

# **B.Tech – Information Technology**

## **CURRICULUM & SYLLABI**

### ***Regulation 2020***

*(Applicable to candidates admitted in the academic year 2020-2021 onwards)*



## **K.S.R. College of Engineering**

(Autonomous)

K.S.R. Kalvi Nagar, Tiruchengode – 637 215

Namakkal (Dt), Tamilnadu, India

Email : [info@ksrce.ac.in](mailto:info@ksrce.ac.in)

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

**(Autonomous)**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

**(REGULATIONS 2020)**

**Vision of the Institution**

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

**Mission of the Institution**

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

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

**Vision of the Department**

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

**Mission of the Department**

**DM 1** To make the students competitive and efficient in technical field through technological transformations in Information Technology, by providing them advanced curriculum, infrastructure and nurturing human values.

**DM 2** To provide an excellent forum for higher studies that leads to careers as Computer and IT professionals in the widely diversified domains of industry, government and academia.

**Programme Educational Objectives (PEOs)**


**The graduates of the programme will be able to**

**PEO 1 Engineering Acquaintance:** Incorporate with necessary background in science and engineering fundamentals to analyze and solve IT problems and prepare them skilled manpower in the field of IT for subsequently generation.

**PEO 2 Modern Technical Tools:** Enhance in latest programming languages, technologies, software development process and communication technology.


**PEO 3 Personality Development:** Attain a successful career in industry through effective communication skills, team spirit, learning ethical responsibilities, attitude and adaptation to emerging technologies.

<b>Program Outcomes (POs)</b>	
<b>PO1</b>	<b>Engineering Graduates will be able to:</b> <b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
<b>PO2</b>	<b>Problem Analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3</b>	<b>Design/Development of Solutions:</b> 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.
<b>PO4</b>	<b>Conduct Investigations of Complex Problems:</b> 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.
<b>PO5</b>	<b>Modern Tool Usage:</b> Create, select, and apply appropriate techniques, resource, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
<b>PO6</b>	<b>The Engineer and Society:</b> 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.
<b>PO7</b>	<b>Environment and Sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>Individual and Team Work:</b> Function effectively as an individual, and as a member or leader diverse teams, and in multidisciplinary settings..
<b>PO10</b>	<b>Communication:</b> 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.
<b>PO11</b>	<b>Project Management and Finance:</b> 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.
<b>PO12</b>	<b>Life-long Learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological change.
<b>Program Specific Outcomes (PSOs)</b>	
<b>PSO1</b>	<b>Technical competency:</b> Analyze a problem, design algorithm, identify and define the computing requirements appropriate to its solution and implement the same.
<b>PSO2</b>	<b>Professional awareness:</b> Contribute core universal values and social good in the community.


		<b>K.S.R. COLLEGE OF ENGINEERING (Autonomous)</b> <b>(Approved by AICTE &amp; Affiliated to Anna University)</b> <b>K.S.R. Kalvi Nagar, Tiruchengode - 637 215</b>						<b>CURRICULUM</b> <b>UG</b> <b>R - 2020</b>			
Department		Department of Information Technology									
Programme		B.Tech – Information Technology									
<b>SEMESTER - I</b>											
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks			
				L	T	P		C	CA	ES	Total
<b>THEORY</b>											
1.	20EN151	Technical English – I (Common To All Branches)	HSMC	2	0	1	3	30	70	100	
2.	20MA151	Engineering Mathematics – I (Common To All Branches)	BSC	3	1	0	4	30	70	100	
3.	20CH051	Engineering Chemistry (Common To All Branches)	BSC	3	0	0	3	30	70	100	
4.	20EE041	Basics of Electrical and Electronics Engineering (Common To AU,CE,CS, IT, ME & SF)	ESC	3	0	0	3	30	70	100	
5.	20IT111	Programming for Problem Solving using C	ESC	3	0	0	3	30	70	100	
<b>MANDATORY COURSES</b>											
6.	20MC151	Induction Programme* (Common To All Branches)	MC	-	0	0	0	-	-	-	
<b>PRACTICAL</b>											
7.	20CH028	Chemistry Laboratory (Common To All Branches)	BSC	0	0	3	1	50	50	100	
8.	20IT121	Programming for Problem Solving Laboratory	ESC	0	0	3	1	50	50	100	
9.	20AU127	Engineering Graphics Laboratory (Common To CE,CS,EC,EE & IT )	ESC	0	0	3	1	50	50	100	
<b>Total</b>				<b>17</b>	<b>1</b>	<b>10</b>	<b>19</b>	<b>800</b>			

(\* - Induction Program will be conducted for 3 weeks as per AICTE guidelines)


SEMESTER - II										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20EN251	Technical English-II (Common To All Branches)	HSMC	2	0	1	3	30	70	100
2.	20MA232	Discrete Mathematics (Common To CS & IT)	BSC	3	1	0	4	30	70	100
3.	20PH051	Engineering Physics (Common To All Branches)	BSC	3	0	0	3	30	70	100
4.	20IT211	Python Software Foundation	PCC	3	0	0	3	30	70	100
5.	20IT212	IT Essential	PCC	3	0	0	3	30	70	100
MANDATORY COURSES										
6.	20MC052	Environmental Science and Engineering (Common To All Branches)	MC	3	0	0	0	-	-	-
PRACTICAL										
7.	20PH028	Physics Laboratory (Common To All Branches)	BSC	0	0	3	1	50	50	100
8.	20GE028	Manufacturing Practices Laboratory (Common To All Branches)	PCC	0	0	3	1	50	50	100
9.	20IT221	Python Software Foundation Laboratory	PCC	0	0	3	1	50	50	100
10.	20IT222	IT Essential Laboratory	ESC	0	0	3	1	50	50	100
Total				14	1	13	20	800		

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Department		Department of Information Technology								
Programme		B.Tech – Information Technology								
SEMESTER - III										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P		C	CA	ES
THEORY										
1.	20MA343	Numerical Computational Techniques (Common To CS & IT)	BSC	3	1	0	4	30	70	100
2.	20EC333	Digital Principles and System Design	ESC	3	0	0	3	30	70	100
3.	20IT311	Object Oriented Programming	PCC	3	0	0	3	30	70	100
4.	20IT312	Operating Systems	PCC	3	0	0	3	30	70	100
5.	20IT313	Data Structures	PCC	3	0	0	3	30	70	100
6.	20IT314	Computer Organization	PCC	3	0	0	3	30	70	100
PRACTICAL										
7.	20IT321	Object Oriented Programming Laboratory	PCC	0	0	3	1	50	50	100
8.	20IT322	Operating Systems Laboratory	PCC	0	0	3	1	50	50	100
9.	20IT323	Data Structures Laboratory	PCC	0	0	3	1	50	50	100
10.	20HR351	Career Development Skills I	EEC	0	2	0	0	50	50	100
Total				18	3	9	22	1000		


SEMESTER - IV										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20MA441	Probability and Decision Models (Common To CS & IT)	BSC	3	1	0	4	30	70	100
2.	20IT411	Database Management Systems	PCC	3	0	0	3	30	70	100
3.	20IT412	Java Programming	PCC	3	0	0	3	30	70	100
4.	20IT413	Design and Analysis of Algorithms	ESC	3	0	0	3	30	70	100
5.	20IT414	Software Engineering Principles and Practices	PCC	3	0	0	3	30	70	100
6.	20HS051	Universal Human Values and Understanding Harmony	HSMC	3	0	0	3	30	70	100
PRACTICAL										
7.	20IT421	Database Systems Laboratory	PCC	0	0	3	1	50	50	100
8.	20IT422	Java Programming Laboratory	PCC	0	0	3	1	50	50	100
9.	20IT423	Design and Analysis of Algorithms Laboratory	ESC	0	0	3	1	50	50	100
10.	20HR462	Career Development Skills II	EEC	0	2	0	0	50	50	100
Total				18	3	9	22	1000		

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Department		Department of Information Technology									
Programme		B.Tech – Information Technology									
<b>SEMESTER - V</b>											
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks			
				L	T	P		C	CA	ES	Total
<b>THEORY</b>											
1.	20EC532	Micro Controller and Embedded Systems	ESC	3	0	0	3	30	70	100	
2.	20IT511	Data Analytics	PCC	3	0	0	3	30	70	100	
3.	20IT512	Theory of Computation	PCC	3	1	0	4	30	70	100	
4.	20IT513	Computer Networks	PCC	3	0	0	3	30	70	100	
5.	20HS002	Total Quality Management (Common To AU,CS,EE,IT,ME,SF)	HSMC	3	0	0	3	30	70	100	
6.		Professional Elective – I	PEC	3	0	0	3	30	70	100	
<b>PRACTICAL</b>											
7.	20IT521	Data Analytics Laboratory	PCC	0	0	3	1	50	50	100	
8.	20IT522	Computer Networks Laboratory	PCC	0	0	3	1	50	50	100	
9.	20HR563	Career Development Skills III	EEC	0	2	0	0	50	50	100	
<b>Total</b>				<b>18</b>	<b>3</b>	<b>6</b>	<b>21</b>	<b>900</b>			

SEMESTER - VI										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20IT611	Web Technology	PCC	3	1	0	4	30	70	100
2.	20IT612	Software Testing	PCC	3	0	0	3	30	70	100
3.	20IT613	Principles of Compiler Design	PCC	3	0	0	3	30	70	100
4.		Professional Elective – II	PEC	3	0	0	3	30	70	100
5.		Professional Elective – III	PEC	3	0	0	3	30	70	100
6.		Open Elective – I	OEC	3	0	0	3	30	70	100
PRACTICAL										
7.	20IT621	Web Technology Laboratory	PCC	0	0	3	1	50	50	100
8.	20IT622	Compiler Design Laboratory	PCC	0	0	3	1	50	50	100
9.	20IT623	Mini project	PROJ	0	0	6	3	50	50	100
10.	20HR664	Career Development Skills IV	EEC	0	2	0	0	50	50	100
Total				18	3	12	24	1000		

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Department		Department of Information Technology								
Programme		B.Tech – Information Technology								
SEMESTER - VII										
Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20IT711	Mobile Application Development	HSMC	3	0	0	3	30	70	100
2.	20IT712	Computer Graphics and Visualization	PCC	3	0	0	3	30	70	100
3.	20IT713	Cryptography and Network Security	PCC	3	1	0	4	30	70	100
4.	20IT714	Artificial Intelligence	PCC	3	0	0	3	30	70	100
5.		Professional Elective-IV	PEC	3	0	0	3	30	70	100
6.		Open Elective – II	OEC	3	0	0	3	30	70	100
PRACTICAL										
7.	20IT721	Mobile Application Development Laboratory	PCC	0	0	3	1	50	50	100
8.	20IT722	Computer Graphics Laboratory	PCC	0	0	3	1	50	50	100
Total				18	1	6	21	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	30	70	100
2.		Open Elective – III	OEC	3	0	0	3	30	70	100
PRACTICAL										
3.	20IT821	Project work	PROJ	0	0	12	6	50	50	100
Total				9	0	12	12	400		

