K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
B.E. COMPUTER SCIENCE AND DESIGN
(REGULATIONS 2020)

Vision of the Institution

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

Mission of the Institution

IM 1	To inculcate in the students self-learning abilities that enable them to become competitive and considerate engineers, technologists, scientists, managers, administrators and entrepreneurs by diligently imparting the best of education, nurturing environmental and social needs.
IM 2	To foster and maintain mutually beneficial partnership with global industries and Institutions through knowledge sharing, collaborative research and innovation.

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

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

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

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

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

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

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

	Program Outcomes (POs)
PO1	**Engineering Graduates will be able to:** **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
	Program Specific Outcomes (PSOs)
PSO1	**Career through professional**: Acquire knowledge in several areas of Computer Science and Design to promote skills necessary for a profession, entrepreneurship and higher education.
PSO2	**Software design and development:** Ability to use appropriate tools and platforms successfully, as well as improve them, to produce applications/products for new media design in areas likes multimedia, animation, virtual reality and gaming.

	K.S.R. COLLEGE OF ENGINEERING (Autonomous) (Approved by AICTE & Affiliated to Anna University) K.S.R. Kalvi Nagar, Tiruchengode- 637 215	CURRICULUM UG R - 2020

Department	Department of COMPUTER SCIENCE AND DESIGN
Programme	B.E - Computer Science and Design

SEMESTER – I

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20EN151	Technical English – I (Common To All Branches)	HSMC	2	0	1	3	40	60	100
2.	20MA151	Engineering Mathematics – I (Common To All Branches)	BSC	3	1	0	4	40	60	100
3.	20CH051	Engineering Chemistry (Common To All Branches)	BSC	3	0	0	3	40	60	100
4.	20EE041	Basics of Electrical and Electronics Engineering (Common To AU, CE, CS, CSD IOT, IT, ME & SF)	ESC	3	0	0	3	40	60	100
5.	20CD111	Problem Solving Techniques with C Programming	ESC	3	0	0	3	40	60	100
MANDATORY COURSES										
6.	20MC151	Induction Program*	MC	0	0	0	0	-	-	-
7.	20GE051	தமிழ்மரபு/Heritage of Tamils	MC	3	0	0	1	40	60	100
PRACTICAL										
8.	20CH028	Chemistry Laboratory (Common To All Branches)	BSC	0	0	3	1	60	40	100
9.	20CD121	Problem Solving Techniques with C Programming Laboratory	ESC	0	0	3	1	60	40	100
10.	20AU127	Engineering Graphics Laboratory (Common To CE, CS, CSD, EC, EE & IT)	ESC	0	0	3	1	60	40	100
			Total	**17**	**1**	**10**	**19**		**800**	

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

SEMESTER – II

Sl.No.	Course Code	Course Name	Category	Hours/ Week			Credit	Maximum Marks		
				L	T	P	C	CA	ES	Total
THEORY										
1.	20EN251	Technical English –II (Common To All Branches)	HSMC	2	0	1	3	40	60	100
2.	20MA232	Discrete Mathematics (Common To CS, CSD, IOT & IT)	BSC	3	1	0	4	40	60	100
3.	20PH051	Engineering Physics (Common To All Branches)	BSC	3	0	0	3	40	60	100
4.	20CD211	Human Computer Interaction	PCC	3	0	0	3	40	60	100
5.	20IO241	Python Programming (Common To CSD & IOT)	ESC	3	0	0	3	40	60	100
MANDATORY COURSES										
6.	20MC052	Environmental Science and Engineering (Common To All Branches)	MC	3	0	0	0	-	-	-
7.	20GE052	தமிழரும்ததொழில்நுட்பமும்/ Tamils and Technology	MC	3	0	0	1	40	60	100
PRACTICAL										
8.	20PH028	Physics Laboratory (Common To All Branches)	BSC	0	0	3	1	60		100
9.	20GE028	Manufacturing Practices Laboratory	ESC	0	0	3	1	60		100
10.	20IO227	Python Programming Laboratory (Common To CSD & IOT)	ESC	0	0	3	1	60		100
		Total		**17**	**1**	**13**	**20**		**900**	

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Department	Department of COMPUTER SCIENCE AND DESIGN
Programme	B.E - Computer Science and Design

SEMESTER – III

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

SEMESTER – IV

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

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

<u>**SEMESTER - I**</u>

20EN151	**TECHNICAL ENGLISH – I**	L	T	P	C
	(Common to All Branches)	2	0	1	3

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

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

CO1:	*Comprehend and apply Grammar in context for professional communication*	*Understand*
CO2:	*Infer the gist and specific information.*	*Apply*
CO3:	*Discuss, express and interact in the society and place of study.*	*Create*
CO4:	*Critically interpret and comprehend a given text.*	*Evaluate*
CO5:	*Prioritize the listening skills for academic and professional purposes.*	*Apply*

UNIT – I   **[9]**

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

UNIT– II   **[9]**

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

UNIT– III   **[9]**

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

UNIT – IV   **[9]**

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

UNIT – V   **[9]**

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

                                                                                                           Total = 45 Periods

Text Books:

1   Meenakshi Raman, Technical Communication, Oxford University Press, New Delhi, First Edition, 2017

2   S.Sumant, Technical English – I, Vijay Nicole, Chennai, Second Edition, 2018

Reference Books:

1   Dr.P.Rathna, English Work Book – I, VRB Publishers Pvt. Ltd., Chennai, Second Edition, 2018

2   Seely, The Oxford Guide to Writing and Speaking, Oxford University Press, New Delhi, First Edition, 2016

3   M Ashra Rizvi, Effective Technical Communication, Tata McGraw Hill, New Delhi, First Edition,2005

4   P.Kiranmani Dutt, A course in Communication Skills, Cambridge University Press, New Delhi, First Edition, 2014

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E - COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20EN151   **Course Name:** TECHNICAL ENGLISH – I

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

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

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

<u>**SEMESTER – I**</u>

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

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

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

CO1:	*Interpret the concepts of Matrix applications in the field of engineering.*	*Understand*
CO2:	*Acquire knowledge in solving ordinary differential equations.*	*Evaluate*
CO3:	*Extend and apply the concepts of differential calculus problems.*	*Apply*
CO4:	*Develop the skills in solving the functions of several variables.*	*Remember*
CO5:	*Applying the concepts and solving the Vector Calculus problems.*	*Apply*

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

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

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

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

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

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

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

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

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

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

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

Text Books:

1 Ravish R Singh and Mukul Bhatt, Engineering Mathematics – I, McGraw Hill Publications, Fourth Edition, New Delhi, 2016.

2 Grewal B.S, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, Forty Third Edition, New Delhi, 2015.

Reference Books:

1 Bali N. P and Manish Goyal, Textbook on Engineering Mathematics, Laxmi Publications (p) Ltd., Seventh Edition, 2016.

2 H.K. Dass, Advance Engineering Mathematics, S. Chand and company, Eleventh Edition, 2015.

3 Jain R.K. and Iyengar S.R.K., - Advanced Engineering Mathematics, Narosa Publicaitons, Eighth Edition, 2012.

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

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DEPARTMENT OF COMPUTE SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

			REGULATION:		**R 2020**
COURSE CODE:	**20MA151**		**COURSE NAME:**		**ENGINEERING MATHEMATICS – I**

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

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

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

<u>**SEMESTER – I**</u>

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

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

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive Level*
CO1: *Make use of the manufacture, properties and uses of advanced engineering materials.*	*Understand*
CO2: *Explain the concept of corrosion and its control.*	*Understand*
CO3: *Use the concept of thermodynamics in engineering applications.*	*Understand*
CO4: *Recall the periodic properties such as ionization energy, electron affinity and electro negativity.*	*Remember*
CO5: *Analyze the usage of various spectroscopic techniques.*	*Understand*

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

Abrasives – Moh's scale of hardness – types – natural [Diamond] – synthetic [SiC]; Refractories – characteristics – classifications [Acidic, basic and neutral refractories] – properties – refractoriness – RUL – porosity – thermal spalling; Lubricants – definition – function – characteristics – properties – viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants – graphite and MoS_2; Nano materials – CNT– synthesis [CVD, laser evaporation, pyrolysis] – applications – medicine, electronics, biomaterials and environment.

UNIT–II   **ELECTROCHEMISTRY AND CORROSION**   **[9]**

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

UNIT–III   **CHEMICAL THERMODYNAMICS**   **[9]**

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

UNIT–IV   **ATOMIC STRUCTURE AND CHEMICAL BONDING**   **[9]**

Effective nuclear charge – orbitals – variations of s, p, d and f orbital – electronic configurations – ionization energy – electron affinity and electro negativity; Types of bonding – ionic, covalent and coordination bonding – hydrogen bonding and its types; Crystal field theory – the energy level diagram for transition metal complexes ($[Fe(CN)_6]^{3-}$, $[Ni(CN)_4]^{2-}$ and $[CoCl_4]^{2-}$ only); Role of transition metal ions in biological system; Band theory of solids.

UNIT – V   **PHOTOCHEMISTRY AND SPECTROSCOPIC TECHNIQUES**   **[9]**

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

Total = 45 Periods

Text Books:

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

Reference Books:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E- COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	REGULATION:	R 2020
COURSE CODE: **20CH051**	COURSE NAME:	**ENGINEERING CHEMISTRY**

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

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

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

<u>SEMESTER – I</u>

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

Prerequisite: *Engineering Mathematics, Engineering Physics*

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

UNIT – I　　　　ELECTRICAL CIRCUITS　　　　　　　　　　[9]

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

UNIT –II　　　　DC MOTOR AND TRANSFORMERS　　　　　　　[9]

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

UNIT –III　　　　AC MOTORS & SPECIAL MACHINES　　　　　　[9]

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

UNIT–IV　　　　MEASURING INSTRUMENTS　　　　　　　　　[9]

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

UNIT – V　　　　ANALOG AND DIGITAL ELECTRONICS　　　　　[9]

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

Total = 45 Periods

Text Books:

1　Smarajit Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI Learning Private Limited, New Delhi, Second Edition, 2007.

