K.S.R. COLLEGE OF ENGINEERING: TIRUCHENGODE - 637 215
(Autonomous)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E. COMPUTER SCIENCE AND ENGINEERING (INTERNET OF THINGS)
(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: (Internet of Things)

DV	To emerge as a leading technical education in the field of Internet of things with a focus on developing professionally competent and socially profound engineers capable of working in global environment.

Mission of the Department / Programme: (Internet of Things)

DM 1	To provide state- of- the art facilities to build up the students in industry- ready IoT system development.
DM 2	To impart the spirit of team work, societal responsibilities and professionalism among the students and faculty.
DM 3	To inculcate learning of the emerging technologies thereby helping the students to pursue higher studies leading to lifelong learning.

Programme Educational Objectives (PEOs): (Internet of Things)

The graduates of the Programme will be able to	
PEO 1	**Socio Economic Pursuit:** To promote innovation and creativity to adopt the socio-economic related activities.
PEO 2	**Professional Eminence:** To pursue successful careers in industry, academia and public service, by applying the acquired knowledge of Engineering, providing technical leadership for their business, as well as other professional careers.
PEO 3	**Morality Expert:** To instill management qualities in graduates with an experience of confidence, professionalism and moral attitude to provide expert leaders for serving the society.

Programme Outcomes (POs) of B.E. - Computer Science and Engineering (Internet of Things)

	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	**Skill Intensification:** The ability to formulate mathematical models and problem solving skills through programming techniques for addressing real-world challenges while applying suitable Internet of Things principles and concepts.
PSO2	**Persistence Exploration:** Foster lifelong learning and improve research skills to develop creative, cost-effective techniques for producing energy-efficient and eco- friendly integrated solutions for existing and new applications related to Internet of Things technology and applications.

	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	Computer Science and Engineering
Programme	B.E – Computer Science and Engineering (Internet of Things)

SEMESTER – I

SI.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.	20IO111	Problem solving using C	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
PRAIOICAL										
8.	20CH028	Chemistry Laboratory (Common To All Branches)	BSC	0	0	3	1	60	40	100
9.	20IO121	Problem solving using C Laboratory	ESC	0	0	3	1	60	40	100
10.	20EE125	Electrical and Electronics Laboratory	ESC	0	0	3	1	60	40	100
			Total	17	1	10	20	900		

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

SEMESTER – II

SI.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.	20IO211	Fundamentals of IOT and Applications	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	தமிழரும் தொழில் நுட்பமும்/ Tamils and Technology	MC	3	0	0	1	40	60	100
PRAIOICAL										
8.	20PH028	Physics Laboratory (Common To All Branches)	BSC	0	0	3	1	60	40	100
9.	20IO221	Fundamentals of IOT Laboratory	PCC	0	0	3	1	60	40	100
10.	20IO227	Python Programming Laboratory (Common To CSD & IOT)	ESC	0	0	3	1	60	40	100
			Total	20	1	10	20	900		

B.E. – Computer Science and Engineering (Internet of Things)

	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	Computer Science and Engineering
Programme	B.E – Computer Science and Engineering (Internet of Things)

SEMESTER – III

Sl.No.	Course Code	Course Name	Category	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	1	0	4	40	60	100
5.	20IO311	Sensor and Devices	PCC	3	0	0	3	40	60	100
6.	20CD343	Computer Organization and Architecture	PCC	3	0	0	3	40	60	100
PRAIOICAL										
7.	20IO327	Java programming Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
8.	20IO329	Data Structures Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
9.	201O321	Sensor and Devices Laboratory	PCC	0	0	3	1	60	40	100
10.	20HR351	Career Development Skills I	EEC	0	2	0	0	60	40	100
		Total		18	4	9	23		1000	

SEMESTER – IV

Sl.No.	Course Code	Course Name	Category	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.	20CD443	Design and Analysis of Algorithms (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
5.	20IO444	Operating systems (Common To CSD & IOT)	PCC	3	0	0	3	40	60	100
6.	20EE431	Microprocessors and Microcontrollers (Common To CS & IOT)	ESC	3	0	0	3	40	60	100
PRAIOICAL										
7.	20IO427	Database Management Systems Laboratory(Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
8.	20IO429	Operating systems Laboratory (Common To CSD & IOT)	PCC	0	0	3	1	60	40	100
9.	20EE425	Microprocessors and Microcontrollers Laboratory (Common To CS & IOT)	ESC	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		900	

KSRCE – Curriculum and Syllabi (R 2020)   4

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E - COMPUTER SCIENCE AND ENGINEERING(IOT)
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	T	P	C
	(Common to All Branches)	3	1	0	4

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

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

UNIT– I　　　　LINEAR ALGEBRA　　　　　　　　　　　　　　　　　　　[12]

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

UNIT – II　　　　ORDINARY DIFFERENTIAL EQUATIONS　　　　　　　　　[12]

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

UNIT – III　　　　DIFFERENTIAL CALCULUS　　　　　　　　　　　　　　[12]

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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	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:	*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.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E- COMPUTER SCIENCE AND ENGINEERING(IOT)
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	L	T	P	C
	(Common To AU, CE, CS, CSD, IOT, IT, ME & SF)	3	0	0	3

Prerequisite: *Engineering Mathematics, Engineering Physics*

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

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

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

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

UNIT – II   **DC MOTOR AND TRANSFORMERS**   **[9]**

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

UNIT – III   **AC MOTORS & SPECIAL MACHINES**   **[9]**

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

UNIT– IV   **MEASURING INSTRUMENTS**   **[9]**

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

UNIT – V   **ANALOG AND DIGITAL ELECTRONICS**   **[9]**

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

Total = 45 Periods

Text Books :

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

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

Reference Books :

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

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

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

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E- COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

Regulation: **R 2020**

Course Code: **20EE041**   **Course Name:** **BASCIS OF ELECTRICAL AND ELCTRONICS ENGINEERING**