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Department		Department of Information Technology									
Programme		B.Tech - Information Technology									
List of Electives											
PROFESSIONAL ELECTIVE - I (SEMESTER - V)											
Sl.No.	Course Code	Course Name	Specializa tion	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.	20IT561	Object Oriented Analysis and Design	S1	PEC	3	0	0	3	30	70	100
2.	20IT562	Advanced Computer Architecture	S2	PEC	3	0	0	3	30	70	100
3.	20IT563	Mobile Computing	S3	PEC	3	0	0	3	30	70	100
4.	20IT564	Unix Internals	S4	PEC	3	0	0	3	30	70	100
5.	20IT565	Agile Methodologies (Infosys Elective)	S5	PEC	3	0	0	3	30	70	100
6.	20IT566	Enterprise Resource and Planning	S1	PEC	3	0	0	3	30	70	100

<b>PROFESSIONAL ELECTIVE - II (SEMESTER - VI)</b>											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		CA	ES	Total
1.	20IT661	Bio Informatics	S1	PEC	3	0	0	3	30	70	100
2.	20IT662	Cloud computing (Infosys Elective)	S1	PEC	3	0	0	3	30	70	100
3.	20IT663	Human Computer Interaction	S2	PEC	3	0	0	3	30	70	100
4.	20IT664	Service Oriented Architecture	S2	PEC	3	0	0	3	30	70	100
5.	20IT665	TCP / IP Protocol Suite	S3	PEC	3	0	0	3	30	70	100
6.	20IT666	Internet of Things (Infosys Elective)	S3	PEC	3	0	0	3	30	70	100

<b>PROFESSIONAL ELECTIVE - III (SEMESTER - VI)</b>											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		CA	ES	Total
1.	20IT667	Wireless Communication	S1	PEC	3	0	0	3	30	70	100
2.	20IT668	Software Quality Assurance	S5	PEC	3	0	0	3	30	70	100
3.	20IT669	Social Network Analysis	S3	PEC	3	0	0	3	30	70	100
4.	20IT671	Machine Learning Techniques (Infosys Elective)	S5	PEC	3	0	0	3	30	70	100
5.	20IT672	Open Source Software	S4	PEC	3	0	0	3	30	70	100
6.	20IT673	Tele Communication and Switching Techniques	S3	PEC	3	0	0	3	30	70	100



PROFESSIONAL ELECTIVE – IV (SEMESTER – VII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		CA	ES	Total
1.	20IT761	Distributed Computing	S1	PEC	3	0	0	3	30	70	100
2.	20IT762	Enterprise Networking	S3	PEC	3	0	0	3	30	70	100
3.	20IT763	Digital Image Processing	S2	PEC	3	0	0	3	30	70	100
4.	20IT764	Quantum Computing	S1	PEC	3	0	0	3	30	70	100
5.	20IT765	Video Analytics	S3	PEC	3	0	0	3	30	70	100
6.	20IT766	Business Intelligence and Applications (Infosys Elective)	S5	PEC	3	0	0	3	30	70	100

PROFESSIONAL ELECTIVE – V (SEMESTER - VIII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		CA	ES	Total
1.	20IT861	Pattern Recognition	S2	PEC	3	0	0	3	30	70	100
2.	20IT862	Green Computing	S5	PEC	3	0	0	3	30	70	100
3.	20IT863	Reasoning and Expert Systems	S1	PEC	3	0	0	3	30	70	100
4.	20IT864	Information Theory and Coding Techniques	S2	PEC	3	0	0	3	30	70	100
5.	20IT865	Wireless Sensor Networks	S4	PEC	3	0	0	3	30	70	100
6.	20IT866	Software Project Management	S5	PEC	3	0	0	3	30	70	100

OPEN ELECTIVES ( SEMESTER VI ,VII and VIII)											
Sl.No.	Course Code	Course Name	Specialization	Category	Hours/ Week			Credit	Maximum Marks		
					L	T	P		C	CA	ES
1.		Disaster Management (Common to CE,CS,IT)	HS	OEC	3	0	0	3	30	70	100
2.		Analog and Digital Communication (Common to EE,IT)	EC	OEC	3	0	0	3	30	70	100
3.		Industrial Robotics (Common to CS,IT,ME)	ME	OEC	3	0	0	3	30	70	100
4.		Basics of Civil and Mechanical Engineering (Common to CS,EE,IT)	CE	OEC	3	0	0	3	30	70	100
5.		Human Resource Management (Common to CS,IT)	HS	OEC	3	0	0	3	30	70	100
6.		Engineering Economics and Financial Accounting (Common to CS,EE,IT)	HS	OEC	3	0	0	3	30	70	100
7.		Medical Electronics (Common to CS,EC,IT)	EC	OEC	3	0	0	3	30	70	100
8.		Solid waste Management (Common to CS,IT)	CE	OEC	3	0	0	3	30	70	100
9.		Industrial Safety Engineering (Common to CS,IT)	ME	OEC	3	0	0	3	30	70	100
10.		Control Systems (Common to EE,IT)	EE	OEC	3	0	0	3	30	70	100
11.		Fundamentals of Nano Technologies	EC	OEC	3	0	0	3	30	70	100
12.		Principles of Management (Common to All)	HS	OEC	3	0	0	3	30	70	100
13.		Municipal Waste and Management (Common to CE,CS,EE,IT,ME)	CE	OEC	3	0	0	3	30	70	100
14.		Intelligent Vehicles Technology (Common to CS,IT)	AU	OEC	3	0	0	3	30	70	100
15.		Architecture Planning Aspects (Common to CE,CS,EE,IT,ME)	CE	OEC	3	0	0	3	30	70	100

S1 - Recent Technologies and Computing

S2 - Data and Knowledge Engineering

S3 - Computer Networks and Security

S4 - Systems and Software Engineering

S5 - Entrepreneurship and Managerial Skills

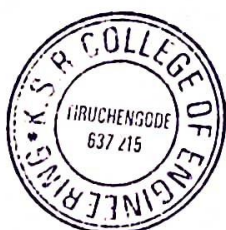
LIST OF VALUE ADDED COURSES

Sl. No.	Course Name	Number of Hours	Offered by Internal / External
1	Business English Certification	15	Internal / External
2	Hands on Training on Hadoop	15	Internal / External
3	Computer Hardware and Troubleshooting	15	Internal / External
4	Infosys Campus Connect - Foundation Program	15	Internal / External
5	Online Course Certification for Software Testing	15	Internal/ External
6	Hands-on Training on Network Simulation Tools like NS3 etc.,	15	Internal / External
7	Hands-on Training on Data Mining Tools like Weka etc.,	15	Internal / External
8	Hands-on Training on Android Application Development	15	Internal / External
9	Hands-on Training on MATLAB	15	Internal / External
10	Hands-on Training on RedHat Linux	15	Internal/ External
11	Course on Google App Scripting	15	Internal / External

COURSE COMPONENT SUMMARY

S. No.	Subject Area	Credits Per Semester								Credits Total	Percentage Credits
		I	II	III	IV	V	VI	VII	VIII		
1.	HSMC	3	3	-	3	3	-	3	-	15	9.31
2.	BSC	8	8	4	4	-	-	-	-	24	15.0
3.	ESC	8	1	3	4	3	-	-	-	19	11.80
4.	PCC	-	8	15	11	12	12	12	-	70	43.37
5.	PEC	-	-	-	-	3	6	3	3	15	9.31
6.	OEC	-	-	-	-	-	3	3	3	9	5.59
7.	PROJ	-	-	-	-	-	3	-	6	9	5.59
TOTAL		19	20	22	22	21	24	21	12	161	100

Total No. of Credits = 161



*G. S. Singaravel*  
**Chairman (BoS)**

**Dr. G. Singaravel**  
**Professor & Head**  
 Department of Information Technology  
 K.S.R. College of Engineering (Autonomous)  
 Tiruchengode - 637 215  
 Namakka! (Dt), Tamilnadu, India.

*[Signature]*  
**PRINCIPAL,**  
**K.S.R. COLLEGE OF ENGINEERING,**  
**TIRUCHENGODE - 637 209.**

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

(Common to All Branches)

L	T	P	C
2	0	1	3

**Prerequisite:** No prerequisites are needed for enrolling into the course**Course Objectives :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Comprehend and apply Grammar in context for professional communication

Understand

CO2: Infer the gist and specific information

Apply

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

Create

CO4: Critically interpret and comprehend a given text

Evaluate

CO5: Prioritize the listening skills for academic and professional purposes

Apply

**UNIT - I****[ 9 ]**

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

**UNIT - II****[ 9 ]**

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

**UNIT - III****[ 9 ]**

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

**UNIT - IV****[ 9 ]**

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

**UNIT - V****[ 9 ]**

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

**Total (L= 40, T = 5 ) = 45 Periods****Text Books :**

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

**Reference Books :**

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

**CO PO MAPPING**

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

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

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

R 2020

SEMESTER – I**20MA151****ENGINEERING MATHEMATICS – I**

(Common to All Branches)

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 Interpret the concepts of Matrix applications in the field of engineering.

Understand

CO2 Acquire knowledge in solving ordinary differential equations.

Evaluate

CO3 Extend and apply the concepts of differential calculus problems.

Apply

CO4 Develop the skills in solving the functions of several variables.

Remember

CO5 Applying the concepts and solving the Vector Calculus problems.

Apply

**UNIT – I****LINEAR ALGEBRA****[12]**

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

**UNIT – II****ORDINARY DIFFERENTIAL EQUATIONS****[12]**

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

**UNIT – III****DIFFERENTIAL CALCULUS****[12]**

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

**UNIT – IV****FUNCTIONS OF SEVERAL VARIABLES****[12]**

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

**UNIT – V****VECTOR CALCULUS****[12]**

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

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

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

**Reference Books :**

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

**CO PO MAPPING**

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

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

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

R 2020

**SEMESTER – I****ENGINEERING CHEMISTRY**

(Common to All Branches)

**20CH051**

L	T	P	C
3	0	0	3

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

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

**UNIT-I ADVANCED ENGINEERING MATERIALS****[ 9 ]**

Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS<sub>2</sub>; 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)<sub>6</sub>]<sup>3-</sup>, [Ni(CN)<sub>4</sub>]<sup>2-</sup> and [CoCl<sub>4</sub>]<sup>2-</sup> 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 its applications in medicine – chemiluminescence; Colorimetry – principle – instrumentation (block diagram only) – estimation of iron by colorimetry; principles of spectroscopy – selection rules – vibrational and rotational spectroscopy – applications; Flame photometry – principle – instrumentation (block diagram only) – estimation of sodium; Atomic absorption spectroscopy – principle – instrumentation (block diagram only) – estimation of nickel.

**Total = 45 Periods****Text Books :**

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

**Reference Books :**

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



**CO PO MAPPING**

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

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

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

R 2020

**SEMESTER – I**

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

**Prerequisite:** Engineering Mathematics, Engineering Physics

<b>Course Outcomes : On Completion of this course, the student will be able to</b>	<b>Cognitive Level</b>
CO1 Solve the electric circuits by applying basic circuit laws for various combinations of circuit elements.	Apply
CO2 Explain the construction, operating principle and application of DC motor and transformers.	Understand
CO3 Enlighten the construction, operating principle and application of AC motors and Special Machines.	Understand
CO4 Illustrate the function of various measuring instruments.	Understand
CO5 Discuss the characteristics of Diodes, BJT and Digital systems.	Understand

**UNIT – I ELECTRICAL CIRCUITS [ 9 ]**

Structural of Electrical Power System – Ohm's Law – 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 Jegathesan, V., Vinoth Kumar, K., Saravanakumar, R., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, First Edition, 2012.