2　Jegathesan,V.,VinothKumar, K.,Saravanakumar,R., Basic Electrical and Electronics Engineering, Wiley India,NewDelhi,First Edition, 2012.

Reference Books:

1　Muthusubramanian,R., Salivahanan, S., and Muraleedharan, K.A., Basic Electrical, Electronics and Computer Engineering,Tata McGraw Hill, New Delhi, Second Edition, 2006.

2　Nagsarkar, T.K., and Sukhija M.S, Basics of Electrical Engineering, Oxford University press, New Delhi, Ninth Edition, 2005.

3　Mehta, V.K and Rohit Mehta, Principle of Electrical Engineering, S Chand & Company, New Delhi, Second Edition, 2008.

4　Mahmood Nahvi and Joseph A. Edminister, Electric Circuits, Schaum Outline Series, McGraw Hill, New Delhi, Fifth Edition, 2002.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E- COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: R 2020

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

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

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

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

<u>**SEMESTER – I**</u>

		L	T	P	C
20CD111	**PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING**	3	0	0	3

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

Course Outcomes: On Completion of this course, the student will be able to	**Cognitive Level**
CO1: Identify the basic concepts of problem solving	*Understand*
CO2: Choose the right data representation formats based on the requirements of the problem.	*Understand*
CO3: Explore the concepts of Statements, Array and Strings.	*Apply*
CO4: Illustrate the usage of Functions and Pointers.	*Evaluate*
CO5: Apply the concept of Structures and Files.	*Apply*

UNIT – I　　FUNDAMENTALS OF PROBLEM SOLVING　　[9]

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

UNIT – II　　FUNDAMENTALS OF C PROGRAMMING　　[9]

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

UNIT – III　　STATEMENTS, ARRAY AND STRING　　[9]

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

UNIT – IV　　FUNCTIONS AND POINTERS　　[9]

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

UNIT – V　　STRUCTURES, UNIONS AND FILES　　[9]

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

Total = 45 Periods

Text Books:

1　R.G.Dromey, How to Solve it by Computer, Pearson Education, India, 2008.

2　Herbert Schildt, C - The Complete Reference, Tata McGraw-Hill, New Delhi, Fourth Edition, 2017.

Reference Books:

1　PradipDey and Manas Ghosh, Fundamentals of Computing and Programming in C, Oxford University Press, Bengaluru, First Edition, 2013.

2　E.Balagurusamy, Programming in ANSI C, Tata McGraw-Hill, New Delhi, Sixth Edition, 2012.

3　Yashavant P. Kanetkar, Let Us C, BPB Publications, New Delhi, Seventeenth Edition, 2011.

4　Nptel.ac.in/courses/106104128/

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E- COMPTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Identify the basic concepts of problem solving.*	3	3	1	3	1	-	-	-	1	-	-	1	2	2
CO2	*Choose the right data representation formats based on the requirements of the problem.*	3	3	1	3	2	-	-	-	1	-	-	1	3	3
CO3	*Explore the concepts of Statements, Array and Strings.*	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	*Illustrate the usage of Functions and Pointers.*	3	2	2	2	2	-	-	-	1	-	-	1	3	2
CO5	*Apply the concept of Structures and Files.*	2	2	2	2	2	-	-	-	1	-	-	1	2	1
	Average	3	3	2	2	2	-	-	-	1	-	-	1	3	2

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

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

<u>SEMESTER – I</u>

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

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

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

CO1:   *Involve in physical activity, creative arts and culture and feel comfortable in the new environment.*   *Understand*

CO2:   *Build relationship between teachers and students and make familiarizing with departments.*   *Understand*

CO3:   *Concentrate on literary activities.*   *Apply*

CO4:   *Develop the required skills through lectures and workshops.*   *Remember*

CO5:   *Acquire skills in extracurricular activities.*   *Analyze*

List of activities during the three weeks Students Induction Programme (SIP):   **3 Weeks**

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

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

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

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

MODULE V: LITERARY ACTIVITIES
- Literary activity would encompass reading a book, writing a summary, debating, enacting a play etc.

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

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

MODULE VIII: EXTRA CURRICULAR ACTIVITIES

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

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: R 2020

COURSE CODE: **20MC151**   COURSE NAME: **INDUCTION PROGRAMME**

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

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

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

SEMESTER - I

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

Prerequisite(s): No prerequisites are needed for enrolling into the course

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

CO1:	Recognize the extensive literature of Tamil and its classical nature.	Understand
CO2:	Apprehend the heritage of sculpture, painting and musical instruments of ancient people.	Understand
CO3:	Review on folk and martial arts of Tamil people.	Understand
CO4:	Insight thinai concepts, trade and victory of Chozha dynasty.	Understand
CO5:	Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.	Understand

UNIT - I   **LANGUAGE AND LITERATURE**   **[03]**

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

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

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

UNIT - III   **FOLK AND MARTIAL ARTS**   **[03]**

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

UNIT - IV   **THINAI CONCEPT OF TAMILS**   **[03]**

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

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

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

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

Text Books:

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

Reference Books :

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

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

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

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

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

<u>SEMESTER - I</u>

20GE051	தமிழர்மரபு	L	T	P	C
	(அனைத்FFனைகளுக்கும்ப பொFவொனைF)	1	0	0	1

முன்கூட்டியFறைசொர்அறிவு : ததறைஇல்றல

	தொடம்கைத்திஎைவினைவுகை : தொடத்னதபவஎறிகரகமொகைக்றுமுடித்தபிஎ�॒பு, மொணவர்கைொல்முடியும்வினைவுகை	அறிஎ॒ொஎ॒ை஗॒ல் நிறல
CO1:	தமிழ்தமொழியின்தசந்ததன்றமஎ஗்றும்இலக்கியம்குறித்தததரிதல்	புரிதல்
CO2:	தமிழர்களின்சிஎ॒பக்கறல , ஒவியக்கறலஎ஗்றும்இறசக்கருவிகள்குறித்தததளிவு	புரிதல்
CO3:	தமிழர்களின்நொட்டுப்புறரக்கறலகள்எ஗்றும்வீரவிறளயொட்டுகள்குறித்தததளிவு	புரிதல்
CO4:	தமிழர்களின்திறைக்தகொட்பொடுகள், சங்ககொலஎை஗இகம்எ஗்றும்தசொழர்களின்தஎை஗றிகள்குறித்தத கைஎ்கள் .	புரிதல்
CO5:	இந்தியததசியஇயக்கம், சுயமரியொறதஇயக்கம்எ஗்றும்சித்தமருத்தைம்பஎ஗றியபுரிதல்.	புரிதல்

அலகு – I　பமொழி எ஗்றும் இலக்கியம்　　　　　　　　　　　**[03]**

இந்திய தமொழிக் குடும்பங்கள் – திரொவிட தமொழிகள்–தமிழ் ஒரு தசம்தமொழி – தமிழ் தசச்விலயக்கிகியங்கள் – சங்க இலக்கியத்தின் சமயச்சொர்பை஗஗ை தன்றம – சங்க இலக்கியத்தில் பகிர்தல் ஐம் – திருக்குஎைஎ஗ில் தமலொஎை஗றமக் கருத்Fக்கள் – தமிழ் கொப்பியங்கள், தமிழகத்தில் சமைதபௌத்த சமயங்களின் தொக்கம் – பக்தி இலக்கியம், ஆழ்எ஗ொர்கள் எ஗்றும் நொயன்மொர்கள் – சிஎை஗றிலகியங்கள் தமிழில் நவீன இலக்கியத்தின் எைர்ச்சி – தமிழ் இலக்கியஎைளர்ச்சியில் பொரதியொர் எ஗்றும் பொரதிதொசன் ஆகிதயொரின் பங்களிப்பு.

அலகு – II　மரபு – தொனை ஒவியங்கை முதல் நவீஎ஗ ஒவியங்கை வனரா – சிஎ஗஗ க் கனல　　　　　　　　**[03]**

நடுகல் முதல் நவீன சிஎ஗஗ங்கள் எைறா – ஐம்தபொன் சிறலகள் – பழங்குடியினர் எ஗்றும் எைர்கள் தயொரிக்கும் றகவிறனப் தபொருட்கள், தபொஎ஗றமகள் – ததர் தசய்யும் கறல – சுடுமஎ஗ சிஎ॒பங்கள் – நொட்டுப்புஎைத் ததய்எை஗ங்கள் – குமரிமுனியில் திருஎை஗ள்ளுஎைர் சிறல –

இறச கருவிகள் – மிருதங்கம், பறை,வீறை,யொழ்,நொதஸ்எைரம் – தமிழர்களின் சமூகதபொருஎைொதொர எை஗ொழ்வில் தகொவில்களின் பங்கு.

அலகு – III　நொட்டு புஎை஗க் கனலஎைக் எ஗்றும் வீர வினையொட்டுக்கை　　　　　　**[03]**

ததருக்கூத்F, கரகொட்டம், வில்லுப்பொட்டு, கையொன் கூத்F, ஒயிலொட்டம், ததொல்பொறை**க்** கூத்F, சிலம்பொட்டம், எைரி, புலியொட்டம், தமிழர்களின் விறளயொட்டுகள்.

அலகு – IV　தமிழர்எகிஎ஗ தினணக் ககொட்ᴇ பொடுகை　　　　　　　　**[03]**

தமிழகத்தின் தொஎைரங்களும், விலங்குகளும் – ததொல்கொப்பியம் எ஗்றும் சங்க இலக்கியத்தில் அகம் எ஗்றும் புஎை஗க் தகொட்பொடுகள் – தமிழர்கள் தபொஎ஗றிய ஐக்தகொட்பொடு - சங்கக்கொலத்தில் தமிழகத்தில் எழுத்தறிவும் கல்வியும் – சங்ககொல நகரங்களும் Fறை முகங்களும் – சங்ககொலத்தில் எஎ஗றுமதி எ஗்றும் இைக்குமதி – கடல் கடந்த நொடுகளில் தசொழர்களின் தைஎை஗றி.