CO	Course 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
20IO111	**PROBLEM SOLVING USING 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:	Acquire the basic concepts of computer and algorithm.	*Understand*
CO2:	Explore the fundamental algorithms based on the problem requirements.	*Understand*
CO3:	Enhance the concepts, syntax and semantics of C programming language	*Apply*
CO4:	Illustrate the usage of Array, Functions and Pointers.	*Apply*
CO5:	Utilize the concept of Structures, Union, Strings and Files.	*Apply*

UNIT – I   BASIC OF COMPUTER AND ALGORITHM   [9]

Introduction to Computers – Components of Computer – History and Generation of Computer –Types of Computers – Advantages and Disadvantages of using computers – Computer Software – Introduction to Algorithms – Pseudo code and Flowchart – Steps in Problem Solving – Problem Solving Strategies – Top-down design.

UNIT – II   FUNDAMENTAL ALGORITHMS   [9]

Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Generation of the Fibonacci Sequence – Reversing the Digits of an Integer – Decimal to Binary Conversion and vice versa – The Greatest Common Divisor of two Integers – Checking for a prime number.

UNIT – III   FOUNDATIONS OF C   [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. Statements: Selection Statements – Iteration statements – Jump statements – Expression statements – Block statements.

UNIT – IV   ARRAY, FUNCTIONS AND POINTERS   [9]

Array: Single-Dimensional arrays –Two-Dimensional arrays – Multidimensional arrays – Function: General form of function – Scope of a function – Function arguments – Recursion. Pointers: Pointer variables – Pointer Operators – Pointers and Arrays – Pointers to functions.

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

Accessing Structure Members – Structure Assignments – Arrays of Structures – Passing Structures to Functions – Unions – String: Declaring and Initializing String Variables – String Handling Functions and Operations – Files: Streams and Files – File System Basics – fread() and fwrite() – fseek() and Random-Access I/O – fprintf() and fscanf().

Total = 45 Periods

Text Books :

1   Shelly, Vermaat, Discovering Computer Fundamentals, Shelly Cashman Series, Course Technology Inc, United States, Eighth Edition, 2011.

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

Reference Books :

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

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

3   K.R.Venugopal and Sudeep R Prasad, Mastering C, MC Graw Hill, India, Second Edition,2015.

4   Nptel.ac.in/courses/106104128/.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E- COMPTER SCIENCE AND EGINEERING(IOT)
CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO111**   **Course Name:**   **PROBLEM SOLVING USING C**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Acquire the basic concepts of computer and algorithm.*	3	3	1	3	1	-	-	-	1	-	-	1	2	2
CO2	*Explore the fundamental algorithms based on the problem requirements.*	3	3	1	3	2	-	-	-	1	-	-	1	3	3
CO3	*Enhance the concepts, syntax and semantics of C programming language*	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	*Illustrate the usage of Array, Functions and Pointers.*	3	2	2	2	2	-	-	-	1	-	-	1	3	2
CO5	*Utilize the concept of Structures, Union, Strings 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, Vivekanand Kendras, S-VYASA, etc. may be organized. (3 sessions, 9 hours).

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

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**

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

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

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

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

CO1:   *Recognize the extensive literature of Tamil and its classical nature.*   Understand

CO2:   *Apprehend the heritage of sculpture, painting and musical instruments of ancient people.*   Understand

CO3:   *Review on folk and martial arts of Tamil people.*   Understand

CO4:   *Insightthinai concepts, trade and victory of Chozha dynasty.*   Understand

CO5:   *Realize the contribution of Tamil in Indian freedom struggle, self-esteem movement and siddha medicine.*   Understand

UNIT - I   LANGUAGE AND LITERATURE   [03]

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

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

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

UNIT - III   FOLK AND MARTIAL ARTS   [03]

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

UNIT - IV   THINAI CONCEPT OF TAMILS   [03]

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

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

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

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

Text Books :

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

2   Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukarasu) (Published by : International Institute of Tamil Studies)

Reference Books :

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

2   The Contribution of the Tamil to Indian Culture (Dr.M.Valarmathi) (Puplished by International Institute of Tamil Studies).

3   Keeladi – 'Sangam City Civilzation on the banks of river Vaigai; (Jointly Published by: Department of Archaeology &Tamilnadu Text Book and Educational Services Corporation, Tamilnadu)

4   Studies in the History of India with Special Reference to Tamilnadu (Dr.K.K.Pillay) (Published by: The Author)

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)

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	-	3	-	-
	Average	-	-	-	-	-	-	**3**	**3**	-	**2**	-	**3**	-	-

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

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

SEMESTER - I

		L	T	P	C
20GE051	**தமிழர்மரபு** **(அனைத்து துறைகளுக்கும் பொதுவானது)**	1	0	0	1

முன்கூட்டிய துறைசார் அறிவு : தேவை இல்லை

பாடம் கற்றத்தின் விளைவுகள் : பாடத்தை வெற்றிகரகமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்	அறிவாற்றல் நிலை
CO1: தமிழ்மொழியின் செந்ததன்மை மற்றும் இலக்கியம் குறித்த தெரிதல்	புரிதல்
CO2: தமிழர்களின் சிற்பக்கலை, ஓவியக்கலை மற்றும் இசைக் கருவிகள் குறித்த தெளிவு	புரிதல்
CO3: தமிழர்களின் நாட்டுப் புரைக் கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு	புரிதல்
CO4: தமிழர்களின் திணைக் கோட்பாடுகள், சங்ககாலவணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள்.	புரிதல்
CO5: இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்துவம் பற்றிய புரிதல்.	புரிதல்

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

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

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

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

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

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

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

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

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

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

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

Text Books :