**Reference Books :**

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

**CO PO MAPPING**

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

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

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

R 2020

SEMESTER - I

20IT111

PROGRAMMING FOR PROBLEM SOLVING USING C

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: Discuss the fundamentals of problem solving

Create

CO2: Design efficient algorithms for basic operations

Create

CO3: Explain the concept of Loops, Array and Strings to solve different problems.

Understand

CO4: Apply the concepts of Function modules, its usage and memory allocation using Pointers

Apply

CO5: Apply the concepts of structures and unions: declaration, initialization and implementation.

Apply

**UNIT - I INTRODUCTION TO COMPUTER PROBLEM SOLVING****[ 9 ]**

Overview of computers – Applications – Characteristics – Basic computer organization – Number System – Problem solving – Algorithm – Flowchart – Pseudo code – Examples : Exchanging values of two variables – Find largest number – Summation of a set of numbers – Reversing digits of an integer – Factorial computation – Fibonacci sequence – Reversing the numbers

**UNIT - II INTRODUCTION TO C LANGUAGE****[ 9 ]**

C Program Structure – Keywords – Data Types and Sizes – Constants – Variables – Operators – User defined data types (Typedef) – Input and Output Statements – Conditional Expression – If-Else – Nested If – Switch Case Statements

**UNIT - III LOOPS , ARRAYS AND STRINGS****[ 9 ]**

Looping: While – Do-While – For – Nested Control Structures – Break – Continue – Goto Statement – Single Dimensional Array – Multidimensional Array – Strings – String Manipulation – Scope of the Variables : auto, extern, register and static

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

Function – Function Prototypes – Calling Function: Call by Value – Call by Reference – Recursion – Command Line Argument – Pointers: Declaration – Pointer Manipulations – Array of Pointers – Function Pointers – Dynamic Memory Allocation : malloc , calloc and dealloc

**UNIT – V STRUCTURES, UNIONS AND FILES****[ 9 ]**

Defining a Structure – Structures and Functions – Array of structures – Unions – Files: Opening and Closing a File – Reading and Writing a file

**Total = 45 Periods****Text Books :**

- 1 Byron S Gottfried and Jitendar Kumar Chhabra, Programming with C, Tata McGraw Hill Publishing Company, Third Edition, 2011.
- 2 PradipDey and ManasGhosh , Programming in C, Second Edition, Oxford University Press, 2011.

**Reference Books :**

- 1 Ashok N.Kamathane, Computer Programming, Pearson Education, 2014.
- 2 Maureen Sprinkle , Problem Solving and Programming Concepts ,Pearson 7th Edition, 2011.
- 3 Dennis M.Ritche, C Programming Language, Pearson Education,,2017
- 4 K.N.King, C Programming: Modern Approach, Second Edition,2017

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
<b>C01</b>	<i>Discuss the fundamentals of problem solving</i>	2	2	2	2	2	1	-	-	-	-	-	2	2	2
<b>C02</b>	<i>Design efficient algorithms for basic operations</i>	2	2	2	2	2	1	-	-	-	-	-	2	2	2
<b>C03</b>	<i>Explain the concept of Loops, Array and Strings to solve different problems.</i>	2	2	2	2	2	1	-	-	-	-	-	2	2	2
<b>C04</b>	<i>Apply the concepts of Function modules, its usage and memory allocation using Pointers</i>	2	2	2	2	2	1	-	-	-	-	-	2	2	2
<b>C05</b>	<i>Apply the concepts of structures and unions: declaration, initialization and implementation.</i>	2	2	2	2	2	1	-	-	-	-	-	2	2	2
<b>Average</b>		<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>2</b>

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

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

R 2020

**SEMESTER-I**

20MC151

**INDUCTION PROGRAMME**

L	T	P	C
0	0	0	0

**(Common To All Branches)****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.*
- CO2 *Build relationship between teachers and students and make familiarizing with departments.*
- CO3 *Concentrate on literary activities.*
- CO4 *Develop the required skills through lectures and workshops.*
- CO5 *Acquire skills in extracurricular activities.*

*Understand**Understand**Apply**Remember**Analyze***3 weeks****List of activities during the three weeks Students Induction Programme (SIP):****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, Vivekanand Kendras, S-VYASA, etc. may be organized. (3 sessions, 9 hours).

**MODULE VIII: EXTRA CURRICULAR ACTIVITIES**

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

**MODULE IX: FEED BACK & REPORT ON THE PROGRAMMES:**

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

**CO PO MAPPING**

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

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

R 2020

**SEMESTER – I****20CH028****CHEMISTRY LABORATORY**  
(Common To All Branches)

L	T	P	C
0	0	3	1

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

- CO1 Apply the principle of conductometric titration.  
 CO2 Relate the role of pH in quantitative analysis of a solution.  
 CO3 Perceive the knowledge of the concentration of Iron by electrochemical methods.  
 CO4 Analyze the application of water in various fields.  
 CO5 Recall the nature of corrosion process.

**Cognitive level**

Understand  
 Understand  
 Understand  
 Understand  
 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<sub>2</sub> Vs. Na<sub>2</sub>SO<sub>4</sub>.
4. Estimation of Ferrous ion by Potentiometry – Fe<sup>2+</sup> Vs K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>.
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, Newyork, Eighth Edition, 2014.

**Reference Books :**

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



**CO PO MAPPING**

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	-	-
<b>Average</b>		<b>3</b>	<b>2</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>-</b>

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

**SEMESTER – I****20IT121****PROGRAMMING FOR PROBLEM SOLVING  
LABORATORY**

L	T	P	C
0	0	3	1

**Prerequisite: NIL****Course Outcomes:****CO1:** Interpret the basic concept of C programming*Understand***CO2:** Develop the program using the concept of Structured Programming*Create***CO3:** Identify suitable data structure for solving a problem*Apply***CO4:** Demonstrate the use of conditional statement*Understand***CO5:** Construct the program using structures and unions*Create***List of Experiments:**

1. Design an algorithm for exchanging the Values.
2. Design an algorithm and Draw a flowchart for Factorial Computation.
3. Design an algorithm and Draw a flowchart for check whether the given number is a prime number.
4. To write a program for finding the roots of a quadratic equation.
5. To Write a Program using Decision Making statements.
6. To write a program for finding the given year is leap year or not.
7. To design a calculator to perform the operations namely addition, subtraction, multiplication and division.
8. To generate the internal marks of students for five different subjects using structures.
9. To check whether the given string is palindrome or not without using string handling functions.
10. To write a program for calculating factorial using recursion and non recursive functions.
11. To swap the values of two variables using pointers.

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Interpret the basic concept of C programming</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO2	<i>Develop the program using the concept of Structured Programming</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO3	<i>Identify suitable data structure for solving a problem</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO4	<i>Demonstrate the use of conditional statement</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO5	<i>Construct the program using structures and unions</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>

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

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

R 2020

SEMESTER - I

20AU127

**ENGINEERING GRAPHICS LABORATORY**

(Common To CE,CS,EC,EE, &amp; IT)

L	T	P	C
0	0	3	1

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

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

**List of Experiments:**

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

**Total = 45 Periods**

**CO PO MAPPING**

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	-	-	-	-	-	-	-	-	-
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

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

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

R 2020

**SEMESTER - II****20EN251****TECHNICAL ENGLISH – II**  
(Common To All Branches)

L	T	P	C
2	0	1	3

*Prerequisite: No prerequisites are needed for enrolling into the course***Course Objectives : On successful completion of the 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 (L= 40, T = 5 ) = 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

**CO PO MAPPING**

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

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

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

R 2020

SEMESTER – II

20MA232

## DISCRETE MATHEMATICS

(Common To CS &amp; IT)

L	T	P	C
3	1	0	4

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

C01:	Solve logical problems.	Understand
C02:	Construct algorithms and derive complexities.	Understand
C03:	Acquire the knowledge of sets that are required for developing computational models.	Remember
C04:	Solving computational operations associated with functions.	Understand
C05:	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 Indian reprint, 2013.
- 3 Seymour Lipschutz, Discrete Mathematics, Schaum's outlines series, Tata McGraw Hill P.Co, New Delhi, Second Edition. 2012.
- 4 N. Subramanian, Discrete Mathematics, SCM Publications, Erode, First Edition, 2010.



**CO PO MAPPING**

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

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

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

R 2020

## SEMESTER – II

## ENGINEERING PHYSICS

20PH051

(Common to All Branches)

L	T	P	C
3	0	0	3

**Prerequisite:** NIL**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<sub>2</sub> 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.

**CO PO MAPPING**

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

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

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

R 2020

SEMESTER - II

20IT211

PYTHON SOFTWARE FOUNDATION

L	T	P	C
3	0	0	3

**Prerequisite:** Fundamental knowledge in C programming**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Summarize the fundamentals of Data Expression.

Understand

CO2: Construct an efficient algorithms for Control Flow functions

Apply

CO3: Analyze programs using Strings and Lists

Analyze

CO4: Interpret the knowledge in Tuples and Dictionary

Understand

CO5: Explain the concept of reading and writing on files.

Understand

**UNIT - I****INTRODUCTION****[ 9 ]**

Introduction – Literal Constants – Variables and Identifiers – Data Types – Input Operation – Comments – Reserved Words – Indentation – Operators and Expressions – Expressions – Operations on Strings – Other Data Types – Type Conversion – Decision Control Statements – Functions and Modules – Case Study: Tower of Hanoi

**UNIT - II****STRINGS AND LISTS****[ 9 ]**

Strings: String slices – Immutability – String functions and methods – String module – Lists as arrays. Illustrative programs: Square root – gcd – Exponentiation – Sum of array of numbers – Linear search – Binary search. Lists: List operations – List slices – List methods – List loop – Mutability – Aliasing – Cloning lists – List parameters.

**UNIT - III****TUPLES AND DICTIONARIES****[ 9 ]**

Tuples: Tuple assignment – Tuple as return value. Dictionaries: operations and methods. Advanced list processing – List comprehension. Illustrative programs: Selection sort – Insertion sort – Merge sort – Histogram

**UNIT - IV****FILES AND PACKAGES****[ 9 ]**

Files and exception: Text files – Reading and writing files – format operator– command line arguments– errors and exceptions – Handling exceptions – Modules – Packages – Illustrative programs: word count – Copy file.

**UNIT - V****OBJECT ORIENTED PROGRAMMING****[ 9 ]**

Classes and Objects – Classes and Functions – Classes and methods – Constructor – Static Methods – Inheritance – Types of Inheritance – Composition or Containership or Complex Objects – Abstract Classes and Interfaces – Operator Overloading – Polymorphism – Error and Exception Handling, Case Study: Compressing String and Files

**Total = 45 Periods****Text Books :**

- 1 Mark Lutz, , Programming Python, O'Reilly,4th Edition , 2013
- 2 Mark Lutz, Python Pocket Reference, O'Reilly Media, 5<sup>th</sup> Edition, 2014

**Reference Books :**

- 1 Alex Martelli ,Python in a Nutshell, O'Reilly.3<sup>rd</sup> Edition,2017
- 2 Guido van Rossum and Jr. Fred L. Drake,An Introduction to Python, Network Theory Ltd ,5<sup>th</sup> Edition,2011
- 3 Bill Lubanovic, Introducing Python Modern Computing in Simple Packages, O'Reilly Media, 1<sup>st</sup> Edition 2014
- 4 David Beazley, Brian K. Jones, Python Cookbook, O'Reilly Media, 3<sup>rd</sup> Edition, 2013
- 5 <https://www.python.org>

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Summarize the fundamentals of Data Expression.	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO2	Construct an efficient algorithms for Control Flow functions	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO3	Analyze programs using Strings and Lists	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO4	Interpret the knowledge in Tuples and Dictionary	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO5	Explain the concept of reading and writing on files	3	3	3	3	-	-	-	-	2	2	-	3	3	3
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>

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

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

R 2020

SEMESTER - II

20IT212

IT ESSENTIAL

L	T	P	C
3	0	0	3

**Prerequisite:** Fundamental knowledge in C programming**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Classify the types and fundamentals of servers

Analyze

CO2: Develop scripting using PHP

Apply

CO3: Explain the basics of networking and Internet.