அலகு – V　இந்திய கதசிய இயக்கம் எ஗்றும் இந்திய ண் தொட்டிஎை஗குத் தமிழர்எகிஎ஗ ங்கஎ ᴇ பு　　　　　　**[03]**

இந்திய விடுதறலப்தபொரில் தமிழர்களின் பங்கு – இந்தியொவின் பிஎ஗பகுதிகளில் தமிழ் பைப்பொட்டின் தொக்கம் – சுயமரியொறத இயக்கம் – இந்திய மருத்Fஎைத்தில் சித்தமருத்Fஎைத்தின் பங்கு கல்ைைட்டுகள் றகதயழுத்F'ப்படிகள் - தமிழ்ப் புத்தகங்கள்களின் அச்சு ைைரலொறு.

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

Text Books :

1   தமிழகைரலொறு-மக்களும்பைப்பொடும்-

     தகதகபிள்றள(தைளியீடுதமிழ்நொடுபொடநூல்மைற்றும்கல்வியில்பைபிகள்கழகம்) ,உலக த்தமிழொரொய்ச்சிநிறுைனம், தசன்றன, **2002**

2   கைகினித்தமிழ்முறைனர்இல. சுந்தரம், விகடன்பிரசுரம், 2016

Reference Books :

1   கீழடி-ைறகநதிக்கறரயில்சங்ககொலநகரநொகரிகம்.(தைதொல்லியல்Fைறைதைளியீடு)

2   தபொருறந– ஐஆைைஙகறரநொகரிகம் (தைதொல்லியல்Fைறைதைளியீடு)

3   Social Life of Tamils (Dr.K.K.Pillay) A joint Publication of TNTB & ESC and RMRL – (in print)

4   Social Life of the Tamils – The Classical Period (Dr.S.Sigaravelu) (Published by: International Institute of Tamil Studies).

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

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation:	R 2020

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	தமிழ்தமொழியின்சந்ததன்ம ற மைந்றும்இலக்கியம்குறித்த ததரிதல்	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2:	தமிழர்களின்சிலைப்பக்கறல , ஓவியக்கறலைமைந்றும்இறசக் க ருவிகள்குறித்தததளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3:	தமிழர்களின்நொட்டுப்புறரக்க றலகள்மைந்றும்வீரவிறளயொட் டுகள்குறித்தததளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4:	தமிழர்களின்திறைக்தகொட்ப தெொடுகள், சங்ககொலைலைஇகம்மைந்றுமைச த தெொழர்களின்தைலைஇறிகள் குறித்த தகைல்கள் .	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5:	இந்தியததசியஇயக்கம், சுயமரியொறதஇயக்கம்மைந்று மசித்தமருத்தைம்ம்பைறியபுரி தல்.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	-	-	-	-	-	-	3	3	-	2	-	3	-	-

1. சிறிF (குறைந்த)2. மிதமொன (நடுத்தர) 3. கைசமொன (உயர்)

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

<u>**SEMESTER – I**</u>

| 20CD421 | **CHEMISTRY LABORATORY**
(Common To All Branches) | L T P C
0 0 3 1 |

Prerequisite: Knowledge of Engineering Chemistry

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

CO1: *Apply the principle of conductometric titration.* 　　　　　　　*Understand*

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.*

LIST OF EXPERIMENTS:

1. Conductometric Titration – Strong Acid Vs. Strong Base.

2. Conductometric Titration – Mixture of Weak and Strong Acids Vs. Strong Base.

3. Conductometric Titration – Precipitation, $BaCl_2$ Vs. Na_2SO_4.

4. Estimation of Ferrous ion by Potentiometry – Fe^{2+} Vs $K_2Cr_2O_7$.

5. Estimation of Hydrochloric Acid by pH metry.

6. Estimation of Iron by Spectrophotometry.

7. Estimation of hardness in water by EDTA method.

8. Estimation of chloride in water sample by Argentometry.

9. Estimation of dissolved oxygen (DO) in water by Winkler's method.

10. Determination of rate of corrosion of mild steel by weight loss method.

Total : 30 Periods

Text Book:

1　Department of Chemistry Staff members, Chemistry Laboratory Manual, K.S.R. College of Engineering, Tiruchengode, Fourth Edition, 2020.

2　I. Vogel, Vogel's Textbook of Quantitative Chemical Analysis, John Wiley & sons, New York, Eighth Edition, 2014.

Reference Books:

1　S. K. Bhasin and Sudha Rani, Laboratory Manual of Engineering Chemistry, Dhanpat Rai Publishing Company Private Limited, New Delhi, Third Edition, 2012.

2　I. Vogel and J. Mendham, Vogel's Textbook of Quantitative Chemical Analysis, Harlow, Prentice Hall, Sixth Edition, 2000.

3　G.H. Jeffery, J. Bassett, J. Mendham and R.C. Denny, Vogel's Text book of quantitative analysis chemical analysis, Longman, Singapore publishers, Singapore, ELBS Fifth Edition, 1996.

4　B.S. Furniss, A.J, Hannaford, P.W.G. Smith and A.R.Tatchel, Vogels Textbook of practical organic chemistry, John Wiley & sons, Newyork, Fifth Edition, 1989.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

		Regulation:	R 2020
Course Code:	20CH028	Course Name:	CHEMISTRY LABORATORY

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

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

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

<u>**SEMESTER – I**</u>

20CD121	**PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING LABORATORY**	L	T	P	C
		0	0	3	1

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

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

CO1:	*Illustrate the basic concepts of MS Office. Build the knowledge of flowchart and create the fundamentals of algorithm.*	*Apply*
CO2:	*Build code segments for handling control and looping statements.*	*Apply*
CO3:	*Identify the allocation of static and dynamic memory and its utilization.*	*Understand*
CO4:	*Consume the knowledge of string handling functions.*	*Apply*
CO5:	*Demonstrate use of pointers, structures and files handling functions.*	*Understand*

LIST OF EXPERIMENTS:

1. Prepare a Bio-data using MS Word with appropriate page, text and table formatting options and send the same too many recipients using mail merge.

2. Prepare a mark sheet with five subjects for five students in MS Excel File using Formulas, Functions and Charts.

3. i) Prepare a Power Point presentation for your organization with varying animation effects using timer.
   ii) Prepare a Student Database in MS Access, manipulate the data and generate report.

4. Design an algorithm and execute the flowchart for count the digits and character of the input.

5. Design an algorithm to execute the flowchart for produce various sequence of numbers like Fibonacci.

6. Controls statements and Decision-making constructs.

7. Single and Multidimensional array.

8. String and String handling functions.

9. Functions and Recursion, call by value and call by reference

10. Pointers

11. Structures and unions

12. Files and File handling functions.

Total : 45 Periods

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

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	Regulation:	R 2020
Course Code: 20CD121	Course Name:	PROBLEM SOLVING TECHNIQUES WITH C PROGRAMMING LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Illustrate the basic concepts of MS Office. Build the knowledge of flowchart and create the fundamentals of algorithm.*	3	3	3	2	3	-	-	-	1	-	-	1	2	1
CO2	*Build code segments for handling control and looping statements.*	3	2	3	1	3	-	-	-	1	-	-	1	2	1
CO3	*Identify the allocation of static & dynamic memory and its utilization.*	3	3	3	2	3	-	-	-	1	-	-	1	3	2
CO4	*Consume the knowledge of string handling functions.*	3	3	3	1	3	-	-	-	1	-	-	1	2	1
CO5	*Demonstrate use of pointers, structures and files handling functions.*	3	3	2	2	3	-	-	-	1	-	-	1	1	2
	Average	3	3	3	2	3	-	-	-	1	-	-	1	2	2

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

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

<u>**SEMESTER - I**</u>

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

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

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

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

List of Experiments:

1. Study of basic tools, commands and coordinate system (absolute, relative, polar, etc.) used in 2D software.

2. Draw the conic curves and special curves by using AutoCAD.

3. Draw the front view, top view, side view of objects from the given pictorial view.

4. Draw the projections of straight lines.

5. Draw the projections of polygonal surface.

6. Draw the projections of simple solid objects.

7. Draw the sectional view and the true shape of the given section.

8. Draw the development of surfaces like prism, pyramids, cylinders and cone.

9. Draw the isometric projections of simple solids, truncated prism and pyramids.

10. Draw the isometric projections of cylinder and cone.

Total : 45 Periods

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

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20AU127**

Course Name: **ENGINEERING GRAPHICS LABORATORY**

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

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

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

SEMESTER – II

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

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

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: Infer and apply the enriched vocabulary, by knowing the basic grammatical structure, in academic and professional contexts.	*Understand*
CO2: Identify and use Standard English in diverse situations.	*Apply*
CO3: Interpret by reading a text and comprehend a given text.	*Create*
CO4: Organize and compose business letters.	*Evaluate*
CO5: Prioritize the listening skill for academic and personal development purposes.	*Apply*

UNIT – I   **[9]**

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

UNIT – II   **[9]**

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

UNIT – III   **[9]**

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

UNIT – IV   **[9]**

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

UNIT – V   **[9]**

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

Total = 45 Periods

Text Books:

1 Dr.S.Sumant, Technical English II, Tata McGraw Hill, New Delhi, Second Edition, 2016

2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2004.