1   தமிழகவரலாறு-மக்களும்பண்பாடும்-கேகேபிள்ளை (வெளியீடு தமிழ்நாடு பாடநூல் மற்றும் கல்வியில் பணிகள் கழகம்) ,உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை,

B.E. – Computer Science and Engineering (Internet of Things)

2002

2 கணினித்தமிழ்முனைவர் இல. சுந்தரம், விகடன் பிரசுரம், 2016

Reference Books :

1 கீழடி-வைகை   நதிக்கரையில்   சங்ககால
நகரநாகரிகம்.(தொல்லியல்துறைவெளியீடு)

2 பொருநை – ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)

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 ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)

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:	தமிழ் மொழியின் செந்ததன்மை மற்றும் இலக்கியம் குறித்ததெரிதல்	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2:	தமிழர்களின் சிற்பக்கலை , ஓவியக்கலை மற்றும் இசைக் கருவிகள் குறித்த தெளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3:	தமிழர்களின் நாட்டுப்புரைக் கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்த தெளிவு	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4:	தமிழர்களின் திணைக் கோட்பாடுகள், சங்ககால வணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள் .	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5:	இந்திய தேசிய இயக்கம், சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்தவம் பற்றிய புரிதல்.	-	-	-	-	-	-	3	3	-	2	-	3	-	-
	Average	-	-	-	-	-	-	3	3	-	2	-	3	-	-

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

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

<u>SEMESTER – I</u>

20CH028	**CHEMISTRY LABORATORY** (Common To All Branches)	L	T	P	C
		0	0	3	1

Prerequisite: *Knowledge of Engineering Chemistry*

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

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

LIST OF EXPERIMENTS:

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

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

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

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

5. Estimation of Hydrochloric Acid by pH metry.

6. Estimation of Iron by Spectrophotometry.

7. Estimation of hardness in water by EDTA method.

8. Estimation of chloride in water sample by Argentometry.

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

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

Total : 30 Periods

Text Book :

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

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

Reference Books :

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

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

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

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)

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)   **R 2020**

<u>SEMESTER – I</u>

		L	T	P	C
20IO121	**PROBLEM SOLVING USING C LABORATORY**	0	0	3	1

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

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: Illustrate the basic concepts of MS Office.	*Understand*
CO2: Apply the idea of formulas, functions in MS Excel and Database fundamentals	*Apply*
CO3: Build the knowledge of flowchart and fundamentals of algorithm.	*Create*
CO4: Build code segments for handling control and looping statements.	*Understand*
CO5: Consume the knowledge of function classifications and Structures	*Apply*

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 to execute the flowchart for implement the factorization of given number.

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

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

7. Controls statements and Decision-making constructs.

8. Single and Multidimensional Array

9. String and String Handling functions

10. Functions and its types

11. Structures and Unions.

12. Pointers

Total : 45 Periods

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

Regulation: **R 2020**

Course Code: **20IO121**   **Course Name:**   **PROBLEM SOLVING USING C 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.*	3	2	2	1	1	-	-	-	1	-	-	1	3	2
CO2	*Apply the idea of formulas, functions in MS Excel and Database fundamentals*	3	3	3	3	1	-	-	-	1	-	-	1	3	2
CO3	*Build the knowledge of flowchart and fundamentals of algorithm.*	3	3	2	2	1	-	-	-	1	-	-	1	3	2
CO4	*Build code segments for handling control and looping statements.*	3	3	3	3	2	-	-	-	2	-	-	2	3	3
CO5	*Consume the knowledge of function classifications and Structures*	3	3	3	3	2	-	-	-	1	-	-	2	3	2
	Average	3	3	3	2	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 - I**</u>

		L	T	P	C
20EE125	**ELECTRICAL AND ELECTRONICS LABORATORY**	0	0	3	1

Prerequisites: *NIL*

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

CO1:	*Verify the ohm's law and kirchhoff's law.*	*Understand*
CO2:	*Verify the V-I characteristics of PN junction diode and zener diode.*	*Understand*
CO3:	*Verify the input and output characteristics of common emitter configuration of BJT.*	*Understand*
CO4:	*Develop the digital logic circuit to verify the boolean expressions.*	*Understand*
CO5:	*Measure the electrical quantities using analog and digital meters.*	*Understand*

LIST OF EXPERIMENTS:

1. Verification of Ohm's Law.
2. Verification of Kirchhoff's Laws.
3. Real time verification of V-I Characteristics of PN junction diodes.
4. Real time verification of V-I Characteristics of Zener diodes.
5. Characteristics of transistor under common emitter configuration.
6. Develop a digital logic circuit to verify the given Boolean expression Y=A.B+A.C.
7. Develop a digital logic circuit to verify the given Boolean expression Y=(A+B)(A+C).
8. Measurement of electrical quantities by using Digital Multimeter and LCR meter.
9. Measurement of Voltage, Current and Power in DC Circuit.
10. Measurement of Voltage, Current and Power in single phase AC Circuits.

Total = 45 Periods

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

Regulation: **R 2020**

Course Code: **20EE125**   **Course Name:**   **ELECTRICAL AND ELECTRONICS LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	*Verify the ohm's law and kirchhoff's law.*	3	2	-	-	-	-	-	2	3	2	-	1	-	-
CO2:	*Verify the V-I characteristics of PN junction diode and zener diode.*	3	2	-	-	-	-	-	2	3	2	-	1	-	-
CO3:	*Verify the input and output characteristics of common emitter configuration of BJT.*	3	2	-	-	-	-	-	2	3	2	-	1	-	-
CO4:	*Develop the digital logic circuit to verify the boolean expressions.*	3	2	-	-	-	-	-	2	3	2	-	1	-	-
CO5:	*Measure the electrical quantities using analog and digital meters.*	3	2	-	-	-	-	-	2	3	2	-	1	-	-
	Average	**3**	**2**	**-**	**-**	**-**	**-**	**-**	**2**	**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>

