using D3 tool*	*Apply*

Unit - I **PRINCIPLES OF DATA VISUALIZATION** **[9]**

Visual Processing and Perceptual Rankings: Anscombe's Quartet - Gestalt Principles Of Visual Perception – Pre attentive Processing. Five Guidelines for Better Data Visualizations- Show the Data - Reduce the Clutter - Integrate the Graphics and Text - Avoid the Spaghetti Chart - Start with Gray - Form and Function.

Unit - II **BASIC CHART TYPES** **[9]**

Comparing Categories: Charts: Bar, Marimekko and Mosaic, Unit, Isotype, and Waffle, Gauge and Bullet, Waterfall - Paired Bar - Stacked Bar- Diverging Bar - Sankey Diagram -Time: Chart - Line Circular Line,Slope, Bump, Cycle, Area, Stacked Area, Horizon, Gantt – Sparklines -Streamgraph - Flow Charts and Timelines - Connected Scatterplot. Distribution: Histogram - Chart: Pyramid, Candlestick, Violin - Plot: Box-and-Whisker, Ridgeline, Stem-and-Leaf.

Unit – III **ADVANCED CHART TYPES** **[9]**

Geospatial: Choropleth Map – Cartogram - Proportional Symbol and Dot Density Maps - Flow Map – Relationship: Scatterplot- Parallel Coordinates Plot - Radar Charts - Chord Diagram - Arc Chart -Correlation Matrix-Network Diagrams -Tree Diagrams - Part To-Whole: Pie Charts – Tree map - Sunburst Diagram - Nightingale Chart -Voronoi Diagram – Qualitative: Icons - Word - Quotes - Phrases - Matrices and Lists - Tables: Guidelines – Demonstration.

Unit – IV **DESIGNING AND REDESIGNING YOUR VISUAL** **[9]**

Developing: Anatomy - Color Palettes - Defining Fonts - Guidance - Exporting Images - Accessibility, Diversity, and Inclusion. Redesigns: Paired Bar Chart, Stacked Bar Chart, Line Chart, Choropleth Map, Dot Plot, Line Chart, Table- Data Visualization Tools.

Unit - V **D3 BASICS** **[9]**

Introduction: Origins and Context – Alternatives – Setup – Data: Generating Page Elements - Binding Data - Drawing with Data: Drawing divs and SVGs - Making a Bar Chart and Scatterplot - Scales – Axes- Updates, Transitions, and Motion – Interactivity – Paths : Line and Area Charts– Selections – Layouts: Pie, Stack and Force Layout.

Total = 45 Periods

Text Books:

1. Schwabish, Jonathan. Better data visualizations: A guide for scholars, researchers, and Wonks. Columbia University Press, 2021. for Units I to IV.
2. Murray, Scott. Interactive data visualization for the web: an introduction to designing with D3. " O'Reilly Media, Inc.", 2017, for Unit V.

Reference Books:

1. Christian Tominski, Heidrun Schumann, Interactive Visual Data Analysis, A K Peters/CRC Press; 1st edition, 2020.
2. Tamara Munzner, Visualization Analysis and Design, A K Peters/CRC Press; 1st edition, 2014.

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND DESIGN
CO-PO MAPPING

Regulation: R 2020

Course Code: 20CDE09 **Course Name: INTERACTIVE VISUAL DATA ANALYSIS FOR DESIGNERS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Explain the principles of visual perception and data visualization best practices*	3	2	1	2	1	-	1	2	1	-	-	-	3	2
CO2	*Interpret the basic chart types used for Comparing Categories, Time and Distribution.*	3	2	1	2	1	-	1	2	1	-	-	-	3	2
CO3	*Illustrate the chart types for Geospatial, Relationship, Part-To-Whole, Qualitative and Tables.*	3	2	1	2	1	-	1	2	1	-	-	-	3	2
CO4	*Apply the steps involved in designing and redesigning of Data Visualization*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO5	*Demonstrate how to perform data Visualization using D3 tool*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
	Average	**3**	**2.4**	**1.4**	**1.6**	**1.4**	**-**	**1**	**1.6**	**1**	**-**	**-**	**-**	**3**	**2**