Reference Books:

1 Michael Swan, Practical English Usage, Oxford University Press, New Delhi, First Edition, 2015.

2 Dept. of Humanities and social sciences, Anna University, Chennai, English for Engineers and Technologists, Orient Longman, First Edition, 2014

3 Hory Sankar Mukerjee, Business Communication, Oxford University Press, New Delhi, First Edition,2013.

4 Department of English, English for Technologists and Engineers, Orient Black Swan, Chennai, First Edition, 2016

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

		Regulation:	R 2020
Course Code:	20EN251	Course Name:	TECHNICAL ENGLISH – II

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

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

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

SEMESTER – II

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

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

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

CO1:	Solve logical problems.	Understand
CO2:	Construct algorithms and derive complexities.	Understand
CO3:	Acquire the knowledge of sets that are required for developing computational models.	Remember
CO4:	Solving computational operations associated with functions.	Understand
CO5:	Apply the concepts of Graph theory and Combinatory in network algorithms.	Apply

UNIT – I   PROPOSITIONAL CALCULUS   [12]

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

UNIT – II   PREDICATE CALCULUS   [12]

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

UNIT – III   SET THEORY   [12]

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

UNIT – IV   FUNCTIONS   [12]

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

UNIT – V   GRAPH THEORY AND COMBINATORICS   [12]

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

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

Text Books:

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

Reference Books:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20MA232   **Course Name:** **DISCRETE MATHEMATICS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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	-	-	-	-	-	-	-	-	-	-
	Average	3	3	3	3	-	-	-	-	-	-	-	-	-	-

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

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

SEMESTER – II

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

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

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

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

UNIT – I   ACOUSTICS AND ULTRASONICS   [9]

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

UNIT – II   LASER TECHNOLOGY   [9]

Introduction – Principle of Spontaneous emission and stimulated emission – Population inversion, pumping – Einstein's A and B coefficients (derivation). Types of lasers – Nd-YAG, CO_2 and Semiconductor lasers (homo-junction and hetero-junction) – Qualitative Industrial Applications: Lasers in welding, heat treatment and cutting – Medical applications – Holography (construction and reconstruction of images).

UNIT – III   CRYSTAL PHYSICS   [9]

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

UNIT – IV   QUANTUM PHYSICS   [9]

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

UNIT – V   OPTOELECTRONIC DEVICES   [9]

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

Total = 45 Periods

Text Books:

1 M.N. Avadhanulu and P.G. Kshirsagar, A text book of Engineering Physics, S. Chand and Company, New Delhi, seventh Edition, 2014.

2 R.K.Gaur & S.L.Gupta, Engineering Physics, Dhanpat Rai Publication, New Delhi, seventh Edition, 2014.

Reference Books:

1 D. Halliday, R. Resnick and J. Walker, Fundamentals of Physics, John Wiley & sons, USA, ninth Edition, 2011.

2 V. Rajendran, Engineering Physics, Tata McGraw Hill, New Delhi, first Edition, 2011.

3 R. A. Serway and J. W. Jewett, Physics for Scientists and Engineers with Modern Physics, ninth edition, Cengage Learning, USA, 2013.

4 Arthur Beiser, Concepts of Modern Physics, Tata McGraw Hill, New Delhi, sixth Edition, 2010.

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

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20PH051**   **Course Name:**   **ENGINEERING PHYSICS**

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

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

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

<u>**SEMESTER – II**</u>

		L	T	C
20CD211	**HUMAN COMPUTER INTERACTION**	3	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: Describe the foundations of Human Computer Interaction.	*Understand*
CO2: Infer with the design technologies and software process.	*Understand*
CO3: Apply the concepts of human interaction models and theories.	*Apply*
CO4: Design effective HCI for individuals and persons with disabilities	*Apply*
CO5: Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.	*Understand*

UNIT – I   FOUNDATIONS OF HCI   **[9]**

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

UNIT – II   DESIGN AND SOFTWARE PROCESS   **[9]**

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

UNIT – III   MODELS AND THEORIES   **[9]**

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

UNIT – IV   MOBILE HCI   **[9]**

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

UNIT – V   WEB INTERFACE DESIGN   **[9]**

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

Total = 45 Periods

Text Books:

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

Reference Books:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Describe the foundations of Human Computer Interaction.*	2	3	1	-	2	2	-	-	1	-	1	2	2	2
CO2	*Infer with the design technologies and software process.*	3	3	3	-	2	1	-	-	1	-	1	3	2	2
CO3	*Apply the concepts of human interaction models and theories .*	2	3	3	-	3	1	-	-	1	-	1	3	2	2
CO4	*Design effective HCI for individuals and persons with disabilities*	3	3	3	-	3	1	-	-	1	-	1	2	2	2
CO5	*Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.*	3	3	3	-	2	3	-	-	1	-	1	2	2	2
	Average	**3**	**3**	**3**	-	2	1	**-**	**-**	1	-	1	**2**	**2**	2

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

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

<u>**SEMESTER – II**</u>

	PYTHON PROGRAMMING	L	T	P	C
20IO241	(Common to CSD & IOT)	3	0	0	3

Prerequisite: Basic knowledge of C programming.

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: *Illustrate basic concepts of python programming.*	*Understand*
CO2: *Apply the necessary data structures includes list, tuple and dictionary in the required fields and exception handling.*	*Apply*
CO3: *Analyze, design and implement the problems using OOP concepts.*	*Analyze*
CO4: *Demonstrate the simple file operations and data manipulation techniques.*	*Understand*
CO5: *Design web site using python GUI.*	*Apply*

UNIT – I   **FUNDAMENTALS OF PYTHON**   **[9]**

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

UNIT – II   **COLLECTIONS AND EXCEPTIONS**   **[9]**

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

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

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

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

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

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

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

Total = 45 Periods

Text Books:

1   Paul Barry, Head First Python: A Learner's Guide to the Fundamentals of Python Programming, A Brain-Friendly Guide, a Shroff/O'Reilly; Third edition, 2023.
2   Karl Beecher, Computational Thinking: A Beginner's Guide to Problem Solving and programming, , BCS Learning & amp, Development Limited, First Edition, 2017.

References:

1   Yashwant Kanetkar, Aditya Kanetkar, Let Us Python BPB Publications, First Edition,2023.
2   Allen B. Downey, Think Python, O'Reilly Media, California, Second Edition, 2016.
3   Bill Lubanovic, Introducing Python Modern Computing in Simple Packages, O'Reilly Media, California, Second Edition, 2019
4   David Beazley, Brian K. Jones, Python Cookbook, O'Reilly Media, California, Third Edition, 2013
5   Mark Lutz, Python Pocket Reference, O'Reilly Media, California, Fifth Edition, 2014

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

		Regulation:		**R 2020**

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

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

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

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

<u>**SEMESTER – II**</u>

ENVIRONMENTAL SCIENCE AND ENGINEERING   L   T   P   C

20MC052   (Common to All Branches)   3   0   0   0

Prerequisite: No prerequisites are needed for enrolling into the course

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

CO1:	Interpret the importance in conservation of resources for future generation.	Understand
CO2:	Relate the importance of ecosystem and biodiversity.	Remember
CO3:	Analyze the impact of pollution and hazardous waste in a global and societal context.	Understand
CO4:	Identify the contemporary issues that result in environmental degradation that would attempt to provide solutions to overcome the problems.	Understand
CO5:	Predict the concept of Sustainability and Green Chemistry.	Understand

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

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

UNIT – II   ECOSYSTEM AND BIODIVERSITY   [9]

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

UNIT– III   ENVIRONMENTAL POLLUTION   [9]

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

UNIT– IV   SOCIAL ISSUES AND ENVIRONMENT   [9]

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

UNIT– V   SUSTAINABILITY AND GREEN CHEMISTRY   [9]

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

Total = 45 Periods

Text Book:

1   Dr. T. Arun Luiz, Environmental Science and Engineering, S.Chand & Company Private Limited, New Delhi, First Edition, 2016.

2   Anubha Kaushik and C. P. Kaushik, Environmental Science and Engineering, New Age International Publishers, Chennai, Fifth Edition, 2016.

Reference Books:

1   G. Tyler Miller and Scott E. Spoolman, Environmental Science, Cengage Learning India Private Limited, New Delhi, Fourteenth Edition, 2014.

2   Dr. A. Ravikrishnan, Environmental Science and Engineering, Sri krishna Hi-tech Publishing Company Private Limited, Chennai, Tenth Edition, 2014.

3   Raman Sivakumar, Introduction to Environmental Science and Engineering, Tata McGraw Hill Education Private Limited, Fourth Edition, 2012.

4   S S. Dara, A Text book of Environmental Chemistry and pollution control, S. Chand & Company Limited, New Delhi, Tenth Edition, 2005.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	Regulation:	R 2020
Course Code: 20MC052	**Course Name:**	ENVIRONMENTAL SCIENCE AND ENGINEERING

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

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

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

<u>SEMESTER - II</u>

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

Prerequisite(s): *No prerequisites are needed for enrolling into the course*

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

CO1:	*Understand the weaving and ceramic technology of ancient Tamil People nature.*	*Understand*
CO2:	*Comprehend the construction technology, building materials in sangam Period and case studies.*	*Understand*
CO3:	*Infer the metal process, coin and beads manufacturing with relevant archeological evidence*	*Understand*
CO4:	*Realize the agriculture methods, irrigation technology and pearl diving.*	*Understand*
CO5:	*Apply the knowledge of scientific Tamil and Tamil computing.*	*Apply*

UNIT - I   WEAVING AND CERAMIC TECHNOLOGY   [03]

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

UNIT - II   DESIGN AND CONSTRUCTION TECHNOLOGY   [03]

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

UNIT - III   MANUFACTURING TECHNOLOGY   [03]

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

UNIT - IV   AGRICULTURE AND IRRIGATION TECHNOLOGY   [03]

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

UNIT - V   SCIENTIFIC TAMIL & TAMIL COMPUTING   [03]

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

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

Text Books:

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

Reference Books:

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

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

Regulation: R 2020

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Understand the weaving and ceramic technology of ancient Tamil People nature.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	Comprehend the construction technology, building materials in sangam Period and case studies.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	Realize the agriculture methods, irrigation technology and pearl diving.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	Apply the knowledge of scientific Tamil and Tamil computing.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	-	-	-	-	-	-	3	3	-	2	-	3	-	-

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

SEMESTER - II

20GE052	தமிழரும் பதொழில் நுட் மும் (அனைத்F Fனைகளுக்கும் ப ொF்வொனை◌F)	L	T	P	C
		1	0	0	1

முை◌கூட்டிய Fனைசொர்அறிவு : ததைஇல்றல

ொடம்கை்கை்திை◌்விை◌வுகை் ொட்னதபவை்றிகரகமொகக்ழுமுடித்தபிை◌்பு, மொணவர்ைகொல்முடியும்விை◌வுகை்	:	அறிை◌ொை◌ ை◌ல் நிறல