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

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

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

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

UNIT – I   **[9]**

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

UNIT – II   **[9]**

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

UNIT – III   **[9]**

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

UNIT – IV   **[9]**

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

UNIT – V   **[9]**

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

Total = 45 Periods

Text Books:

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

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

Reference Books:

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

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

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

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)
<u>**CO-PO MAPPING**</u>

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**

<u>**SEMESTER – II**</u>

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

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

Course Outcomes: On Completion of this course, the student will be able to	**Cognitive level**
CO1: Solve logical problems.	Understand
CO2: Construct algorithms and derive complexities.	Understand
CO3: Acquire the knowledge of sets that are required for developing computational models.	Remember
CO4: Solving computational operations associated with functions.	Understand
CO5: Apply the concepts of Graph theory and Combinatory in network algorithms.	Apply

UNIT – I   PROPOSITIONAL CALCULUS   [12]

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

UNIT – II   PREDICATE CALCULUS   [12]

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

UNIT – III   SET THEORY   [12]

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

UNIT – IV   FUNCTIONS   [12]

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

UNIT – V   GRAPH THEORY AND COMBINATORICS   [12]

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

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

Text Books:

1 Trembly J.P, and Manohar R, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw–Hill Publishing Co. Ltd, New Delhi, Forty third Re-print ,2014.

2 Venkatraman M.K, Sridharan. N and Chandrasekaran N. Discrete Mathematics, The National Publishing Company, Chennai, Fourth edition, 2014.

Reference Books:

1 Kenneth. H. Rosen, Discrete Mathematics and its Applications, Tata McGraw Hill P.Co, New Delhi, Seventh Edition, 2014.

2 Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, Discrete Mathematical Structures, Pearson Education Pvt Ltd ,New Delhi, Sixth Edition, 2013.

3   Seymour Lipschutz, Discrete Mathematics, Schaum'soulines series, Tata McGraw Hill P.Co, New Delhi, Second Edition, 2012.

4   N. Subramanian, Discrete Mathematics, SCM Publications, Erode, First Edition, 2010.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B. B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)
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**

<u>SEMESTER – II</u>

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

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

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

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

UNIT – I   **ACOUSTICS AND ULTRASONICS**   **[9]**

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

UNIT – II   **LASER TECHNOLOGY**   **[9]**

Introduction – Principle of Spontaneous emission and stimulated emission – Population inversion, pumping – Einstein's A and B coefficients (derivation). Types of lasers – Nd-YAG, 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 ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING (IOT)
<u>**CO-PO MAPPING**</u>

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	P	C
20IO211	**FUNDAMENTALS OF IOT AND APPLICATIONS**		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 knowledge of IoT.*	*Understand*
CO2:	*Examine requirements of various communication models and protocols.*	*Understand*
CO3:	*Design portable IoT using Arduino/Raspberry Pi /open platform.*	*Apply*
CO4:	*Apply data analytics and use cloud offerings related to IoT.*	*Apply*
CO5:	*Summarize applications of IoT in real time scenario.*	*Understand*

UNIT – I   INTRODUCTION TO SIGNALS AND SYSTEMS   [9]

Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT Models – Simplified IoT Architecture and Core IoT Functional Stack – Fog – Edge and Cloud in IoT.

UNIT – II   COMPONENTS IN INTERNET OF THINGS   [9]

Functional Blocks of an IoT Ecosystem – Sensors, Actuators and Smart Objects – Control Units – Communication modules (Bluetooth, Zigbee, Wifi, GPS, GSM Modules)

UNIT – III   PROTOCOLS AND TECHNOLOGIES BEHIND IOT   [9]

IOT Protocols – IPv6, 6LoWPAN, MQTT, CoAP – RFID – Wireless Sensor Networks – Big Data Analytics – Cloud Computing – Embedded Systems.

UNIT – IV   OPEN PLATFORMS AND PROGRAMMING   [9]

IOT deployment for Raspberry Pi and Arduino platform – Architecture – Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.

UNI T– V   IOT APPLICATIONS   [9]

Business models for the internet of things – Smart city – Smart mobility and transport – Industrial IoT – Smart health – Environment monitoring and surveillance – Home Automation – Smart Agriculture.

Total = 45 Periods

Text Books:

1 Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things, CISCO Press, India, First Edition, 2017.

2 Arshdeep Bahga and Vijay Madisetti, Internet of Things - A Hands-on Approach, Universities Press, First Edition, 2015

Reference Books:

1 Perry Lea, Internet of things for architects, Packt Publishing, UK, First Edition, 2018.

2 Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things – Key applications and Protocols, Wiley, US, First Edition, 2012

3 https://www.arduino.cc/https://www.ibm.com/smarterplanet/us/en/?ca=v_smarterplanet.

4 https://archive.nptel.ac.in/courses/106/105/106105166/

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

Regulation: **R 2020**

Course Code: **20IO211** **Course Name:** **FUNDAMENTALS OF IOT AND APPLICATIONS**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Identify the basic knowledge of IoT.*	3	2	-	-	2	-	1	1	-	2	-	1	3	2
CO2	*Examine requirements of various communication models and protocols.*	3	2	-	-	2	-	1	1	-	2	-	1	3	2
CO3	*Design portable IoT using Arduino/Raspberry Pi /open platform.*	3	2	-	-	2	-	1	1	-	2	-	1	3	2
CO4	*Apply data analytics and use cloud offerings related to IoT.*	3	2	-	-	2	-	1	1	-	2		1	3	2
CO5	*Summarize applications of IoT in real time scenario*	3	2	-	-	2	-	1	1	-	2	-	1	3	2
	Average	3	2	-	-	2	-	1	1	-	2	-	1	3	2

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

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

<u>SEMESTER – II</u>

20IO241	**PYTHON PROGRAMMING**	L	T	P	C
	(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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