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

K.S.R. COLLEGE OF ENGINEERING (Autonomous) **R 2020**

SEMESTER - VI

		L	T	P	C
20CDE10	**DIGITAL MARKETING**	3	0	0	3

Prerequisite: Nil

Course Outcomes: On successful completion of the course, the student will be able to		***Cognitive Level***
CO1:	*Apply the concept of digital marketing landscape and its importance in modern business*	*Apply*
CO2:	*Apply SEO techniques to improve website performance and organic search rankings.*	*Apply*
CO3:	*Differentiate SEM and SMM campaign strategies to build an effective, unified digital marketing approach.*	*Understand*
CO4:	*Analyze content marketing and email marketing principles to apply them effectively in digital marketing practices.*	*Apply*
CO5:	*Differentiate emerging areas of digital marketing to apply suitable strategies in real-world scenarios.*	*Understand*

Unit - I **BASICS OF DIGITAL MARKETING** **[9]**

Evolution of Digital Marketing - Introduction to Digital Marketing - How Website works - Website ingredients - Digital Marketing vs Traditional Marketing - The role of digital marketing in business - Digital Marketing channels - Customer journey (stages of Digital Marketing) - Digital Marketing Metrics - Tools used in Digital Marketing (Free as well as third party tools) - Demand generation - Demand fulfilment, Digital Marketing trends.

Unit - II **SEARCH ENGINE OPTIMIZATION (SEO)** **[9]**

How Search Engine works - SERP layout - Role of search algorithms - Ranking Factors - SEO Components (Technical SEO - On page SEO - Off-page SEO) Keyword Research - On-Page SEO Techniques -Off-Page SEO Techniques - Technical SEO (Introduction to technical SEO, website indexing, crawl ability, XML sitemaps, robots.txt, broken links, redirect issues and other technical issues) - Local SEO (Google My Business, How Local SEO works).

Unit – III **SEARCH ENGINE MARKETING (SEM) AND SOCIAL MEDIA MARKETING (SMM)** **[9]**

Introduction to Search Engine Marketing (SEM) - PPC model - Key SEM platforms (Google Ads, Microsoft Advertising, etc.) - SEM Campaign Creation and Management - Bidding formula - Native advertising. Introduction to Social Media Marketing (SMM) - Major social media platforms and their marketing potential (Facebook, Instagram, Twitter, LinkedIn, etc.) - Organic vs. paid social media marketing - SMM Campaign Creation and Management - Social media marketing strategy - Integrating SEM and SMM in Digital Marketing Strategy.

Unit – IV **CONTENT MARKETING AND EMAIL MARKETING** **[9]**

Introduction to Content Marketing and its importance - Content marketing funnel -Types of content - Content Creation and Optimization - Content Distribution and Promotion - Measuring content marketing performance. Introduction to Email Marketing - Types of email marketing - Benefits of email marketing - Email marketing regulations and best practices - Email Campaign Creation and Management - Email marketing metrics - Email marketing technical setup.

Unit - V **DIGITAL BUSINESS PRESENT AND FUTURE** **[9]**

Digital Marketing – Landscape and Emerging Areas: Digital Marketing – Global Landscape – Digital Marketing – The Indian View – Digital Marketing – Emerging Trends and Concepts. A Career in Digital Marketing: Emerging Opportunities for Digital Marketing Professionals – Building a Career in Digital Marketing– Top Digital Marketing Areas as Career Tracks –Approaching a Career in Digital Marketing.

Total = 45 Periods

Text Books:

1. Puneet Bhatia, “Fundamentals of Digital Marketing”, 1st Edition, Pearson Education, 2019.

Reference Books:

1. digitalgarage/course/digital-marketing.

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

Regulation: R 2020

Course Code: 20CDE10 **Course Name: DIGITAL MARKETING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Apply the concept of digital marketing landscape and its importance in modern business*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO2	*Apply SEO techniques to improve website performance and organic search rankings.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO3	*Differentiate SEM and SMM campaign strategies to build an effective, unified digital marketing approach.*	3	2	1	2	1	-	1	2	1	-	-	-	3	2
CO4	*Analyze content marketing and email marketing principles to apply them effectively in digital marketing practices.*	3	3	2	1	2	-	1	1	1	-	-	-	3	2
CO5	*Differentiate emerging areas of digital marketing to apply suitable strategies in real-world scenarios.*	3	2	1	2	1	-	1	2	1	-	-	-	3	2
	Average	**3**	**2.6**	**1.6**	**1.4**	**1.6**	**-**	**1**	**1.4**	**1**	**-**	**-**	**-**	**3**	**2**

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