CO1:	சங்ககொலத்தமிழிர்களின்தநசவும்றும்பொறை◌றனதல்த த ொழில்நுட்பம்குறித்Fக்றுை◌ர்தல்	புரிதல்
CO2:	சங்ககொலத்தமிழிர்களின்கட்டிடததொழில்நுட்பம்கட்டுமொன தபொருட்கள்ம்றும்அை◌ை◌றைவிளகும்தளங்கள்குறித்Fஅறி வு	புரிதல்
CO3:	சங்ககொலத்தமிழிர்களின்உதலொகத்ததொழில், நொை◌யங்கள்ம்றும்ை◌மிகள்சொர்ந்ததொல்லியல்சொன்றுக ள்ப்றிய அறிவு	புரிதல்
CO4:	சங்ககொலத்தமிழிர்களின்ைதளொை◌ை◌றம, நீர்ப்பொசனமுறைகள்ம்றும்முத்Fகுளித்தல்குறித்ததைளி வு	புரிதல்
CO5:	நவீனஅறிவியல்தமிழ்ம்றும்கன்னிதமிழ்குறிதபுரிந்Fகொ ் தொள்ளும்ம்றும்பயன்படுத்தலும்	பகுப்பொய்வு

அலகு – I	**பநசவு ம்றும் ொை◌னத் பதொழில்நுட் ம்**	**[03]**

சங்ககொலத்தில்தநசவுத்ததொழில்–
பொறை◌னத்ததொழில்நுட்பம்கருப்புசிை◌்புபொை◌◌டங்கள்–
பொை◌◌டகளில்கீை◌ல்குறியீடுகள்

அலகு – II	**வடிவனம ்பும்ம்றும்கட்டிடத்பதொழில்நுட் ம்**	**[03]**

சங்ககொலத்தில்ை◌டிை◌றமப்புஉம்றும்கட்டுமொனங்கள்&சங்ககொலத்தில்வீட்டுப்தபொருட் களில்ை◌டிை◌றமப்பு–   சங்ககொலத்தில்கட்டுமொனத்தபொருட்களும்நடுகல்லும்–
சிலப்பதிகொரத்தில்தமறடஅறமப்புை◌ற்றியவிை◌ரங்கள்–மொமல்லபுரச்சிை◌◌பங்களும்,
தகொவில்களும்–
ததொழர்கொலத்F்தபருங்கொயில்கள்ம்றும்பிை◌ை◌ழிபொட்டுத்தலங்கள்–
நொயக்கர்கொலக்தகொயில்கள்–மொதிரிகட்டறமப்புகள்ப்றிஅறிதல்,
மFறரமீனொட்சிஅம்மன்ஆலயம்ம்றும்திருமறலநொயக்கர்மஹொல்–
தசட்டிநொட்டுவீடுகள்–பிரிட்டிஷ்கொலத்தில்தசன்றனஇந்ததொ-
சொதரொதசனிக்கட்டிடக்கறல.

அலகு – III	**ை◌ை◌ ்த்தித்பதொழில்நுட் ம்**	**[03]**

கப்பல்கட்டும்கறல–உதலொகவியல்–இரும்புத்ததொழிலை◌◌சொரல–இரும்றபஉருக்குதல்,
எஃகு–ை◌ரலொை◌◌றுச்சொன்றுகளொகதசம்புஉம்றும்தங்கநொை◌யங்கள்–
நொை◌யங்கள்அச்சடித்தல்–மைஉருை◌ை◌க்கும்ததொழிலை◌◌சொரலகள்–கல்மைிகள்–
கை்◌ை◌ொடிமைிகள்–சுடும்மைிகள்–சங்குமைிகள்–எலும்புFை◌◌டுகள்–
ததொல்லியல்சொன்றுகள்–சிலப்பதிகொரத்தில்மைிகளின்றைகள்.

அலகு – IV	**கைவொண்னமம்றும்நீர் ொை◌சைத்பதொழில்நுட் ம்**	**[03]**

அறை,ஏரி,குளங்கள்,மதகு–தசொழர்கொலகுமிழித்தூம்பின்முக்கியத்Fை◌◌ம்–
கொல்நறடபரொமரிப்பு–கொல்நறடகளுக்கொகைடிறை◌றமக்கப்பட்டகிை◌◌றுகள்–
ைதளொை◌◌றமம்றும்தைளொை◌◌றமசொர்ந்ததசயல்பொடுகள்–கடல்சொர்அறிவு–
மீன்ை◌ளம்–முத்Fம்றும்முத்Fக்குளித்தல்–தபருங்கடல்குறித்தைப்றடயஅறிவு–
அறிவுசொர்சமூகம்.

அலகு – V	**அறிவியல்தமிழ்ம்றும்றைகினித்தமிழ்**	**[03]**

அறிவியல்தமிழின்ைஎளர்ச்சி–

கைனித்தமிழ்ைஎளர்ச்சி
– தமிழ்நூல்கறளமின்பதிப்புதசய்தல்–தமிழ்தமன்தபொருட்கள்உருைஒொக்கம்–
தமிழ்இறையக்கல்விக்கழகம்–தமிழ்மின்நூலகம்–
இறையத்தில்தமிழ்அகரோதிகள்தசொைஒ்குறைத்திட்டம்.

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

Text Books :

1 தமிழகைரலொனு- மக்களும்பைபொடும்- தகதகபிள்றள (தைளியீடுதமிழ்நொடுபொடநூல்மம்றும்கல்வியில்பைபிகள்கழகம்)

2 கைகினித்தமிழ் - முறனைர்இல. சுந்தரம் (விகடன்பிரசுரம்)

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20GE052

Course Name: தமிழரும்பதொழில்நுட் மும்/TAMILS AND TECHNOLOGY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	சங்ககொலத்தமிழிர்களின்தநச வும்மற்றும்பொறனைறனதல்ததொ ழில்நுட்பம்குறித்Fகைக்றுரைர்தல்	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2:	சங்ககொலத்தமிழிர்களின்கட்டி டதொழில்நுட்பம்கட்டுமொனப த பொருட்கள்மம்றும்அைமை்றைவி ளைகும்தளங்கள்குறித்Fஅறிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3:	சங்ககொலத்தமிழிர்களின்ஊல த பொகத்ததொழில், நொயைங்கள்மம்றும்மைைகள்ச பொர்ந்ததொல்லியல்சொன்றுகள்ப ைம்ப்றியஅறிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4:	சங்ககொலத்தமிழிர்களின்தைள பொைம்றம, நீர்ப்பொசனமுறைகள்மம்றும்மு த்Fகுளித்தல்குறித்ததஙைிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5:	நவீனஅறிவியல்தமிழ்மம்றும்க ன்னிதமிழ்குறித்தபுரிந்Fதொகொள் ளளும்மம்றும்பயன்படுத்தலும்	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**3**	**-**	**2**	**-**	**3**	**-**	**-**

1. சிறிF (குறைந்த)2. மிதமொன (நடுத்தர) 3. கைசமொன (உயர்)

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: *Knowledge in Engineering Physics*

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

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

List of Experiments in Physics Laboratory

1. Determination of wavelength of Laser using grating and the Size of the Particles.

2. Determination of thickness of the given material by Air – wedge method.

3. Determination of velocity of Ultrasonic waves and compressibility using Ultrasonic interferometer.

4. Spectrometer grating - Determination of wavelength of mercury spectrum.

5. Determination of thermal conductivity of a bad conductor by Lee's disc method.

6. Determination of Young's modulus of the material of a uniform bar by Non – Uniform bending method.

7. Determination of Band gap energy of a semiconductor.

8. Determination of Viscosity of a given liquid by Poiseuille's method.

9. Torsional pendulum - Determination of rigidity modulus of a given wire.

10. V-I Characteristics of Solar Cell.

Total : 30 Periods

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

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20PH028   **Course Name:** PHYSICS LABORATORY

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

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

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

<u>**SEMESTER – II**</u>

20GE028   **MANUFACTURING PRACTICES LABORATORY**   L T P C
(Common to All Branches)   0 0 3 1

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

GROUP A (CIVIL & MECHANICAL)

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

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

CO2: *Perform welding practice to join simple structures.*   *Apply*

CO3: *Practice simple operations in lathe and drilling machine.*   *Understand*

LIST OF EXPERIMENTS

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

LIST OF EQUIPMENT

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

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B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20GE028   Course Name: **MANUFACTURING PRACTICES LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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)

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

SEMESTER – II

| 20GE028 | **GROUP B (ELECTRICAL & ELECTRONICS)**
(Common to all Branches) | L T P C
0 3 1 |

Prerequisite: No prerequisites are needed for enrolling into the course

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

CO1:	Construct different types of wiring used in house.	Understand
CO2:	Calibrate single phase Energy meter.	Understand
CO3:	Demonstrate different electronic components, logic gates and CRO.	Understand

List of Experiments:
ELECTRICAL ENGINEERING

1. Fluorescent lamp wiring & Stair-case wiring.

2. Residential house wiring using switches, fuse, indicator, lamp and fan.

3. Calibration of Single phase Energy meter

ELECTRONICS ENGINEERING

1. Study of Electronic components and Soldering practice.

2. Study of logic gates AND, OR, EX-OR, NOT, Half and Full Adder.

3. Study of CRO

Total : 45 Periods

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B.E – COMPUTER SCIENCE AND DESIGN
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Regulation: **R 2020**

Course Code: 20GE028   **Course Name:**   **MANUFACTURING PRACTICES LABORATORY**

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

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

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

<u>**SEMESTER – II**</u>

		L	T	P	C
20IO227	**PYTHON PROGRAMMING LABORATORY** (Common to CSD& IOT)	0	0	3	1

Prerequisite: *Basic knowledge of C programming*

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

CO1:	*Design simple programs using conditional statements and loops.*	*Apply*
CO2:	*Using python list, tuples and dictionaries.*	*Apply*
CO3:	*Detecting the exception handling mechanism in python.*	*Analyze*
CO4:	*Demonstrate the use of files in python.*	*Create*
CO5:	*Construct GUI applications using python programming.*	*Create*