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**

SEMESTER –II

20MC052	**ENVIRONMENTAL SCIENCE AND ENGINEERING**	L	T	P	C
	(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.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**	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:	*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) –ThirumalaiNayakar 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)

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

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)

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

<u>SEMESTER - II</u>

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

முன்கூட்டியதுறைசார்அறிவு : தேவையில்லை

பாடம்கற்றத்தின்விளைவுகள்   :
பாடத்தைவெற்றிகரமாககற்றுமுடித்தபின்பு,   அறிவாற்றல்
மாணவர்களால்முடியும்விளைவுகள்   நிலை

CO1: *சங்ககாலத்தமிழிர்களின்நெசவுமற்றும்பானைவனைதல் தொழில்நுட்பம்குறித்துகற்றுணர்தல்* — புரிதல்

CO2: *சங்ககாலத்தமிழிர்களின்கட்டிடதொழில்நுட்பம்கட்டுமான பொருட்கள்மற்றும்அவற்றைவிளகும்தளங்கள்குறித்துஅறிவு* — புரிதல்

CO3: *சங்ககாலத்தமிழிர்களின்உலோகத்தொழில், நாணயங்கள்மற்றும்மணிகள்சார்ந்ததொல்லியல்சான்றுகள்பற்றியஅறிவு* — புரிதல்

CO4: *சங்ககாலத்தமிழிர்களின்வேளாண்மை, நீர்ப்பாசனமுறைகள்மற்றும்முத்துகுளித்தல்குறித்ததெளிவு* — புரிதல்

CO5: *நவீனஅறிவியல்தமிழ்மற்றும்கன்னிதமிழ்குறித்தபுரிந்து கொள்ளலும்மற்றும்பயன்படுத்தலும்* — பகுப்பாய்வு

அலகு – I   நெசவு மற்றும் பானைத் தொழில்நுட்பம்   [03]

சங்ககாலத்தில்நெசவுத்தொழில்– பானைத்தொழில்நுட்பம்கருப்புசிவப்புபாண்டங்கள்– பாண்டகளில்கீறல்குறியீடுகள்

அலகு – II   வடிவமைப்புமற்றும்கட்டிடத்தொழில்நுட்பம்   [03]
சங்ககாலத்தில்வடிவமைப்புமற்றும்கட்டுமானங்கள்&சங்ககாலத்தில்வீட்டுப்பொருட் களில்வடிவமைப்பு–   சங்ககாலத்தில்கட்டுமானப்பொருட்களும்நடுகல்லும்– சிலப்பதிகாரத்தில்மேடைஅமைப்புபற்றியவிவரங்கள்–மாமல்லபுரச்சிற்பங்களும், கோவில்களும்– சோழர்காலத்துப்பெருங்கோயில்கள்மற்றும்பிறவழிபாடுத்தலங்கள்– நாயக்கர்காலக்கோயில்கள்–மாதிரிகட்டமைப்புகள்பற்றிஅறிதல், மதுரைமீனாட்சிஅம்மன்ஆலயம்மற்றும்திருமலைநாயக்கர்மஹால்– செட்டிநாட்டுவீடுகள்–பிரிட்டிஷ்காலத்தில்சென்னைஇந்தோ- சாரோசெனிக்கட்டிடக்கலை.

அலகு – III   உற்பத்தித்தொழில்நுட்பம்   [03]
கப்பல்கட்டும்கலை–உலோகவியல்–இரும்புத்தொழிற்சாலை–இரும்பைஉருக்குதல், எஃகு–வரலாற்றுச்சான்றுகளாகசெம்புமற்றும்தங்கநாணயங்கள்– நாணயங்கள்அச்சடித்தல்–மணிஉருவாக்கும்தொழிற்சாலைகள்–கல்மணிகள்– கண்ணாடிமணிகள்–சுடுமண்மணிகள்–சங்குமணிகள்–எலும்புத்துண்டுகள்– தொல்லியல்சான்றுகள்–சிலப்பதிகாரத்தில்மணிகளின்வகைகள்.

அலகு – IV   வேளாண்மைமற்றும்நீர்ப்பாசனத்தொழில்நுட்பம்   [03]
அணை,ஏரி,குளங்கள்,மதகு–சோழர்காலகுமிழித்தூம்பின்முக்கியத்துவம்– கால்நடைபராமரிப்பு–கால்நடைகளுக்காகவடிவமைக்கப்பட்டகிணறுகள்– வேளாண்மைமற்றும்வேளாண்மைசார்ந்தசெயல்பாடுகள்–கடல்சார்அறிவு– மீன்வளம்–முத்தும்மற்றும்முத்துக்குளித்தல்–பெருங்கடல்குறித்தபண்டையஅறிவு– அறிவுசார்சமூகம்.

அலகு – V   அறிவியல்தமிழ்மற்றும்கணினித்தமிழ்   [03]
அறிவியல்தமிழின்வளர்ச்சி–   கணினித்தமிழ்வளர்ச்சி– தமிழ்நூல்களைமின்பதிப்புசெய்தல்–தமிழ்மென்பொருட்கள்உருவாக்கம்–

B.E. – Computer Science and Engineering (Internet of Things)

தமிழ்இணையக்கல்விக்கழகம்–தமிழ்மின்னூலகம்–
இணையத்தில்தமிழ்அகராதிகள்சொற்குவைத்திட்டம்.