Evaluate

CO4: Summarize the fundamentals and components of mobile communication

Understand

CO5: Explain the architectures and features of current trends in information Technology

Understand

**UNIT – I WEB ESSENTIALS****[ 9 ]**

Website Essentials : Client-Server Paradigm – Browser Fundamentals – Authoring tools – Types of Servers: Application Server – Web Server – Database Server

**UNIT – II SCRIPTING ESSENTIALS****[ 9 ]**

Need for Scripting languages – Types of scripting languages - Working Principle - Client Side scripting – Server Side scripting – PHP : Variables and Constants – Flow Control and Looping – Functions – PHP and MySQL – PHP and HTML – Cookies – Simple PHP scripts

**UNIT – III NETWORKING ESSENTIALS****[ 9 ]**

Fundamental computer network concepts – Types of computer networks – Network layers – TCP/IP model – Wireless Local Area Network – Ethernet – WiFi – Network Routing – Switching – Network components

**UNIT – IV MOBILE COMMUNICATION ESSENTIALS****[ 9 ]**

Cell phone working fundamentals – Cell phone frequencies &amp; channels – Digital cell phone components – Generations of cellular networks – Cell phone network technologies / architecture – Voice calls &amp; SMS

**UNIT – V RECENT TRENDS IN IT****[ 9 ]**

Cloud Computing: Architecture – Deployment models – Service models – Big Data: Sources – Characteristics and Benefits – Tools. Internet of Things: Features – Hardware and Software – Applications – Block Chain – Cyber Security

**Total = 45 Periods****Text Books :**

- 1 Pelin Aksoy, Laura DeNardis, Introduction to Information Technology, Cengage Learning, Fourth Indian Reprint 2010.
- 2 Deitel & Deitel, Internet & World Wide Web How To Program, Pearson International Edition Education, Fourth Edition, 2009.

**Reference Books :**

- 1 Brian.K.Williams, Stacey.C.Sawyer, Using Information Technology – A Practical Introduction to Computers and Communication, Tata McGraw Hill Publishing Company Ltd., New Delhi, 11th Edition, 2015.
- 2 V.Rajaraman, Introduction to Information Technology, PHI Learning, Second Edition, 2013.
- 3 Introduction to Information Technology, Pearson Education, IITL Education solutions Ltd., 2012.
- 4 Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition, O'REILLY, 2014.

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Classify the types and fundamentals of servers	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO2	Develop scripting using PHP.	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO3	Explain the basics of networking and Internet.	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO4	Summarize the fundamentals and components of mobile communication	3	3	3	3	-	-	-	-	2	2	-	3	3	3
CO5	Explain the architectures and features of current trends in information Technology	3	3	3	3	-	-	-	-	2	2	-	3	3	3
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

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

R 2020

SEMESTER –II

## ENVIRONMENTAL SCIENCE AND ENGINEERING

20MC052

(Common to All Branches)

L	T	P	C
3	0	0	0

**Prerequisite:** NIL**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.



**CO PO MAPPING**

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

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

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

R 2020

SEMESTER – II

20PH028

## PHYSICS LABORATORY

(Common to All Branches)

L	T	P	C
0	0	3	1

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

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

**List of Experiments in Physics Laboratory**

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

**Total = 30 Periods****Text Book :**

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

**References :**

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

**CO PO MAPPING**

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

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

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

R 2020

**SEMESTER – II**

20GE028

**MANUFACTURING PRACTICES LABORATORY**

(Common to All Branches)

L	T	P	C
0	0	3	1

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

CO1: Prepare green sand mould for simple patterns and carpentry components with simple joints.

CO2: Perform welding practice to join simple structures.

CO3: Practice simple operations in lathe and drilling machine.

**LIST OF EXPERIMENTS**

1. Study of fitting, smithy, plastic molding, 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.
6. 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 equipments 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.   |

**CO PO MAPPING**

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

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

**SEMESTER – II****20GE028****GROUP B (ELECTRICAL & ELECTRONICS)**  
(Common to all Branches)

L	T	P	C
0	0	3	1

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

CO1 Construct different types of wiring used in house.

CO2 Calibrate single phase Energy meter.

CO3 Demonstrate different electronic components, logic gates and CRO.

**Cognitive level**

Understand

Understand

Understand

**List of Experiments:****ELECTRICAL ENGINEERING**

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

**ELECTRONICS ENGINEERING**

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

**Total : 45 Periods****CO PO MAPPING**

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

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

**SEMESTER – II****20IT221****PYTHON SOFTWARE FOUNDATION LABORATORY**

L	T	P	C
0	0	3	1

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

CO1: Construct the code segments using Python

CO2: Show the solutions for real world problems using Structured Programming

CO3: Identify suitable data structure for solving a problem

CO4: Design and implement sorting and searching algorithms

CO5: Evaluate Pygame to design simple applications

**Cognitive Level**

Apply

Understand

Apply

Create

Evaluate

**List of Experiments:**

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton's method)
3. Write a program for Exponentiation (power of a number)
4. Illustrate the program for finding the maximum of a list of numbers
5. Write a program for Linear search and Binary search
6. Write a program for Selection sort and Insertion sort
7. Write a coding for Merge sort
8. Find the First n prime numbers
9. Write a coding for Multiplication of two matrices
10. Write a program for taking the command line arguments (word count)
11. Find the most frequent words in a text read from a file
12. Simulate elliptical orbits in Pygame.
13. Simulate bouncing ball in Pygame.

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Construct the code segments using Python	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO2	Show the solutions for real world problems using Structured Programming	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO3	Identify suitable data structure for solving a problem	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO4	Design and implement sorting and searching algorithms	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO5	Evaluate Pygame to design simple applications	3	2	2	1	3	-	-	-	-	-	-	-	3	1
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>	-	-	-	-	-	-	-	<b>3</b>	<b>1</b>

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

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

R 2020

SEMESTER – II

20IT222

IT ESSENTIAL 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: Create the professional looking documents and presentations.

Create

CO2: Build device drivers and configure operating systems

Apply

CO3: Build the code segments using PHP, HTML and CSS

Apply

CO4: Identify the network communication components

Apply

CO5: Design simple applications using JavaScript

Create

**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. Install and configuration of windows operating system, device drivers
5. Study of computer networking components.
6. Develop a PHP code to print alphabet triangle pattern
7. Write a PHP code to create, retrieve and delete cookie.
8. Develop a code segment to turn on or off bulb using JavaScript
9. Create a simple web page using HTML and CSS.
10. Create a Google Form with controls like check box, radio button and file upload option to collect details from the students.

**Total = 45 Periods**



**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Create the professional looking documents and presentations.	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO2	Build device drivers and configure operating systems	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO3	Build the code segments using PHP , HTML and CSS	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO4	Identify the network communication components	3	3	3	1	3	-	-	-	-	-	-	-	3	1
CO5	Design simple applications using JavaScript	3	2	2	1	3	-	-	-	-	-	-	-	3	1
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>1</b>

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

**SEMESTER – III**

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

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

<b>Course Outcomes: On Completion of this course , the student will be able to</b>	<b>Cognitive level</b>
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<sup>rd</sup> rule and 3/8<sup>th</sup> 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, 12<sup>th</sup> edition, 2016.
- 2 Dr. M.K. Venkataraman, Numerical Methods in Science and Engineering, National Publishing Company, Chennai, 4<sup>th</sup> edition, 2012.

**References :**

- 1 Sukhendu Dey and Shishir Gupta, Numerical Methods , Tata McGraw Hill Publishing Company, New Delhi, First Edition 2013.
- 2 Gerald.V, Applied Numerical Analysis, Pearson Education, New delhi, 6th edition, 2013.
- 3 P. Kandasamy, K. Thilagavathy, K. Gunavathy Numerical Methods , S. Chand Company, New Delhi, 5th edition, 2016.
- 4 S.R.K. Iyengar, R.K.Jain, "Numerical Methods", New Age International Publishers, New Delhi, 1st edition , 2014.

**CO PO MAPPING**

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

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

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

R 2020

SEMESTER - III

20EC333

DIGITAL PRINCIPLES AND SYSTEM 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: Analyze different methods used for simplification of boolean expressions.

Analyze

CO2: Design and implement Combinational circuits and develop their HDL models

Apply

CO3: Formulate a procedure for analyze and design of synchronous sequential circuits and develop their HDL models

Apply

CO4: Analyze and design asynchronous sequential digital circuits

Analyze

CO5: Acquire knowledge of the nomenclature and technology in the area of memory devices: ROM, RAM, PROM and PLD

Understand

**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 – Implementation of logic functions using basic gates, NAND-NOR implementations.

**UNIT - II COMBINATIONAL LOGIC****[ 9 ]**

Combinational circuit – Analysis and design procedure – Circuits for arithmetic operation : Half adder, full adder, Half subtractor, full subtractor, parallel adder, carry look ahead adder & binary adder – 2 bit Magnitude comparator, Code converters – Decoders and Encoders – Multiplexers and Demultiplexers – Introduction to HDL – HDL models of Combinational circuits.

**UNIT - III SYNCHRONOUS SEQUENTIAL LOGIC****[ 9 ]**

Latches and Flip Flops – Analysis and design procedure – State assignment and State reduction – Shift registers – Counters – HDL for sequential logic circuits

**UNIT - IV ASYNCHRONOUS SEQUENTIAL LOGIC****[ 9 ]**

Analysis and design of asynchronous sequential circuits – Reduction of state and flow table – Race-free state assignment – Hazards

**UNIT - V MEMORY AND PROGRAMMABLE LOGIC****[ 9 ]**

Classification of memories – ROM: ROM organization, PROM, EPROM, EEPROM, EAPROM, RAM: RAM organization - Memory expansion - Static RAM cell - Dynamic RAM cell - Programmable Logic Devices: Programmable Logic Array - Programmable Array Logic - Field Programmable Gate Arrays - Implementation of combinational logic circuits using ROM, PLA and PAL.

**Total = 45 Periods****Text Books :**

- 1 Donald P. Leach, Albert Paul Malvino and Goutam Saha, Digital Principles and Applications, McGraw Hill Education, USA, Eighth Edition, 2015.
- 2 M. Morris Mano, Digital Design, Prentice Hall of India Pvt. Ltd, Noida, Fourth Edition, 2012.