LIST OF EXPERIMENTS:

1. Write a simple program to display a single level and multilevel string.
2. Write a function to compute the GCD of two numbers
3. Write a program to display the largest number among three numbers.
4. Create a program to implement the operation on List, Tuple and Dictionary.
5. Write a program to demonstrate the user-defined exception handling mechanism in Python
6. Write a program to perform the following
    I.   Sum an array of numbers,
    II.   Linear Search
    III. Binary Search
7. Create a program to implement multi-threading concept.
8. Create a program to implement Employee management system using class and objects.
9. Write a program to draw various objects using turtle object
10. Create a program for Employee Details using files.
11. Design and implement a graphical user interface to perform any arithmetic operation.
12. Write a program to implement database connectivity using MySQL.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	Regulation:	R 2020
Course Code: 20IO227	Course Name:	PYTHON PROGRAMMING LABORATORY

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

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

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

SEMESTER – III

20MA343	NUMERICAL COMPUTATIONAL TECHNIQUES (Common To CS, CSD, IOT & IT)	L 3	T 1	C 4

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

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

CO1:	*Solve polynomial, transcendental equations, simultaneous linear equations numerically.*	*Understand*
CO2:	*Predict the unknown values by using Interpolation techniques.*	*Apply*
CO3:	*Evaluate the problems in differentiation and integration by using numerical techniques.*	*Evaluate*
CO4:	*Solving the initial value problems for ordinary differential equations.*	*Remember*
CO5:	*Determine the numerical solutions to boundary value problems.*	*Remember*

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

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

UNIT – II   INTERPOLATION AND APPROXIMATION   [12]

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

UNIT – III   NUMERICAL DIFFERENTIATION AND INTEGRATION   [12]

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

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

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

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

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

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

Text Books:

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

References:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20MA343**   **Course Name:**   **NUMERICAL COMPUTATIONAL TECHNIQUES**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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										
	Average	**3**	**3**	**3**	**3**										

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

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

SEMESTER – III

20IO341	**JAVA PROGRAMMING**	L	T	C
	(Common TO CSD & IOT)	3	0	3

Prerequisite: *Fundamentals of C programming and object-oriented concepts*

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

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

UNIT – I   JAVA FUNDAMENTALS   [9]

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

UNIT – II   CONSTRUCTORS AND INHERITANCE   [9]

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

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

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

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

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

UNIT – V   STRING AND DATABASE CONNECTIVITY   [9]

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

Total = 45 Periods

Text Books:

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

2 Cay S. Horstmann, Core Java Volume 1 – Fundamentals, Prentice Hall, India, Tenth Edition, 2015.

References:

1 Herbert Schildt, Java - A Beginner Guide, Oracle Press, McGraw-Hill Education, New Delhi, Sixth Edition, 2014.

2 Joshua Bloch, Effective Java: A Programming Language Guide, Addison-Wesley Professional, USA, Third Edition, 2018.

3 Allen B. Downey and Chris Mayfield, Think Java: How to Think Like a Computer Scientist, O'Reilly, California, First Edition, 2016.

4 D.T. Editorial Services, Java 8 Programming Black Book, Dreamtech Press, Delhi, First Edition, 2015.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

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

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

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

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

SEMESTER – III

20IO342	DATA STRUCTURES	L	T	C
	(Common TO CSD & IOT)	3	0	3

Prerequisite: *Basic Knowledge of C programming*

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

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

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

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

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

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

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

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

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

UNIT – V   **SEARCHING, HASHING AND SORTING**   **[9]**

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

Total = 45 Periods

Text Books:

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

References:

1. R. F. Gilberg, B. A. Forouzan, Data Structures, Thomson, India, Second Edition, 2005.
2. A.K. Sharma, Data Structures using C, Pearson Education, India, First Edition, 2011.
3. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Fundamentals of Data Structures in C++, University Press, United States, Second Edition, 2008
4. Robert Sedgewick and Kevin Wayne, Algorithms, Pearson Education, India, Fourth Edition, 2017.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

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

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

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

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

<u>**SEMESTER – III**</u>

20EE231	DIGITAL PRINCIPLES AND COMPUTER DESIGN (Common TO CS,CSD & IOT)	L	T	P	C
		3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: Identify the various methods used for the simplification of boolean functions.	*Understand*
CO2: Design and analyze the combinational circuits.	*Analyze*
CO3: Construct and analyze the sequential circuits.	*Analyze*
CO4: Apply the knowledge to design the processor unit.	*Apply*
CO5: Summarize the simple computer design and HDL.	*Remember*

UNIT – I   BOOLEAN ALGEBRA AND LOGIC GATES   [9]

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

UNIT – II   COMBINATIONAL LOGIC   [9]

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

UNIT – III   SYNCHRONOUS SEQUENTIAL LOGIC   [9]

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

UNIT – IV   PROCESSOR DESIGN   [9]

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

UNIT – V   SIMPLE COMPUTER DESIGN AND HDL   [9]

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

Total = 45 Periods

Text Books:

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

Reference Books:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20EE231** **Course Name:** **DIGITAL PRINCIPLES AND COMPUTER DESIGN**

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

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

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

<u>**SEMESTER – III**</u>

20CD311	**DESIGN THINKING**	L	T	P	C
	(Common TO CSD & IOT)	3	0	0	3

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: Remember the design thinking principles.	*Remember*
CO2: Recognize the concepts and identify the Issues in design thinking process.	*Understand*
CO3: Identify various key ideas in design thinking to different problems.	*Understand*
CO4: Examine the business ideas and to implement the design.	*Understand*
CO5: Apply design thinking approach to real world problems.	*Apply*

UNIT – I　　BASICS OF DESIGN THINKING　　[9]

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

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

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

UNIT – III　　ENCOURAGE IDEAS AND PROTOTYPING　　[9]

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

UNIT – IV　　TEST BUSINESS IDEAS AND IMPLEMENTATION　　[9]

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

UNIT – V　　FUTURE　　[9]

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

Total = 45 Periods

Text Books:

1　Christian Mueller-Roterberg, Handbook of Design Thinking - Tips & Tools for how to design thinking, Kindle Direct Publishing, First Edition, 2018.
2　Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, Harper Collins Publishers Ltd, New York, First Edition, 2009.

Reference Books:

1　Jeanne Liedtka and Tim Ogilvie, Designing for Growth: a design thinking tool kit for managers, Columbia University Press, New York, Second Edition, 2011
2　Johnny Schneider, Understanding Design Thinking, Lean and Agile, O'Reilly Media, California, First Edition, 2017
3　Roger Martin, The Design of Business: Why Design Thinking is the Next Competitive Advantage, Harvard Business Press, United States, First Edition, 2009.
4　Idris Mootee, Design Thinking for Strategic Innovation, John Wiley & Sons Inc, New Jersey, First Edition, 2013

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	Regulation:	**R 2020**

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Remember the design thinking principles.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO2	*Recognize the concepts and identify the Issues in design thinking process.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO3	*Identify various key ideas in design thinking to different problems.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO4	*Examine the business ideas and to implement the design.*	3	3	3	3	3	-	-	-	2	-	-	2	3	3
CO5	*Apply design thinking approach to real world problems.*	3	3	3	3		-	-	-	2	-	-	2	3	3
	Average	3	3	3	3	3	-	-	-	2	-	-	2	3	-

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

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

<u>**SEMESTER – III**</u>

20CD343	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
	(Common To CSD & IOT)	3	0	0	3

Prerequisite: *Basic knowledge of digital computer operations*

Course Outcomes: On Completion of this course, the student will be able to	Cognitive level
CO1: Identify the basics structure of computers, operations and instructions.	Remember
CO2: Outline the arithmetic operations and working of hardwired micro programmed control.	Understand
CO3: Comprehend pipelined execution and design control unit.	Apply
CO4: Recognize the hierarchical memory system including cache memory and virtual memory	Understand
CO5: Examine the different ways of communicating with I/O devices and standard I/O interfaces.	Apply

UNIT – I   BASIC STRUCTURE AND ARITHMETIC OPERATIONS   [9]

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

UNIT – II   BASIC PROCESSING UNIT   [9]

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

UNIT – III   PIPELINING EXECUTION   [9]

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

UNIT – IV   MEMORY SYSTEM AND STORAGES   [9]

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

UNIT – V   I/O ORGANIZATION   [9]

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

Total = 45 Periods

Text Books:

1 Carl Hamacher, Zvonko Vranesic, SafwatZaky and Naraig Manjikian, Computer Organization and Embedded Systems, McGraw Hill, US, Sixth Edition, 2012.

2 M.Morris Mano, Computer System Architecture, McGraw Hill, United states, Third Edition, 2012.

References:

1 William Stallings, Computer Organization and Architecture - Designing for Performance, Prentice Hall, United states, Eighth Edition, 2010.

2 David A. Patterson and John L. Hennessy, Computer Organization and Design: The Hardware/Software interface, University of California, Berkeley, Fifth Edition, 2014.