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

Text Books :

1 தமிழகவரலாறு-   மக்களும்பண்பாடும்-   கேகேபிள்ளை
(வெளியீடுதமிழ்நாடுபாடநூல்மற்றும்கல்வியில்பணிகள்கழகம்)

2 கணினித்தமிழ் - முனைவர்இல. சுந்தரம் (விகடன்பிரசுரம்)

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

Regulation: R 2020

Course Code: 20GE052

Course Name: தமிழரும் தொழில் நுட்பமும்/TAMILS AND TECHNOLOGY

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

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

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

<u>**SEMESTER – II**</u>

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

Prerequisite: *Knowledge in Engineering Physics*

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

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

List of Experiments in Physics Laboratory

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

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

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

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

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

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

7. Determination of Band gap energy of a semiconductor.

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

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

10. V-I Characteristics of Solar Cell.

Total : 30 Periods

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

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

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>

		L	T	P	C
20IO221	**FUNDAMENTALS OF IOT LABORATORY**	0	0	3	1

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

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

CO1:	*Examine about Arduino, LED and control intensity of light*	*Understand*
CO2:	*Describe the implement of buzzer and LCD in applications*	*Understand*
CO3:	*Implement LM35 sensor, LDR in applications*	*Apply*
CO4:	*Demonstrate the key input and servo motor.*	*Apply*
CO5:	*Summarize the concept of sensor value to upload in Cloud.*	*Understand*

LIST OF EXPERIMENTS:

1. Implement a program to Blink LED using Arduino.

2. Implement a program to control intensity light using Arduino.

3. Implement a program for LCD Display using Arduino.

4. Implement a program for Buzzer Indication using Arduino. Horn indicator different

5. Implement a program for LDR using Arduino.

6. Implement a program for LM35 Sensor using Arduino.

7. Implement a program for Key Input with LED using Arduino.

8. Implement a program for Servo Motor Control using Arduino.

Total : 45 Periods

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

Regulation: **R 2020**

Course Code: **20IO221**   **Course Name:**   **FUNDAMENTALS OF IOT LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Examine about Arduino, LED and control intensity of light.*	2	2	-	-	2	-	2	1	-	2	-	1	3	2
CO2	*Describe the implement of buzzer and LCD in applications*	2	2	-	-	2	-	2	1	-	2	-	1	3	2
CO3	*Implement LM35 sensor, LDR in applications.*	2	2	-	-	2	-	2	1	-	2	-	1	3	2
CO4	*Demonstrate the key input and servo motor.*	2	3	-	-	2	-	2	1	-	2		1	3	2
CO5	*Summarize the concept of sensor value to upload in Cloud.*	2	3	-	-	2	-	2	1	-	2	-	1	3	2
	Average	3	2	-	-	2	-	1	1	-	2	-	1	3	2

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

B.E. – Computer Science and Engineering (Internet of Things)

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

SEMESTER – II

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

Prerequisite: *Basic knowledge of C programming*

Course Outcomes: On Completion of this course , the student will be able to	*Cognitive level*
CO1: *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

KSRCE – Curriculum and Syllabi (R 2020)   47

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

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 T P C
		3 1 0 4

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

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

CO1: Solve polynomial, transcendental equations, simultaneous linear equations   *Understand*
      numerically.

CO2: Predict the unknown values by using Interpolation techniques.   *Apply*

CO3: Evaluate the problems in differentiation and integration by using numerical   *Evaluate*
      techniques.

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.

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**

<u>SEMESTER – III</u>

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

Prerequisite: Fundamentals of C programming and object-oriented concepts

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

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

UNIT – I　　　JAVA FUNDAMENTALS　　　　　　　　　　　　　　　　　　　[9]

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

UNIT – II　　　CONSTRUCTORS AND INHERITANCE　　　　　　　　　　　　　[9]

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

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

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

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

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

UNIT – V　　　STRING AND DATABASE CONNECTIVITY　　　　　　　　　　[9]

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

Total = 45 Periods

Text Books:

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

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

References:

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

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

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

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**

<u>SEMESTER – III</u>

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

Prerequisite: *Basic Knowledge of C programming*

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

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

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

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

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

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

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

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

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

UNIT – V   SEARCHING, HASHING AND SORTING   [9]

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

Total = 45 Periods

Text Books:

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

References:

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**	L	T	P	C
	(Common TO CS, CSD & IOT)	3	1	0	4

Prerequisite: No prerequisites are needed for enrolling into the course

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

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

UNIT – I   BOOLEAN ALGEBRA AND LOGIC GATES   **[9]**

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

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

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

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

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

UNIT – IV   PROCESSOR DESIGN   **[9]**

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

UNIT – V   SIMPLE COMPUTER DESIGN AND HDL   **[9]**

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

Total = 45 Periods

Text Books:

1   Morris Mano, M., Digital Logic and Computer Design, Prentice-hall of India private limited, New Delhi, First Edition, 2016.

2   John F. Wakerly, Digital Design Principles and Practices, Pearson Education, Noida, Fourth Edition, 2008.

Reference Books:

1   Charles H. Roth Jr, Fundamentals of Logic Design, Jaico Publishing House, Mumbai, Fifth Edition, 2003.

2   Kharate, G.K., Digital Electronics, Oxford University Press, USA, 2012.

3   Morris Mano, M., and Michael D. Ciletti, Digital Design, Pearson Education, New Delhi, Fifth Edition, 2013.

4   Donald D. Givone, Digital Principles and Design, Tata Mcgraw Hill, Noida, First Edition, 2003.

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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>

20IO311	**SENSOR AND DEVICES**	L	T	P	C
		3	0	0	3

Prerequisite: Basic of Internet of Things

Course Outcomes: On Completion of this course, the student will be able to	***Cognitive level***
CO1:	*Describe the basic of IoT value chain structure, application areas and technologies involved.*	*Understand*
CO2:	*Explain IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules.*	*Understand*
CO3:	*Make forecast for IoT devices with a focus on sensors.*	*Understand*
CO4:	*Discuss about Internet of Things with the help of preparing projects designed for Raspberry Pi.*	*Understand*
CO5:	*Propose the applications of sensor framework.*	*Apply*

UNIT – I   INTRODUCTION TO SIGNALS AND SYSTEMS   [9]

Introduction to Internet of Things – Definition and Characteristics of IoT– Sensors – Actuators – Physical Design of IoT – IoT Protocols – IoT communication models – IoT Communication APIs – IoT enabled Technologies – Wireless Sensor Networks – Cloud Computing.