**Reference Books :**

- 1 Soumitra Kumar Mandal, Digital Electronics Principles and Applications, McGraw Hill, USA, Seventh Reprint, 2014.
- 2 John M. Yarbrough, Digital Logic Applications and Design, Thomson Learning, Ninth Reprint, 2012.
- 3 Donald D. Givone, Digital Principles and Design, Tata McGraw, New Delhi, Twenty First Reprint 2012.
- 4 John F. Wakerly, Digital Design Principles and Practices, Pearson Education, Ninth Impression, 2013.
- 5 Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL Design", TMH, New Delhi, Third Edition 2012

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
1	Analyze different methods used for simplification of boolean expressions.	3	2	3	2	1	-	-	-	-	-	-	2	3	1
2	Design and implement Combinational circuits and develop their HDL models	3	3	3	2	3	-	-	-	-	-	-	2	3	2
3	Formulate a procedure for analyze and design of synchronous sequential circuits and develop their HDL models	3	3	3	2	3	-	-	-	-	-	-	2	3	2
4	Analyze and design asynchronous sequential digital circuits	3	3	3	2	3	-	-	-	-	-	-	2	3	2
5	Acquire knowledge of the nomenclature and technology in the area of memory devices: ROM, RAM, PROM and PLD	3	3	3	2	3	-	-	-	-	-	-	2	3	2
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>2</b>

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

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

R 2020

SEMESTER - III

20IT311

OBJECT ORIENTED PROGRAMMING

L	T	P	C
3	0	0	3

**Prerequisite:** Programming for Problem Solving using C**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Design class and objects for real world scenario

Create

CO2: Apply polymorphism concepts to obtain build generic frameworks

Apply

CO3: Apply inheritance concepts to obtain code reusability

Apply

CO4: Create application to manipulate data from files using pointers and file concepts

Create

CO5: Explain the concept of exceptions

Evaluate

**UNIT - I OBJECT ORIENTED PROGRAMMING****[ 9 ]**

Evolution of Object Oriented Programming – Procedural Vs OOPs – Characteristics of OOPs – Classes and Objects – Data Members and Member functions – Access Specifiers – Objects and Functions.

**UNIT - II POLYMORPHISM****[ 9 ]**

Constructors: Types of Constructor – Copy Constructor – Destructors – Static keyword – Friend and Inline functions – Polymorphism : Function Overloading – Operator Overloading – Virtual Function

**UNIT - III INHERITANCE****[ 9 ]**

Inheritance: Advantages – Base and Derived Class – Visibility of Inherited Members : Types of Inheritance: Multiple – Multilevel – Hierarchical – Hybrid – Derived Class Constructors – Overriding Member Functions – Virtual Base Classes – Abstract Classes.

**UNIT - IV POINTERS , STREAMS AND FILES****[ 9 ]**

Pointers : this Pointer – Pointers to Objects and Derived Classes – Streams: Stream Classes – Unformatted I/O Operations – Formatted Console I/O Operations – File Stream Operations – File Pointers Manipulation

**UNIT - V TEMPLATES AND EXCEPTION HANDLING****[ 9 ]**

Templates: Function and Class Templates – Standard Template Library: Algorithms – Containers – Functions – Iterators – Exception Handling Mechanism – Exception Classes – try, throw and catch.

**Total = 45 Periods****Text Books :**

- 1 Robert Lafore ,Object Oriented Programming In C++ , Pearson Education Limited , Fourth Edition , 2017
- 2 Herbert Schildt, C++: The Complete Reference, Fifth Edition, Tata McGraw-Hill, 2017

**Reference Books :**

- 1 E Balagurusamy, Object Oriented Programming with C++, McGraw Hill, Eighth Edition, 2020
- 2 Deitel Paul , Deitel Harvey,C++ How to Program, Tenth Edition, Pearson, 2017.
- 3 K.R. Venugopal, Rajkumar and T.Ravishankar, Mastering C++, Tata McGraw Hill Publishing, 2015
- 4 Programming in C++ : <https://nptel.ac.in/courses/106/105/106105151/>

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	<i>Design class and objects for real world scenario</i>	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO2:	<i>Apply polymorphism concepts to obtain generic frameworks</i>	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO3:	<i>Apply inheritance concepts to obtain code reusability</i>	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO4:	<i>Create application to manipulate data from files using pointers and file concepts</i>	-	1	1	-	2	-	-	-	-	-	-	-	2	2
CO5:	<i>Explain the concept of exceptions</i>	--	1	2	-	2	-	-	-	-	-	-	-	1	1
<b>Average</b>		-	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

20IT312

## OPERATING SYSTEMS

L	T	P	C
3	0	0	3

**Prerequisite:** No prerequisite needed for enrolling into the course.**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Interpret the basic concept of Operating System

Understand

CO2: Analyze process management deadlock prevention and avoidance algorithms

Analyze

CO3: Compare and contrast various memory management schemes

Understand

CO4: Apply the principles of file and I/O management

Apply

CO5: Examine about various advanced operating systems

Analyze

**UNIT-I INTRODUCTION****[ 9 ]**

Basics of Operating Systems: Definition – Generations of Operating Systems – Types of Operating Systems: Mainframe – Desktop – Multiprocessor – Distributed – Clustered – Multiprogramming – Real Time – Embedded and Time sharing. Operating System Components – Operating System Services – System Calls – System Call Execution

**UNIT-II PROCESS MANAGEMENT****[ 9 ]**

Process: Process Concept – Process Control Block – Context Switches – Threads – System Calls – Process Scheduling: Types of Schedulers – Scheduling Criteria – Scheduling Algorithms – Inter process Communication and Synchronization: Shared Memory System – Message Passing – Critical Section – Mutual Exclusion – Semaphores. Deadlocks: Deadlock Characteristics – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection and Recovery

**UNIT-III MEMORY MANAGEMENT****[ 9 ]**

Swapping – Memory Allocation – Contiguous Memory Allocation – Paging – Segmentation – Segmentation with Paging. Virtual Memory – Demand Paging – Page Replacement Policies : Optimal (OPT) – First In First Out (FIFO) – Not Recently Used (NRU) and Least Recently Used (LRU)

**UNIT-IV FILE AND I/O MANAGEMENT****[ 9 ]**

File Concepts – Access methods – Directory Structure – File sharing – Protection – Access Rights – File System Structure – Byte Sequence – Record Sequence and Tree – based – Recovery – Disk formatting – I/O Management : I/O Buffering – Single and Double Buffer Schemes – Disk Organization – Secondary Storage Management – File Allocation Methods :- Free Space Management – Disk Scheduling – Disk Cache

**UNIT-V ADVANCED OS AND CASE STUDY****[ 9 ]**

Microsoft Windows – Apple macOS – Android and Apple's iOS – Linux System – System Administration – Requirements for Linux System Administrator – Setting up a LINUX Multifunction Server – Domain Name System – Setting Up Local Network Services – Virtualization– Setting Up Xen – VMware on Linux Host and Adding Guest OS

**Total = 45 Periods****Text Books :**

- 1 Abraham Silberschatz,,Operating System Concepts, John Wiley & Sons, 10th Edition, 2018
- 2 William Stallings, Operating Systems – Internals and Design Principles, 9th Edition, Prentice Hall, 2018

**Reference Books :**

- 1 Andrew S. Tanenbaum , Operating Systems – Design and Implementation, Pearson Education, 2015
- 2 D.M. Dhamdhare, Operating Systems – A Concept Based Approach, TMGH, 2010
- 3 Harvey M. Deitel, Paul Deitel, David R.Choffnes, Operating Systems, Prentice Hall, 3rd Edition, 2004
- 4 Operating System Fundamentals : <https://nptel.ac.in/courses/106/105/106105214/>



**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	<i>Interpret the basic concept of Operating System</i>	3	2	2	2	2	-	-	-	-	-	-	-	-	1
<b>CO2</b>	<i>Analyze process management deadlock prevention and avoidance algorithms</i>	3	2	2	2	2	-	-	-	-	-	-	-	-	1
<b>CO3</b>	<i>Compare and contrast various memory management schemes</i>	3	-	2	-	2	-	-	-	-	-	-	-	-	1
<b>CO4</b>	<i>Apply the principles of file and I/O management</i>	3	-	2	-	2	-	-	-	-	-	-	-	-	1
<b>CO5</b>	<i>Examine about various advanced operating systems</i>	3	2	2	2	2	-	-	-	-	-	-	-	-	1
<b>Average</b>		<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	-	-	-	-	-	-	-	-	<b>1</b>

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

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

R 2020

SEMESTER - III

20IT313

DATA STRUCTURES

L	T	P	C
3	0	0	3

**Prerequisite:** Programming for Problem solving Using C**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Apply various linear data structures in real time applications and projects

Apply

CO2: Solve the real world problems using stack and queue techniques

Apply

CO3: Construct and solve problems using non linear data structures

Apply

CO4: Design algorithms to solve common sorting and searching problems

Create

CO5: Identify the algorithms that are used to solve various problems using graph

Apply

**UNIT-I LINEAR DATA STRUCTURES – LIST****[ 9 ]**

Abstract Data Types (ADTs) – List ADT – Array based implementation – Linked list implementation – Singly linked list – Circularly linked list – Doubly linked list – Applications of list

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

Stack ADT : Operations – Evaluating arithmetic expressions – Conversion of Infix to postfix expression – Queue ADT : Operations – Circular Queue – Priority Queue – Dequeue – Applications of queue.

**UNIT-III NON- LINEAR DATA STRUCTURES – TREES****[ 9 ]**

Tree ADT: Tree Traversals – Binary Tree ADT – Expression trees – Applications of trees – Binary Search Tree ADT – Threaded Binary Trees – AVL Trees – B Tree – B+ Tree – Heap – Applications of heap.

**UNIT-IV SEARCHING AND SORTING****[ 9 ]**

Searching: Linear Search – Binary Search – Sorting : Bubble Sort – Selection Sort – Insertion Sort – Shell Sort – Radix Sort – Hashing: Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

**UNIT-V GRAPHS****[ 9 ]**

Basic Concepts of Graphs: Operations – Depth First Traversal – Breath First Traversal – Minimum Spanning Trees: Kruskal's and Prim's Algorithm – Shortest Path Algorithm – Dijkstra's Algorithm – Bellman Ford Algorithm.