3 Carpinelli, Computer Systems Organization & Architecture, Pearson Education, India, First Edition, 2001.

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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

REGULATION: R 2020

COURSE CODE: 20CD343 COURSE NAME: **COMPUTER ORGANIZATION AND ARCHITECTURE**

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

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

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

SEMESTER – III

| **20IO327** | **JAVA PROGRAMMING LABORATORY** | L | T | P | C |
| | (Common To CSD & IOT) | 0 | 0 | 3 | 1 |

Prerequisite: Basic knowledge of object-oriented concepts

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1:	*Apply the features of java to find optimal solution for the real-world problems.*	*Apply*
CO2:	*Practically implement the concept of arrays, constructors, inheritance and overloading.*	*Apply*
CO3:	*Recall interface, abstract class and packages concepts.*	*Understand*
CO4:	*Outline the features of exception handling, string handling, threads and command line arguments practically.*	*Understand*
CO5:	*Examine the concept of database connectivity and to implement.*	*Analyze*

List of Experiments:

1. Write a program to get n numbers in an array. Display the elements in ascending and descending order.

2. Write a program for student management system. Initialize the register number of the student through constructors.

3. Write a program for the following using inheritances

    a) Finding area of sphere using single inheritance

    b) Calculating performance of the students using multi-level inheritance

    c) Students' information manipulation using hierarchical inheritance

4. Write a program for calculating area of rectangle and triangle using interface

5. Write a program for employee management using packages.

6. Write a program for calculator operations and handle the exceptions

7. Write a program for manipulating strings.

8. Write a program using the concept of command line arguments

9. Write a program for threads (extending Threads class and implementing runnable interface)

10. Write a program to read and display the student details from the database using database connectivity

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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

REGULATION: **R 2020**

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

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

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

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

<u>**SEMESTER – III**</u>

20EE225	**DIGITAL SYSTEMS LABORATORY**	L	T	P	C
	(Common To CS & CSD)	0	0	3	1

Prerequisite: No prerequisites are needed for enrolling into the course

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

CO1:	*Outline basic Boolean theorems and verify their functionalities.*	*Understand*
CO2:	*Implement combinational circuits using logic gates.*	*Understand*
CO3:	*Design combinational circuits using MSI devices.*	*Apply*
CO4:	*Construct sequential circuits using MSI devices.*	*Apply*
CO5:	*Develop HDL models for combinational and sequential circuits.*	*Understand*

LIST OF EXPERIMENTS:

1. Verification of boolean theorems using logic gates.

2. Design and implementation of combinational circuits using logic gates for arbitrary functions, code converters.

3. Design and implementation of combinational circuits using MSI devices:

   a) 4 - bit binary adder / subtractor

   b) Parity generator / checker

   c) Multiplexers and De-Multiplexers

4. Design and implementation of sequential circuits:

   a) Shift-registers

   b) Synchronous counter

5. Coding combinational / sequential circuits using HDL.

6. Design and implementation of a simple digital system.

Total : 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20EE225   **Course Name:** DIGITAL SYSTEMS LABORATORY

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

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

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

<u>**SEMESTER – III**</u>

20IO329	**DATA STRUCTURES LABORATORY**	L	T	P	C
	(Common To CSD & IOT)	0	0	3	1

Prerequisite: *Basic knowledge of C programming*

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: *Apply the concepts of singly and doubly linked lists.*	*Apply*
CO2: *Implement the applications of stack and queue.*	*Create*
CO3: *Design the balanced tree concepts.*	*Create*
CO4: *Demonstrate the sorting algorithm techniques.*	*Create*
CO5: *Construct the minimum spanning tree.*	*Create*

LIST OF EXPERIMENTS:

1. Implementation of Singly Linked List.

2. Implementation of Doubly linked list

3. Develop a program for Polynomial manipulation.

4. Array implementation of Stack and Queue

5. Linked list implementation of Stack and Queue

6. Write a program that uses stack operations to convert a given infix expression into its postfix equivalent and Evaluation of Arithmetic expression, implement the stack using an array.

7. Design and develop a program for applications of Queue.

8. Develop a program to generate expression tree and display it in the following order: i) Preorder ii) Postorder iii) Inorder

9. Implementation of Binary Search Tree.

10. Implementation of AVL Tree.

11. Write programs for implementing the following graph traversal and MST algorithms:
    a) DFS Algorithm   b) Prims Algorithm.

12. Write programs for implementing the following sorting methods to arrange a list of integers in ascending order: a) Insertion sort   b) Merge sort

13. Implementation of Hashing.

Total : 45 Periods

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

		Regulation:		**R 2020**

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

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

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

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

<u>**SEMESTER – III**</u>

20HR351	**CAREER DEVELOPMENT SKILLS – I**	L	T	P	C
		0	2	0	0

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

Course Outcomes: On Completion of this course, the student will be able to	**Cognitive level**
CO1: *Have competent knowledge on grammar with an understanding of its basic rules.*	*Understand*
CO2: *Communicate effectively and enhance interpersonal skills with renewed self – confidence*	*Apply*
CO3: *Construct sentence in English and make correction*	*Apply*
CO4: *Perform oral communication in any formal situation*	*Create*
CO5: *Develop their LSRW skills.*	*Understand*

UNIT – I   EFFECTIVE ENGLISH – SPOKEN ENGLISH   [6]

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

UNIT – II   ESSENTIAL COMMUNICATION   [6]

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

UNIT – III   WRITTEN COMMUNICATION – PART 1   [6]

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

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

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

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

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

Total =30Periods

Text Books:

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

2 Sarah Freeman, Written Communication in English, Orient Black Swan, Hyderabad, First Edition, 2015

References:

1 Raj N Bakshmi, English Grammar Practice, Orient Black Swan, Hyderabad, First Edition, 2009.

2 M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2005.

3 Thakur K B Sinha, Enrich Your English, Vijay Nicole, Chennai, First Edition, 2005.

4 Norman Lewis. W.R., Word Power Made Easy, Goyal Publications.

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B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: R 2020

Course Code: 20HR351 **Course Name:** CAREER DEVELOPMENT SKILLS – I

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

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

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

<u>**SEMESTER – IV**</u>

20MA441

PROBABILITY AND DECISION MODELS

(Common To CS, CSD, IOT & IT)

L	T	C
3	1	4

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

Course Outcomes: On successful completion of the course, the student will be able to	**Cognitive Level**
CO1: *Explain the importance of one dimensional random variables discrete and continuous distribution.*	*Understand*
CO2: *Develop their skills in joint, marginal and conditional distributions and knowing the concept of covariance correlation & regression.*	*Apply*
CO3: *Analyze the theory of stationary process, Markov Process and transition probabilities, and Poisson Process.*	*Analyze*
CO4: *Illustrate the basic concept of single server and multi-server queuing models.*	*Understand*
CO5: *Estimate Critical Path in PERT and CPM.*	*Evaluate*

UNIT – I   ONE DIMENSIONAL RANDOM VARIABLE   [12]

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

UNIT – II   TWO DIMENSIONAL RANDOM VARIABLES   [12]

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

UNIT – III   RANDOM PROCESSES   [12]

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

UNIT – IV   QUEUEING MODELS   [12]

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

UNIT – V   NETWORK MODELS   [12]

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

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

Text Books:

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

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

Reference Books:

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

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

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

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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

REGULATION: **R 2020**

COURSE CODE: **20MA441**

COURSE NAME: **PROBABILITY AND DECISION MODELS**

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

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

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

20CD441	THEORY OF COMPUTATION	L	T	P	C
	(Common To CSD & IOT)	3	1		4

Prerequisite: *Basic concepts of discrete mathematics.*

Course Outcomes: On Completion of this course, the student will be able to	Cognitive level
CO1: Compare and analyze various finite automata and convert NFA to DFA.	*Evaluate*
CO2: Construct finite automata to regular expression and identify the properties of regular language.	*Analyze*
CO3: Construct context free grammars to generate strings from a context free language and convert them into normal forms.	*Evaluate*
CO4: Construct pushdown automata and convert pushdown automata to context-free grammar.	*Apply*
CO5: Design turing machines for various problems and analyze the undecidability of languages.	*Apply*

UNIT– I   INTRODUCTION TO AUTOMATA THEORY   [12]

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

UNIT– II   REGULAR EXPRESSIONS AND LANGUAGES   [12]

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

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

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

UNIT – IV   PUSHDOWN AUTOMATA   [12]

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

UNIT–V   TURING MACHINE AND UNDECIDABLITY   [12]

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

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

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

References:
1 John C Martin, Introduction to Languages and Automata Theory, Tata McGraw-Hill, New Delhi, Third Edition, 2007.
2 K.L. P Misra and N. Chandrasekharan, Theory of Computer Science, Automata, Languages and Computation, Prentice Hall, India, Third Edition, 2010.
3 Adesh K. Pandey, An introduction to automata theory and formal languages, S.K. Kataria & Sons, New Delhi, First Edition, 2009.
4 Sipser, Michael, Theory of computation, Cengage Learning, India, First Edition,2007.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

REGULATION: **R 2020**

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

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

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

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<u>**SEMESTER – IV**</u>

20IO442	DATABASE MANAGEMENT SYSTEMS	L	T	C
	(Common To CSD & IOT)	3	0	3

Prerequisite: *Basic Knowledge about data structures and computer systems.*

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

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

UNIT – I   BASIC CONCEPTS AND RELATIONAL MODEL   [9]

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

UNIT – II   SQL FUNDAMENTALS AND INTERMEDIATE SQL   [9]

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

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

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

UNIT – IV   DATABASE DESIGN   [9]

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

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

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

Total = 45 Periods

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

References:
1 Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Tata McGraw Hill, New Delhi, Sixth Edition, 2015.
2 S.K. Singh, Database Systems Concepts, Design and Applications, Pearson Education, New Delhi, second Edition, 2011.
3 C.J. Date, A. Kannan and S. Swamynathan, An Introduction to Database Systems, Pearson Education, New Delhi Eighth Edition, 2006.
4 K. Prema, A. Gowri Shankar Reddy, et al, Database Management System Concepts, Notion Press, India, First Edition, 2020.