UNIT – II   IOT AND M2M   [9]

Software defined networks – Network function virtualization – Difference between SDN and NFV for IoT– Basics of IoT System Management with NETCONF– YANG – NETCONF– YANG – SNMP NETOPEER.

UNIT – III   IOT PHYSICAL DEVICES AND ENDPOINTS   [9]

Introduction to Arduino and Raspberry Pi – Installation – Interfaces (serial, SPI, I2C) Controlling Hardware – Connecting LED – Buzzer – Switching High Power devices with transistors – Controlling AC Power devices with Relays – Controlling servo motor – Speed control of DC Motor – Unipolar and Bipolar Stepper motors.

UNIT – IV   SENSOR   [9]

Light sensor– Temperature sensor with thermistor – Voltage sensor – ADC and DAC Temperature and Humidity Sensor DHT11 – Motion Detection Sensors – Wireless Bluetooth Sensors – Level Sensors – USB Sensors – Embedded Sensors – Distance Measurement with ultrasound sensor.

UNIT – V   IOT PHYSICAL SERVERS AND CLOUD OFFERINGS   [9]

Introduction to Cloud Storage models and communication APIs Web Server – Web server for IoT – Cloud for IoT – Python web application framework Designing a RESTful web API.

Total = 45 Periods

Text Books:

1   Simon Monk, Software and Hardware Problems and solutions, Software and Hardware Problems and solutions O'Reilly, USA, First Edition, 2016.
2   Arshdeepahga and Vijay Madisetti, Internet of Things - A Hands-on Approach, Second Edition, 2015

Reference Books:

1   Peter Waher Ovidiu Vermesan, Learning Internet of Things, Packt Publishing, Second Edition, 2015
2   Sensors, Actuators and Their Interfaces, SciTech Publishers, First Edition, 2014
3   Adrian McEwen Hakim Cassimally, Designing the Internet of Things, Wiley, First Edition, 2013,
4   Olivier Hersent, David Boswarthick, Omar Elloum, The Internet of Things Key applications and Protocols', Wiley, Second Edition, 2012.

B.E. – Computer Science and Engineering (Internet of Things)

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
CO-PO MAPPING

Regulation: **R 2020**

Course Code: **20IO311**   **Course Name:**   **SENSOR AND DEVICES**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	Describe the basic of IoT value chain structure, application areas and technologies involved.	3	2	-	1	2	-	1	1	-	2	-	1	2	2
CO2	Explain IoT sensors and technological challenges faced by IoT devices, with a focus on wireless, energy, power, and sensing modules.	3	2	-	1	2	-	1	1	-	2	-	1	2	2
CO3	Make forecast for IoT devices with a focus on sensors.	3	2	-	1	2	-	1	1	-	2	-	1	2	2
CO4	Discuss about Internet of Things with the help of preparing projects designed for Raspberry Pi.	3	2	-	1	2	-	1	1	-	2		1	2	2
CO5	Propose the applications of sensor framework.	3	2	-	1	2	-	1	1	-	2	-	1	2	2
	Average	3	2	-	1	2	-	1	1	-	2	-	1	2	2

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

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

<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.

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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)

R 2020

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

SEMESTER – III

	DATA STRUCTURES LABORATORY	L	T	P	C
20IO329	(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

B.E. – Computer Science and Engineering (Internet of Things)

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

		Regulation:	**R 2020**
Course Code: 20IO329		**Course Name:**	**DATA STRUCTURES LABORATORY**

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

R 2020

K.S.R. COLLEGE OF ENGINEERING (Autonomous)
SEMESTER – III

20IO321

		L	T	P	C
SENSOR AND DEVICES LABORATORY		0	0	3	1
(Common To CSD & IOT)					

Prerequisite: Basic knowledge of Internet of Things

Course Outcomes: On Completion of this course, the student will be able to	*Cognitive level*
CO1: *Examine about Arduino, LED and control intensity of light*	*Understand*
CO2: *Describe the implement of buzzer and LCD in applications*	*Understand*
CO3: *Implement LM35 sensor, LDR in applications*	*Apply*
CO4: *Demonstrate the key input and servo motor.*	*Apply*
CO5: *Summarize the concept of sensor value to upload in Cloud.*	*Understand*

LIST OF EXPERIMENTS:

1. Data acquisition using Multimeter and oscillographic recorder

2. Connect an LED to GPIO pin 25 and control it through the command line.

3. Connect an LED to GPIO pin 24 and a Switch to GPIO 25 and control the LED with the switch.

4. The state of LED should toggle with every press of the switch Use DHT11 temperature sensor and print the temperature and humidity of the room with an interval of 15 seconds

5. Use joystick and display the direction on the screen

6. Use Light Dependent Resistor (LDR) and control an LED that should switch-on/off depending on the light.

7. Create a traffic light signal with three colored lights (Red, Orange and Green) with a duty cycle of 5-2-10 seconds.

8. Switch on and switch of a DC motor based on the position of a switch.

9. Convert an analog voltage to digital value and show it on the screen.

10. Create a door lock application using a reed switch and magnet and give a beep when the door is opened.

11. Control a 230V device (Bulb) with Raspberry Pi using a relay.

12. Control a 230V device using a threshold temperature, using a temperature sensor.

Total: 45 Periods

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

		Regulation:			**R 2020**

Course Code: 20IO321   **Course Name:**   **SENSOR AND DEVICES LABORATORY**

CO	Course Outcomes	Programme Outcomes													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	*Examine about Arduino, LED and control intensity of light*	3	2	-	1	1	-	1	1	-	1	-	1	2	2
CO2	*Describe the implement of buzzer and LCD in applications*	3	2	-	1	1	-	1	1	-	1	-	1	2	2
CO3	*Implement LM35 sensor, LDR in applications*	3	2	-	1	1	-	1	1	-	1	-	1	2	2
CO4	*Demonstrate the key input and servo motor.*	3	2	-	1	2	-	1	1	-	1		1	1	2
CO5	*Summarize the concept of sensor value to upload in Cloud.*	3	2	-	1	2	-	1	1	-	1	-	1	1	2
	Average	3	2	-	1	2	-	1	1	-	1	-	1	2	2