**Total = 45 Periods****Text Books :**

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

**Reference Books :**

- 1 Richard F.Gilberg & Behrouz A. Forouzan, Data Structures : A Pseudocode Approach with C, Second Edition, Cengage Learning India Pvt. Ltd, 2005
- 2 Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill, 2014
- 3 Kruse R.L. Tondo C.L and Leung B.P, Data Structure and Program Design in C, Second Edition, Pearson Education India, 2007
- 4 A.V. Aho, J.E. Hopcraft, and J.D Ullman, Data structures and algorithms, Pearson Education, Reprint 2001
- 5 <http://www.nptelvideos.in/2012/11/data-structures-and-algorithms.html>

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>C01</b>	<i>Apply various linear data structures in real time applications and projects</i>	3	3	3	2	1	-	-	-	-	-	-	-	3	3
<b>C02</b>	<i>Solve the real world problems using stack and queue techniques</i>	3	3	2	2	1	-	-	-	-	-	-	-	2	3
<b>C03</b>	<i>Construct and solve problems using non linear data structures</i>	3	3	2	1	-	-	-	-	-	-	-	-	3	2
<b>C04</b>	<i>Design algorithms to solve common sorting and searching problems</i>	3	3	2	1	-	-	-	-	-	-	-	-	3	3
<b>C05</b>	<i>Identify the algorithms that are used to solve various problems using graph</i>	3	3	1	1	-	-	-	-	-	-	-	-	3	2
<b>Average</b>		<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>3</b>

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

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

R 2020

SEMESTER – III

20IT314

## COMPUTER ORGANIZATION

L	T	P	C
3	0	0	3

**Prerequisite:** No prerequisite needed for enrolling into the course.**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Demonstrate the operational concepts of computers and classify instruction set architectures

Understand

CO2: Apply the various arithmetic operations and discuss the design of ALU

Apply

CO3: Evaluate the performance of a pipelined processor

Understand

CO4: Design the memory and I/O system requirements for any commercial processor

Analyze

CO5: Discuss the concepts of parallelism and multi core processors

Analyze

**UNIT-I BASIC STRUCTURE OF COMPUTERS****[ 9 ]**

Functional units – Operational concepts – Bus structures – Instructions and instruction sequencing – Hardware and Software Interface – Instruction set architecture — Addressing modes – RISC and CISC – Amdahl's law – Performance and metrics

**UNIT-II ARITHMETIC FOR COMPUTERS****[ 9 ]**

Addition and Subtraction – Fast Adders – Multiplication – Division – Floating Point Representation – Floating Point Operations – Sub word Parallelism

**UNIT-III PIPELINING****[ 9 ]**

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations

**UNIT-IV MEMORY & I/O SYSTEM****[ 9 ]**

Memory Hierarchy – Memory Technologies – Cache Memory – Measuring and Improving Cache Performance – Virtual Memory, TLB's – Accessing I/O Devices – Interrupts – Direct Memory Access(DMA) – Bus structure and operation – Arbitration – Interface circuits – USB

**UNIT-V ADVANCED ARCHITECTURE TITLE****[ 9 ]**

Current Trends – Multi core Processors and other Shared Memory Multiprocessors – Graphics and Computing–Graphics Processing Units – Clusters – Warehouse Scale Computers and other Message – Passing Multiprocessors GPUs – Case Study: Pentium Processor

**Total = 45 Periods****Text Books :**

- 1 Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, Fifth Edition, Tata McGraw Hill, 2011.
- 2 M.Morris Mano, Computer System Architecture, Third Edition, Pearson Education, 2017.

**Reference Books :**

- 1 David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software interface', Fifth Edition, Elsevier, 2013.
- 2 William Stallings, Computer Organization and Architecture – Designing for Performance, Ninth Edition, Pearson Education, 2012.
- 3 John P.Hayes, Computer Architecture and Organization, McGraw Hill,3rd edition, 2012.
- 4 Computer Architecture and Organization : <https://nptel.ac.in/courses/106/105/106105163/>

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	<i>Demonstrate the operational concepts of computers and classify instruction set architectures</i>	3	2	2	2	1	–	–	–	–	–	–	–	2	2
<b>CO2</b>	<i>Apply the various arithmetic operations and discuss the design of ALU</i>	3	2	3	3	3	–	–	–	–	–	–	–	2	2
<b>CO3</b>	<i>Evaluate the performance of a pipelined processor</i>	3	3	2	3	2	–	–	–	–	–	–	–	2	2
<b>CO4</b>	<i>Design the memory and I/O system requirements for any commercial processor</i>	3	1	3	1	2	–	–	–	–	–	–	–	2	2
<b>CO5</b>	<i>Discuss the concepts of parallelism and multi core processors</i>	3	2	3	3	2	–	–	–	–	–	–	–	2	2
<b>Average</b>		<b>3</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>2</b>

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

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

R 2020

SEMESTER – III

20IT321

OBJECT ORIENTED PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

**Prerequisite:** Programming for problem solving using C**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

C01 : Create the programs using principles of object oriented language

Create

C02: Apply the concept of static , friend and inline function to solve problem

Apply

C03: Create code segments using polymorphism and inheritance

Apply

C04: Develop programs using file, streams and template

Create

C05: Explain about exception handling mechanism

Understand

**List of Experiments:**

Implementation of the following concepts:

1. Class and Objects
2. static , friend and inline function
3. Constructors and destructors
4. Inheritance
5. function overloading and operator overloading
6. virtual functions
7. Pointers and Type conversion
8. Files and Streams
9. Templates
10. Exception Handling

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Create the programs using principles of object oriented language	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO2	Apply the concept of static, friend and inline function to solve problem	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO3	Create code segments using polymorphism and inheritance	-	2	2	-	2	-	-	-	-	-	-	-	2	2
CO4	Develop programs using file, streams and template	-	1	1	-	2	-	-	-	-	-	-	-	2	2
CO5	Explore about exception handling mechanism	-	1	2	-	2	-	-	-	-	-	-	-	1	1
<b>Average</b>		-	2	2	-	2	-	-	-	-	-	-	-	2	2

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

**SEMESTER – III****20IT322****OPERATING SYSTEMS LABORATORY**

L	T	P	C
0	0	3	1

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

CO1: Make use of LINUX utilities, LINUX file system, file access control and perform basic shell control of the utilities

Apply

CO2: Construct process scheduling &amp; synchronization algorithms, deadlock avoidance and detection Algorithms

Create

CO3: Compare the performance of various CPU Scheduling Algorithm

Evaluate

CO4: Analyze the performance of the various page replacement algorithms

Analyze

CO5: Create processes and implement IPC

Create

**List of Experiments:**

- Write programs using the following system calls of LINUX operating system like fork, exec, getpid, exit, wait, close, stat, opendir, readdir.
- Write programs using the I/O system calls of LINUX operating system (open, read, write etc.)
- Write C programs to simulate LINUX commands like ls, grep etc.
- Recall Shell programming with some simple examples.
- Implement the following CPU scheduling algorithms
  - Round Robin
  - SJF
  - FCFS
  - Priority
- Implementation of File Allocation Strategies (like Sequential, Indexed, Linked)
- Implementation of Producer and Consumer problem using Semaphores.
- Implementation of Files Organization Techniques (like Single level directory, Two levels hierarchical (IDAG))
- Implementation of Banker's algorithm for Dead Locks Avoidance.
- Implementation of Dead Lock Detection methods.
- Implementation of Page Replacement Algorithms (like FIFO, LRU and LFU).
- Implementation of Shared Memory and IPC.
- Implementation of Paging Technique in Memory Management.
- Implementation of Threading and Synchronization Applications.

**Total = 45 Periods**



**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Make use of LINUX utilities, LINUX file system, file access control and perform basic shell control of the utilities	3	2	2	1	-	-	-	-	-	-	-	-	1	1
CO2	Construct process scheduling & synchronization algorithms, deadlock avoidance and detection Algorithms	3	2	2	2	-	-	-	-	-	-	-	-	1	1
CO3	Compare the performance of various CPU Scheduling Algorithm	3	2	2	1	-	-	-	-	-	-	-	-	1	1
CO4	Analyze the performance of the various page replacement algorithms	3	2	2	2	-	-	-	-	-	-	-	-	1	1
CO5	Create processes and implement IPC	3	2	2	1	-	-	-	-	-	-	-	-	1	1
<b>Average</b>		<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>

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

**SEMESTER – III****20IT323****DATA STRUCTURES LABORATORY**

L	T	P	C
0	0	3	1

**Prerequisite:** *Programming for Problem solving Laboratory***Course Outcomes:** *On Completion of this course the student will be able to***Cognitive Level**C01 : *Build elementary data structures such as list, stack, queue, linked list and tree**Apply*C02: *Identify the appropriate data structure for a given problem**Apply*C03: *Construct recursive programs using trees, Heaps and graphs in C**Create*C04: *Construct non-linear data structures for various real time applications in C**Create*C05: *Design programs for finding minimum spanning tree using Prim's and Kruskal's algorithms**Create***List of Experiments:**

1. Array implementation of List, Stack and Queue ADTs.
2. Linked List implementation of List, Stack and Queue ADTs.
3. Evaluation of Expression.
4. Implementation of Array based Circular Queue.
5. Creation of Binary Trees and Implementation of its operation.
6. Implementation of Binary Tree and its Traversals: pre- order, in- order, post- order.
7. Implementation of Binary Search Trees.
8. Implementation of Priority Queues using Heaps.
9. Implementation of Searching and Sorting Algorithms.
10. Implementation of Hashing Techniques.
11. Implementation of Dijkstra's Algorithm.
12. Implementation of minimum spanning tree using Kruskal's Algorithm.
13. Implementation of minimum spanning tree using Prim's Algorithm.

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	Build elementary data structures such as list, stack, queue, linked list and tree	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO2	Identify the appropriate data structure for a given problem	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO3	Construct recursive programs using trees, Heaps and graphs in C	3	2	3	1	-	-	-	-	2	-	1	2	3	2
CO4	Construct non-linear data structures for various real time applications in C	3	3	2	1	-	-	-	-	2	-	1	2	3	2
CO5	Design programs for finding minimum spanning tree using Prim's and Kruskal's algorithms	3	2	2	1	-	-	-	-	2	-	1	2	3	2
<b>Average</b>		<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>

## 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 successful completion of the course, the student will be able to**Cognitive Level**

- CO1: Have competent knowledge on grammar with an understanding of its basic rules.  
 CO2: Communicate effectively and enhance interpersonal skills with renewed self – confidence  
 CO3: Construct sentence in English and make correction  
 CO4: Perform oral communication in any formal situation  
 CO5: Develop their LSRW skills

Understand  
 Apply  
 Apply  
 Create  
 Understand

**UNIT - I EFFECTIVE ENGLISH – SPOKEN ENGLISH****[ 6 ]**

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

**UNIT - II ESSENTIAL COMMUNICATION****[ 6 ]**

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

**UNIT - III WRITTEN COMMUNICATION – PART 1****[ 6 ]**

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

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

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

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

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

**Total = 30 Periods****Text Books :**

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

**Reference Books :**

- 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

**CO PO MAPPING**

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

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

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

R 2020

**SEMESTER – IV**

<b>20MA441</b>	<b>PROBABILITY AND DECISION MODELS</b> (Common To CS & IT)	L	T	P	C
		3	1	0	4

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

<b>Course Outcomes : On successful completion of the course , the student will be able to</b>	<b>Cognitive Level</b>
<b>CO1:</b> Explain the importance of one dimensional random variables discrete and continuous distribution.	Understand
<b>CO2:</b> Develop their skills in joint, marginal and conditional distributions and knowing the concept of covariance correlation & regression	Apply
<b>CO3:</b> Analyze the theory of stationary process, Markov Process and transition probabilities, and Poisson Process	Analyze
<b>CO4:</b> Illustrate the basic concept of single server and multi-server queuing models	Understand
<b>CO5:</b> 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](https://www.youtube.com/watch?v=J70dP_AECzQ)

**CO PO MAPPING**

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

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

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

R 2020

SEMESTER - IV

20IT411	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

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

CO1: Demonstrate the need, background, architecture and evolution of database management system and to introduce the concepts of ER model	Apply
CO2: Design and develop relational models with an emphasis on how to organize, maintain, retrieve and secure information efficiently and effectively from a RDBMS	Create
CO3: Design and evaluate the normality of a logical data model, and correct any anomalies and identify the requirements of data storage and indexing techniques	Apply
CO4: Implement query processing methodologies using various operators	Apply
CO5: Design and develop methods for multiple transactions are managed concurrently and recovered efficiently during failures	Apply

**UNIT - I INTRODUCTION [ 9 ]**

Database and Database Users: Characteristics of database approach – Advantages of using the DBMS Approach – Database Applications. Database system concepts and architecture: Data models – Schemas – Instance – Three schema architecture and data independence – DBMS languages and interfaces – Database system Environment ER model

**UNIT - II RELATIONAL MODEL [ 9 ]**

Relational data model – Relational constraints: Relational model concepts – Relational constraints and Relational data base schema – Update operations – Basic Relational algebra operations – Additional relational operations. SQL: Data definition and Data type – Specifying SQL constraints – Basic queries – Insert – Delete – Update complex queries – views – Assertions and triggers – Dynamic SQL. Database security and Authorization: Security issues – Grant/revoke privileges – SQL injections

**UNIT - III RELATIONAL DATABASE DESIGN [ 9 ]**

Functional dependencies and normalization: Functional dependencies – Normal forms: 1NF– 2NF– 3NF– Boyce Codd NF – Decomposition – Multi valued dependencies and 4NF– join dependencies and 5NF

**UNIT - IV DATA STORAGE AND QUERY PROCESSING [ 9 ]**

Disk Storage – Basic File Structures and Hashing: Secondary Storage Device – RAID – Operations on Files – Heap Files – Sorted Files – Hashing Techniques. Indexing Structures for Files: Types of Single – Level Ordered Indexes – Multilevel Indexes – Dynamic Multilevel Indexes Using B-Trees and B+Trees. Query Processing: Translating SQL Queries into Relational Algebra – Algorithms for External Sorting – Algorithms for SELECT and JOIN Operations – Algorithms for PROJECT and Set Operations

**UNIT - V TRANSACTION MANAGEMENT [ 9 ]**

Transaction Processing: Introduction – Transaction and System Concepts – Desirable Properties of Transactions – Schedules based on Recoverability – Schedules based on Serializability. Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control – Timestamp Ordering. Database Recovery Techniques: Recovery Concepts – Deferred Update – Immediate Update – Shadow Paging – ARIES recovery algorithm

**Total = 45 Periods****Text Books :**

- 1 Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, 7<sup>th</sup> Edition, 2019.
- 2 Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, 7<sup>th</sup> Edition, 2016.