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

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

REGULATION: **R 2020**

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

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

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

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SEMESTER - IV

		L	T	P	C
20CD411	**DATA ANALYTICS AND VISUALIZATION**	3	0	0	3

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

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

CO1:	*Realize the fundamental concepts of data analytics*	*Understand*
CO2:	*Identify Differentiate between different kinds of predictive models*	*Understand*
CO3:	*Examine the specific challenges and opportunities associated with implementing predictive analytics in various sectors*	*Understand*
CO4:	*Analyze the principles of visualizing data effectively and the importance of selecting the appropriate chart types to convey insights*	*Analyze*
CO5:	*Recognize the concept of dashboards and its types.*	*Understand*

UNIT – I	DATA MANAGEMENT	[9]

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

UNIT – II	DATA ANALYTICS	[9]

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

UNIT – III	REGRESSION	[9]

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

UNIT – IV	OBJECT SEGMENTATION	[9]

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

UNIT – V	DATA VISUALIZATION	[9]

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

Total = 45 Periods

Text Books:
1.Student's Handbook for Associate Analytics– II, III.
2.Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers

Reference Books:
1.Introduction to Data Mining, Tan, Steinbach and Kumar, AddisionWisley, 2006.
2.Purna Chander Rao. Kathula, Hands-on Data Analysis and Visualization with Pandas, BPB Publications, Delhi, First Edition ,2020
3.Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford University

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

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

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	*Realize the fundamental concepts of data analytics*	3	1	2	1	2	1	-	-	2	2	2	3	1	3
CO2	*Identify Differentiate between different kinds of predictive models*	2	2	3	2	3	1	-	-	1	2	2	3	2	2
CO3	*Examine the specific challenges and opportunities associated with implementing predictive analytics in various sectors*	2	1	2	1	2	1	-	-	2	2	2	2	1	2
CO4	*Analyze the principles of visualizing data effectively and the importance of selecting the appropriate chart types to convey insights*	3	2	3	2	2	1	-	-	1	1	1	2	3	3
CO5	*Recognize the concept of dashboards and its types.*	2	1	2	2	2	1	-	-	2	2	1	1	1	2
	Average		2.4	1.4	2.5	1.6	2.5	1	-	-	1.6	1.8	1.6	2.2	1.6

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

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

Prerequisite: *Basic Knowledge about data structures*

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

CO1:	Analyze the efficiency of algorithms.	Analyze
CO2:	Design and analyze problems using decrease, transform and conquer techniques.	Understand
CO3:	Identify optimal solution by applying dynamic techniques.	Understand
CO4:	Evaluate various backtracking, branch and bound techniques.	Evaluate
CO5:	Summarize the knowledge about P and NP problems.	Understand

UNIT – I   DIVIDE AND CONQUER TECHNIQUE   [12]

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

UNIT – II   DECREASE AND CONQUER TECHNIQUE   [12]

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

UNIT– III   DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE   [12]

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

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

Backtracking: 4-Queens – Hamiltonian Circuit – Sum of Subset – Graph Coloring – Branch and Bound: Assignment Problem – Knapsack Problem – Traveling Salesman Problem.

UNIT – V   NP PROBLEMS AND APPROXIMATION ALGORITHMS   [12]

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

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

Text Books:

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

References:

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

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20CD443**   **Course Name:** **DESIGN AND ANALYSIS OF ALGORITHMS**

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

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

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

<u>**SEMESTER – IV**</u>

		L	T	C
20IO444	**OPERATING SYSTEMS** (Common To CSD & IOT)	3	0	3

Prerequisite: Basic knowledge of computer architecture.

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

UNIT– I　　　OPERATING SYSTEMS CONCEPTS　　　　　　　　　　　　　[9]

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

UNIT– II　　　PROCESS SCHEDULING　　　　　　　　　　　　　　　　[9]

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

UNIT – III　　　DEADLOCK AND MEMORY MANAGEMENT　　　　　　　　[9]

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

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

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

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

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

Total = 45 Periods

Text Books:

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

References:

1. D. M. Dhamdhere, Operating Systems, Tata McGraw-Hill Education India, Second Edition, 2006.
2. Paul J. Deitel and David R. Choffnes, Operating Systems, Prentice Hall, United States, Third Edition, 2003.
3. Richard Fox, Linux with Operating System Concepts, Taylor & Francis Limited, United States, Second Edition, 2014.
4. Tanenbaum, Modern Operating Systems, Pearson Education, India, Fourth Edition, 2016.

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

Regulation: **R 2020**

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

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

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

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

<u>**SEMESTER – IV**</u>

20IO427	**DATABASE MANAGEMENT SYSTEMS LABORATORY**	L	T	P	C
	(Common To CSD & IOT)	0	0	3	1

Prerequisite: *Basic Knowledge in Data Structures.*

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

CO1: *Design and implement a database schema for real time applications.*   *Apply*

CO2: *Populate and query a database.*   *Apply*

CO3: *Create and maintain tables using PL/SQL.*   *Apply*

CO4: *Utilize function and procedures on any application.*   *Apply*

CO5: *Apply trigger and generate report.*   *Apply*

List of Experiments:

1. Create and apply DDL (SQL) statements for employee /student /bank /online shopping detail sets.

2. Perform data manipulation using DML (SQL) statements for employee /student /bank /online shopping detail sets.

3. Verify DCL and TCL (SQL) statements for employee /student /bank /online shopping detail sets.

4. Perform all the nested, join queries and set oriented operations for employee /student /bank /online shopping detail sets.

5. Create and apply view for employee /student /bank /online shopping detail sets. (create, insert, update and drop)

6. Write PL/SQL code to display employee details using explicit cursors, implicit cursors and cursor loop.

7. Write a PL/SQL function to find the sum, average, minimum and maximum salary of the employee and count the number of employees in a given company name.

8. Write a PL/SQL procedure to calculate for the following i) factorial ii) prime or not iii) biggest of three number.

9. Write and implement before and after insert, update and delete triggers for employee details.

10. Design and implement employee payroll system form design using visual basic and generate report.

Total: 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO427**   **Course Name:**   **DATABASE MANAGEMENT SYSTEMS LABORATORY**

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

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

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

<u>**SEMESTER – IV**</u>

20CD421   **DATA ANALYTICS AND VISUALIZATION LABORATORY**

L	T	P	C
0	0	3	1

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

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

CO1:   *Building machine learning models using data processed with Pandas.*

CO2:   *Acquire how to combine multiple datasets using concatenation, merging, and joining operations.*

CO3:   *Using python list, tuples and dictionaries.*

CO4:   *Implement simple linear regression and logistic regression algorithms from scratch using libraries like NumPy.*

CO5:   *Implementing clustering algorithms using Python libraries like Scikit-learn and exploring different datasets to apply clustering techniques.*

LIST OF EXPERIMENTS:

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

Total: 30 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

	Regulation:	**R 2020**
Course Code: 20CD421	**Course Name:**	DATA ANALYTICS AND VISUALIZATION LABORATORY

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Building machine learning models using data processed with Pandas.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
CO2	*Acquire how to combine multiple datasets using concatenation, merging, and joining operations*	2	2	2	2	3	-	-	-	2	-	3	-	2	2
CO3	*Using python list, tuples and dictionaries.*	2	2	2	2	2	-	-	-	2	-	3	-	2	2
CO4	*Implement simple linear regression and logistic regression algorithms from scratch using libraries like NumPy.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
CO5	*Implementing clustering algorithms using Python libraries like Scikit-learn and exploring different datasets to apply clustering techniques.*	3	3	3	3	3	-	-	-	2	-	3	-	2	2
	Average	3	3	3	3	3	-	-	-	2	-	3	-	2	2

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

<u>**SEMESTER – IV**</u>

20IO429　　　　**OPERATING SYSTEMS LABORATORY**

(Common To CSD & IOT)

L	T	P	C
0	0	3	1

Prerequisite *Basic knowledge about the C Programming.*

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

CO1:	*Implement the commands in Linux OS.*	*Understand*
CO2:	*Evaluate the performance of various CPU scheduling algorithms.*	*Evaluate*
CO3:	*Create process and Implement IPC, deadlock avoidance and detection Algorithms.*	*Create*
CO4:	*Analyze the performance of the various page replacement Algorithms.*	*Analyze*
CO5:	*Examine file organization and file allocation strategies.*	*Analyze*

List of Experiments:

1. Implementations of basic Linux commands and shell programming.

2. Write programs using the following system calls of Linux operating system fork, exec, getpid, exit, wait, close, stat, opendir, readdir, open, read and write.

3. Write a C program to simulate ls, grep and cp.

4. Write a C program to simulate shared memory and IPC

5. Write a C program to implement CPU scheduling algorithms.

6. Write a C program to implement producer consumer problem using semaphores.

7. Write a C program to implement banker's algorithm

8. Write a C program to implement page replacement algorithms

9. Write a C program to implement memory management schemes (first fit, worst fit and best fit)

10. Write a C program to implement File allocation strategies (Sequential, Indexed and Linked list)

Total: 45 Periods

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

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

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

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

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

SEMESTER - IV

		L	T	P	C
20HR432	**CAREER DEVELOPMENT SKILLS - II**	0	2	0	0

Prerequisite: No prerequisites are needed for enrolling into the course

Course Outcomes: On successful completion of the course, the student will be able to	*Cognitive Level*
CO1: Speak and write appropriately by understanding verbal and logical reasoning	*Apply*
CO2: Demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions	*Apply*
CO3: Enhance their skills on quantitative aptitude	*Understand*
CO4: Speak and write appropriately by understanding and applying the basic grammatical rules	*Create*
CO5: Critically evaluate problems related to quantitative aptitude	*Apply*

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

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

UNIT - II   **QUANTITATIVE APTITUDE – PART 1**   **[06]**

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

UNIT - III   **QUANTITATIVE APTITUDE – PART 2**   **[06]**

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

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

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

UNIT - V   **QUANTITATIVE APTITUDE – PART 3**   **[06]**

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

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

Text Books:

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

2   Abhijit Guha, Quantitative Aptitude, TMH, New Delhi, Third Edition,2009

Reference Books:

1   Agarwal. R.S, A.Modern Approach to Verbal and Non- verbal Reasoning, Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.

2   M Ashra Rizvi, Effective Technical Communication, Tata McGraw HILL, New Delhi, First Edition, 2005.

3   M.B. Lal & Goswami, Objective Instant Arithmetic, Upkar Publications, New Delhi, Second Edition, 2012.

4   Norman Lewis. W.R., Word Power Made Easy, Goyal Publications

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DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

B.E – COMPUTER SCIENCE AND DESIGN

CO-PO MAPPING

Regulation: **R 2020**

Course Code   **20HR432**   **Course Name:**   **CAREER DEVELOPMENT SKILLS - II**

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

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