**Reference Books :**

- 1 S.K.Singh, Database Systems Concepts, Design and Applications, Pearson Education, 2<sup>nd</sup> Edition, 2011.
- 2 C.J.Date, A.Kannan and S.Swamynathan, An Introduction to Database Systems, Pearson Education, 8<sup>th</sup> Edition, 2006.
- 3 Raghu Ramakrishnan, Database Management Systems, Tata McGraw Hill, 4<sup>th</sup> Edition, 2010.



**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	<i>Demonstrate the need, background, architecture and evolution of database management system and to introduce the concepts of ER model</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO2	<i>Design and develop relational models with an emphasis on how to organize, maintain, retrieve and secure information efficiently and effectively from a RDBMS</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO3	<i>Design and evaluate the normality of a logical data model, and correct any anomalies and identify the requirements of data storage and indexing techniques</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO4	<i>Implement query processing methodologies using various operators</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
CO5	<i>Design and develop methods for multiple transactions are managed concurrently and recovered efficiently during failures</i>	3	3	3	3	2	2	-	-	2	-	-	2	3	3
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>3</b>	<b>3</b>

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

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

R 2020

SEMESTER – IV

20IT412

JAVA PROGRAMMING

L	T	P	C
3	0	0	3

**Prerequisite:** Fundamentals of Object Oriented Programming Concepts**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Apply java programming fundamentals to solve real world problem

Apply

CO2: Explain the concept of overloading and inheritances

Understand

CO3: Illustrate important features of java like string Manipulations and Exception Handling

Understand

CO4: Demonstrate the features of multithreaded programming and I/O operations

Understand

CO5: Develop application using the concepts of Collections and JDBC connectivity

Create

**UNIT - I JAVA FUNDAMENTALS****[ 9 ]**

Features and components of Java – Architecture of JVM – Structure of a Java class and source code file – Primitive variables – Object reference variable – Scope of variables – Operators – Control Statements – Access and non-access modifiers – Object's Life Cycle – Garbage Collection

**UNIT - II CLASS DESIGN AND INHERITANCE****[ 9 ]**

Package Declaration – Importing Packages : import and static imports – Method : Objects as Parameters – Returning Objects – Method Overloading – Constructor – Constructor Overloading – Nested and Inner Class – Inheritance: Multilevel – Hierarchical – Method Overriding – Interface – this and super

**UNIT - III CORE JAVA APIS AND EXCEPTION HANDLING****[ 9 ]**

Creating and manipulating : Strings – String Builder – Arrays – Array List – Wrapper classes – Working with Dates and Times – Exceptions : Categories – try– catch– finally blocks – throw and throws – Error

**UNIT – IV MULTITHREADING AND I/O OPERATIONS****[ 9 ]**

Thread Life Cycle – Creating Thread –Thread Priority –Thread Pool and Group – Synchronization: Synchronized block – static synchronization – Deadlock – Inter thread Communication – Hierarchy For Package java.io – input and output streams – Random access files.

**UNIT - V COLLECTIONS AND JDBC****[ 9 ]**

Hierarchy of Collection Framework: Linked List – Queue – Hash Set – Linked Hash Set – Tree Set – JDBC API: JDBC Driver Manager – 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, 10th Edition, 2018
- 2 Cay S. Horstmann, Core Java Volume 1 – Fundamentals, Prentice Hall, 10th Edition, 2015

**Reference Books :**

- 1 Herbert Schildt, Java – A Beginner Guide, Oracle Press, McGraw– Hill Education, 6th Edition, 2014
- 2 Joshua Bloch, Effective Java: A Programming Language Guide, Addison– Wesley Professional, 3rd Edition, 2018
- 3 Allen B. Downey and Chris Mayfield, Think Java: How to Think Like a Computer Scientist, O'Reilly, 1st Edition, 2016
- 4 [https://onlinecourses.nptel.ac.in/noc19\\_cs07/preview](https://onlinecourses.nptel.ac.in/noc19_cs07/preview)

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Apply java programming fundamentals to solve real world problem</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO2	<i>Explain the concept of overloading and inheritances</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO3	<i>Illustrate important features of java like string Manipulations and Exception Handling</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO4	<i>Demonstrate the features of multithreaded programming and I/O operations</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
CO5	<i>Develop application using the concepts of Collections and JDBC connectivity</i>	3	3	3	3	3	-	-	-	-	3	-	3	3	3
<b>Average</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>3</b>

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

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

R 2020

SEMESTER - IV

20IT413

DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	0	0	3

**Prerequisite:** Data Structures, programming for Problem Solving in C**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Analyze the algorithms that are used to solve various problems.

Analyze

CO2: Generate and solve the recurrences for divide and conquer techniques.

Analyze

CO3: Solve the problems using greedy and dynamic programming paradigms.

Apply

CO4: Design the algorithms for solving the backtracking and transform and conquer methodologies.

Apply

CO5: Apply the branch and bound technique to solve various problems.

Apply

**UNIT - I FUNDAMENTALS OF ALGORITHM ANALYSIS****[ 9 ]**

Introduction – Analysis framework – Time space tradeoff – Asymptotic notations – Conditional asymptotic notation – Properties of Big-Oh notation – Recurrence equations – Mathematical Analysis of Non-recursive algorithms – Mathematical analysis of recursive Algorithms – Analysis of linear search – Empirical analysis – Algorithm visualization

**UNIT - II BRUTE FORCE AND DIVIDE AND CONQUER STRATEGIES****[ 9 ]**

Brute Force: Selection Sort - Bubble Sort – String matching – Exhaustive Search: Travelling Salesman problem – Divide and Conquer: General Method – Binary Search – Closest-pair problem – Merge Sort – Quick Sort.

**UNIT - III GREEDY AND DYNAMIC PROGRAMMING PARADIGMS****[ 9 ]**

Greedy Algorithms: Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm – Huffman code – Knapsack problem – Dynamic Programming: Warshall's and Floyd's algorithm – Optimal binary search trees

**UNIT - IV BACKTRACKING AND TRANSFORM AND CONQUER METHODOLOGIES****[ 9 ]**

Backtracking: General Method – N-Queen's problem – Sum of subsets – Graph coloring – Hamiltonian problem. Transform and conquer : Presorting – Gaussian elimination

**UNIT - V GRAPH AND BRANCH AND BOUND STRATEGIES****[ 9 ]**

Graph : Connected Components – Bi-connected components – Branch and Bound: General Method (FIFO and LC) – Job assignment problem - 0/1 Knapsack problem – Traveling Salesman Problem – Introduction to NP-Hard and NP-Completeness

**Total = 45 Periods****Text Books :**

- 1 Any Levitin, Introduction to the Design and Analysis of Algorithms, Pearson education, 3<sup>rd</sup> Edition, 2017.
- 2 A.V.Aho, J.E. Hopcroft and J.D.Ullman, The Design and Analysis of Computer Algorithms, Pearson Education Asia, 2010.

**Reference Books :**

- 1 Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Introduction to Algorithms, Prentice Hall of India, 2<sup>nd</sup> Edition, 2007.
- 2 Sara Baase and Allen Van Gelder, Computer Algorithms - Introduction to Design and Analysis, Pearson Education, 3<sup>rd</sup> Edition, 2010.
- 3 Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, 2<sup>nd</sup> Edition, 2008.
- 4 Robert Sedgewick, Philippe Flajolet, An Introduction to the Analysis of Algorithms, Addison-Wesley, Second Edition, 2013.
- 5 <http://www.nptelvideos.in/2012/11/design-analysis-of-algorithms.html>

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	Analyze the algorithms that are used to solve various problems.	3	3	2	2	1	-	-	-	-	-	-	-	3	3
2	Generate and solve the recurrences for divide and conquer techniques.	3	3	2	2	1	-	-	-	-	-	-	-	3	3
3	Solve the problems using greedy and dynamic programming paradigms.	3	3	1	1	-	-	-	-	-	-	-	-	3	2
4	Design the algorithms for solving the backtracking and transform and conquer methodologies.	3	3	2	1	-	-	-	-	-	-	-	-	3	2
5	Apply the branch and bound technique to solve various problems.	3	3	1	1	-	-	-	-	-	-	-	-	3	2
<b>Average</b>		<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	-	-	-	-	-	-	-	<b>3</b>	<b>2</b>

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

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

R 2020

SEMESTER - IV

20IT414

SOFTWARE ENGINEERING PRINCIPLES AND PRACTICES

L	T	P	C
3	0	0	3

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

CO1: Apply the principles of software engineering to real time application with practicing models

Analyze

CO2: Plan the requirement specification and design and implement the software systems.

Create

CO3: Design the processes and quality architecture to the specific needs

Apply

CO4: Discuss various software testing strategies

Understand

CO5: Create the software project with quality product

Create

**UNIT – I THE SOFTWARE PROCESS****[ 9 ]**

Software Engineering: Generic View of Process – Software Engineering Practice – Software Process Model: Prescriptive Models – Waterfall Models – Increment – Evolutionary and Specialized model – Comparison Study of Software Process Models – Agile Process and Models

**UNIT – II REQUIREMENTS ANALYSIS AND SPECIFICATION****[ 9 ]**

Requirements Analysis: Requirements Engineering Tasks – Initialization of the Requirement Engineering Process – Eliciting Requirements – Building the Analysis Model – Validating Requirements – Building the Analysis Model – Requirements Analysis – Model Approaches – Data Modeling Concepts – Scenario Based – Flow Oriented Modeling – Class Based Modeling – Behavioral Modeling – Case Study: Software Requirements Specification (SRS) for Application Project.

**UNIT – III DESIGN CONCEPTS AND ARCHITECTURAL DESIGN****[ 9 ]**

Design Engineering: Design within the Context of Software Engineering – Design concepts – Design model – Architectural design: Software Architecture – Architectural Styles – Architectural Design – Mapping Design Flow into Software Architecture – Introduction to Modeling with UML Language and Design Based on Case Study of SRS.

**UNIT – IV SOFTWARE TESTING STRATEGIES AND STACTICS****[ 9 ]**

Testing strategies: Strategic Approach to Software Testing – Strategic Issues – Testing Strategies for Conventional Software – Object Oriented Software – Validating Testing – System Testing – Art of Debugging. Testing Tactics: Software Testing Fundamentals – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing – Testing for Specialized Environments – Architectures and Applications – Patterns for Software Testing – Case Study of Software Testing Tools.

**UNIT – V MANAGING SOFTWARE PROJECT****[ 9 ]**

Project Management – Spectrum – People – Product and Process – Empirical Estimation Models – Scheduling: Timeline Chart and Tracking the Schedule – Risk management: Risk Identification – Projection and RMMM Plan – SCM Process – SQA Activities and Formal Technical Reviews – ISO 9000 Quality Standards – Emerging Trends in Software Engineering.

**Total = 45 Periods****Text Books :**

- 1 Roger S. Pressman, Software Engineering: A Practitioner Approach, McGraw-Hill ,Seventh Edition,2010
- 2 Ian Sommerville, Software Engineering, Sixth Edition, Pearson Education, New Delhi, 2011

**Reference Books :**

- 1 Jalote P , An Integrated Approach to Software Engineering, Third Edition, Narosa Publishers, New Delhi, 2015

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
1	Apply the principles of software engineering to real time application with practicing models	3	3	2	2	1	-	-	-	-	-	-	-	3	3
2	Plan the requirement specification and design and implement the software systems	3	3	2	2	1	-	-	-	-	-	-	-	3	3
3	Design the processes and quality architecture to the specific needs	3	3	1	1	-	-	-	-	-	-	-	-	3	2
4	Discuss various software testing strategies	3	3	2	1	-	-	-	-	-	-	-	-	3	2
5	Create the software project with quality product	3	3	1	1	-	-	-	-	-	-	-	-	3	2
<b>Average</b>		<b>3</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>2</b>

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

**SEMESTER - IV**

20HS051	<b>UNIVERSAL HUMAN VALUES AND UNDERSTANDING HARMONY</b> (Common To All Branches)	L	T	P	C
		3	0	0	3

**Prerequisite:**

<b>Course Outcomes : On successful completion of the course, the student will be able to</b>	<b>Cognitive Level</b>
CO1: Explain the basic concepts of value education.	Understanding
CO2: Distinguish between the self and the body, implement the meaning of harmony in the Co-existence of Self and the Body.	Understanding
CO3: Explain the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships.	Understanding
CO4: Describe the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.	Understanding
CO5: Explain the ethical and unethical practices in work environment.	Understanding

**UNIT - I INTRODUCTION TO VALUE EDUCATION [ 09 ]**

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 HUMAN BEING [ 09 ]**

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 [ 09 ]**

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 [ 09 ]**

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 PROFESSIONAL ETHICS [ 09 ]**

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 (L= 45, T = 0) = 45 Periods**

**Text Books :**

- 1 Gaur R.R., Sangal, R., Bagaria, G.P., A Foundation Course in Human Values and Professional Ethics, Excell Books Pvt. Ltd., New Delhi, First Edition, 2016.
- 2 Tripathy, A.N., Human Values, New Age International Publishers, 2003.

**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.
- 3 Seebauer, E.G., Robert L. Berry, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press, 2000.
- 4 Banerjee, B.P., Foundations of Ethics and Management, Excel Book, 2005.



**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	<i>Explain the basic concepts of value education.</i>	-	-	-	-	-	1	1	3	3	-	1	3	-	-
CO2	<i>Distinguish between the self and the body, implement the meaning of Harmony in the Co- existence of Self and the Body.</i>	-	-	-	-	-	1	1	3	3	-	1	3	-	-
CO3	<i>Explain the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships.</i>	-	-	-	-	-	1	1	3	3	-	1	3	-	-
CO4	<i>Describe the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.</i>	-	-	-	-	-	1	1	3	3	-	1	3	-	-
CO5	<i>Explain the ethical and unethical practices in work environment.</i>	-	-	-	-	-	1	1	3	3	-	1	3	-	-
<b>Round off Average</b>		-	-	-	-	-	1	1	3	3	-	1	3	-	-

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

SEMESTER – IV**20IT421****DATABASE SYSTEMS LABORATORY**

L	T	P	C
0	0	3	1

**Prerequisite:** No prerequisite needed for enrolling into the course**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1 :Design schema for the given database by creating appropriate tables

Create

CO2::Create SQL queries using DDL and DML statements to retrieve information out of it

Create

CO3::Create views and triggers that automatically indicate the updating of data in the tables

Create

CO4::Construct Import and export of data

Apply

CO5::Apply the concept of databases to the real time application development

Apply

**List of Experiments:**

1. Create a relational database system using DDL commands with constraints
2. Update the database system using DML commands
3. Query the database using simple and complex queries
4. Create and update views
5. High level programming language extensions (Control structures, Procedures and Functions)
6. Working with triggers
7. Use of front end tools to manipulate the database
8. Menu Design
9. Generate reports using a reporting tool
10. Mini Project (Application Development using Oracle/ SQL SERVER / MYSQL)

**Sample Applications:**

- Inventory Control System
- Hospital Management System
- Railway Reservation System
- Web Based User Identification System
- Hotel Management System
- Student Information System
- Library Information System and etc.,

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	<i>Design schema for the given database by creating appropriate tables</i>	3	2	1	1	-	-	-	-	-	-	-	-	3	2
<b>CO2</b>	<i>Create SQL queries using DDL and DML statements to retrieve information out of it</i>	3	2	1	1	-	-	-	-	-	-	-	-	3	2
<b>CO3</b>	<i>Create views and triggers that automatically indicate the updating of data in the tables</i>	3	2	1	1	-	-	-	-	-	-	-	-	3	2
<b>CO4</b>	<i>Construct Import and export of data</i>	3	2	1	1	-	-	-	-	-	-	-	-	3	2
<b>CO5</b>	<i>Apply the concept of databases to the real time application development</i>	3	2	1	1	-	-	-	-	-	-	-	-	3	2
<b>Average</b>		<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3</b>	<b>2</b>

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

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

R 2020

SEMESTER – IV

20IT422

JAVA PROGRAMMING LABORATORY

L	T	P	C
0	0	3	1

**Prerequisite:** Basic knowledge of Object Oriented Concepts**Course Outcomes :** On successful completion of the course, the student will be able to**Cognitive Level**

CO1: Analyze and apply the features of java to find optimal solution for the real world problem

Analyze

CO2: Develop the concept of constructors, inheritance and overloading

Create

CO3: Interpret the concept of arrays and string manipulation functions

Understand

CO4: Demonstrate the features of exception handling and threads

Understand

CO5: Construct the concept of database connectivity

Apply

**List of Experiments:**

1. Write a program to read n elements in array, remove duplications and Display them in sorted order.
2. Write a program for college management system to illustrate the concept of constructor overloading and method overloading.
3. Write a program to illustrate hierarchical inheritance and interface for student information system.
4. Write a program for employee management system using packages and import statements.
5. Write a program to perform calculator operations using exception handling.
6. Write a program for the illustration of string and string builder manipulation functions.
7. Write a program for threads (extending Threads class and implementing Runnableinterface).
8. Write a program to implement student details using database connectivity.
9. Write a java program to implement the concept of collections.
10. Write a java program to illustrate the various I/O and file operations.

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	Analyze and apply the features of java to find optimal solution for the real world problem	3	3	3	3	3	-	-	-	-	3	-	3	3	3	
CO2	Develop the concept of constructors, inheritance and overloading	3	3	3	3	3	-	-	-	-	3	-	3	3	3	
CO3	Interpret the concept of arrays and string manipulation functions	3	3	3	3	3	-	-	-	-	3	-	3	3	3	
CO4	Demonstrate the features of exception handling and threads	3	3	3	3	3	-	-	-	-	3	-	3	3	3	
CO5	Construct the concept of database connectivity	3	3	3	3	3	-	-	-	-	3	-	3	3	3	
Average		3	3	3	3	3	-	-	-	-	3	-	3	3	3	

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

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

R 2020

SEMESTER – IV

20IT423	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
	LABORATORY	0	0	3	1

**Prerequisite:** Programming for problem solving using C

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

CO1: Discuss about various sorting algorithms

CO2: Analyze various searching algorithms

CO3: Develop spanning tree algorithm

CO4: Construct shortest path algorithms

CO5: Construct Travelling salesman problem

**Cognitive Level**

Create

Analyze

Apply

Create

Apply

**List of Experiments:**

1. Implementation of Merge Sort Algorithm.
2. Implementation of Quick Sort Algorithm.
3. Implementation of Selection Sort Algorithm.
4. Implementation of Heap Sort Algorithm.
5. Implementation of Binary Search Algorithm.
6. Implementation of Minimum Spanning Tree Algorithm.
7. Implementation of Knapsack Algorithm.
8. Implementation of All Pair Shortest Path Algorithm.
9. Implementation of Eight Queens Problem.
10. Implementation of Travelling Salesman Problem

**Total = 45 Periods**

**CO PO MAPPING**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Discuss about various sorting algorithms	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO2	Analyze various searching algorithms	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO3	Develop spanning tree algorithm	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO4	Implement shortest path algorithms	3	2	2	1	-	-	-	-	2	-	1	2	3	2
CO5	Implement Travelling salesman problem	3	2	2	1	-	-	-	-	2	-	1	2	3	2
<b>Average</b>		<b>3</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2</b>	<b>-</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>2</b>

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

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

R 2020

SEMESTER - IV

20HR462

CAREER DEVELOPMENT SKILLS - II

L	T	P	C
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****[ 6 ]**

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

**UNIT - II QUANTITATIVE APTITUDE – PART 1****[ 6 ]**

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

**UNIT - III QUANTITATIVE APTITUDE – PART 2****[ 6 ]**

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

**UNIT - IV READING COMPREHENSION&WRITTEN COMMUNICATION –PART 3****[ 6 ]**

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****[ 6 ]**

Profit and Loss – Simple Interest &amp; 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



SEMESTER - IV

20HR462

CAREER DEVELOPMENT SKILLS - II

L	T	P	C
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  
 CO2: Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions  
 CO3: Enhance their skills on quantitative aptitude  
 CO4: Speak and write appropriately by understanding and applying the basic grammatical rules  
 CO5: Critically evaluate problems related to quantitative aptitude

Apply

Apply

Understand

Create

Apply

**UNIT - I VERBAL AND LOGICAL REASONING – PART 1****[ 6 ]**

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

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**UNIT - III QUANTITATIVE APTITUDE – PART 2****[ 6 ]**

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

**UNIT - IV READING COMPREHENSION&WRITTEN COMMUNICATION –PART 3****[ 6 ]**

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****[ 6 ]**

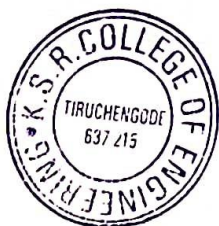
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- 2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2005.
- 3 M.B. Lal & Goswami, Objective Instant Arithmetic, Upkar Publications, New Delhi, second edition, 2012.
- 4 Norman Lewis. W.R., "Word Power Made Easy", Goyal Publications



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