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

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

SEMESTER – III

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

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

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

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

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

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

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

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

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

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

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

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

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

Total =30Periods

Text Books:

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

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

References:

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

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

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

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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>

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

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

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

UNIT – I　　　ONE DIMENSIONAL RANDOM VARIABLE　　　　　　　　[12]

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

UNIT – II　　　TWO DIMENSIONAL RANDOM VARIABLES　　　　　　　[12]

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

UNIT – III　　　RANDOM PROCESSES　　　　　　　　　　　　[12]

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

UNIT – IV　　　QUEUEING MODELS　　　　　　　　　　　　[12]

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

UNIT – V　　　NETWORK MODELS　　　　　　　　　　　　[12]

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

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

Text Books:

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

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

Reference Books:

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

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

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

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

B.E. – Computer Science and Engineering (Internet of Things)

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**

<u>**SEMESTER – IV**</u>

20CD441	**THEORY OF COMPUTATION**	L	T	P	C
	(Common To CSD & IOT)	3	1	0	4

Prerequisite: *Basic concepts of discrete mathematics.*

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

UNIT– I   INTRODUCTION TO AUTOMATA THEORY   **[12]**

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

UNIT– II   REGULAR EXPRESSIONS AND LANGUAGES   **[12]**

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

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

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

UNIT – IV   PUSHDOWN AUTOMATA   **[12]**

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

UNIT–V   TURING MACHINE AND UNDECIDABLITY   **[12]**

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

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

Text Books:

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

References:

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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)

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

<u>**SEMESTER – IV**</u>

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

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

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

CO1: Be aware of database architecture and the relational algebra.   *Understand*

CO2: Apply Structured query language to create and manipulate a relational database.   *Apply*

CO3: Create functions, triggers, recursive queries and indexing.   *Apply*

CO4: Demonstrate the purpose of ER Model and normalization.   *Analyze*

CO5: Discover about transaction, query processing and advanced database concepts.   *Understand*

UNIT – I   BASIC CONCEPTS AND RELATIONAL MODEL   [9]

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

UNIT – II   SQL FUNDAMENTALS AND INTERMEDIATE SQL   [9]

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

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

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

UNIT – IV   DATABASE DESIGN   [9]

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

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

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

Total = 45 Periods

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

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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)

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

<u>SEMESTER – IV</u>

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

Prerequisite: *Basic Knowledge about data structures*

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

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

UNIT – I   DIVIDE AND CONQUER TECHNIQUE   [12]

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

UNIT – II   DECREASE AND CONQUER TECHNIQUE   [12]

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

UNIT– III   DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE   [12]

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

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

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

UNIT – V   NP PROBLEMS AND APPROXIMATION ALGORITHMS   [12]

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

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

Text Books:

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

References:

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

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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>

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

Prerequisite: *Basic knowledge of computer architecture.*

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

CO1: *Identify the components and their functionalities in the operating system.*   *Remember*
CO2: *Apply various CPU scheduling algorithms and synchronization Techniques.*   *Apply*
CO3: *Examine the performance of various memory management techniques.*   *Understand*
CO4: *Summarize the virtual memory concepts and file access methods.*   *Understand*
CO5: *Study the performance of disk management and file system.*   *Analyze*

UNIT– I   OPERATING SYSTEMS CONCEPTS   [9]

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

UNIT– II   PROCESS SCHEDULING   [9]

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

UNIT – III   DEADLOCK AND MEMORY MANAGEMENT   [9]

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

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

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

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

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

Total = 45 Periods

Text Books:

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

References:

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

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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>

20EE431	**MICROPROCESSORS AND MICROCONTROLLERS** (Common To CS & IOT)	L	T	P	C
		3	0	0	3

Prerequisite: Basic knowledge in Computer Organization and Architecture

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

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

UNIT - I   8085 MICROPROCESSORS   [9]

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

UNIT - II   8086 MICROPROCESSORS   [9]

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

UNIT - III   MULTIPROCESSOR CONFIGURATIONS   [9]

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

UNIT - IV   PERIPHERAL INTERFACING   [9]

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

UNIT - V   8051 MICROCONTROLLERS   [9]

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

Total = 45 Periods

Text Books:

1   Ramesh S. Gaonkar, Microprocessor - Architecture, programming and applications with 8085, Penram International Publisher, Sixth Edition, 2013

2   A.K. Ray, K.M. Bhurchandi, Advanced Microprocessors and Peripherals, Tata McGraw Hill, New Delhi, Third Edition, 2012.

Reference Books:

1   Kenneth J. Ayala, The 8051 Microcontroller Architecture, Programming and Applications, Penram International, Mumbai, Second Edition, 2007.

2   Doughlas V. Hall, Microprocessors and Interfacing, Programming and Hardware, Tata McGraw Hill Education, NewDelhi, Second Edition,2012.

3   Yu-Cheng Liu, Glenn A. Gibson, Microcomputer Systems: The 8086 / 8088 Family -Architecture, Programming and Design, Prentice Hall of India, New Delhi, Second Edition, 2007.

4   Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin Mc Kinlay, The 8051 Microcontroller and Embedded Systems: Using Assembly and C, Pearson education, New Delhi, Second Edition, 2011.

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

Regulation: **R 2020**

Course Code: **20EE431**   **Course Name:** **MICROPROCESSORS AND MICROCONTROLLERS**

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

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

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

<u>**SEMESTER – IV**</u>

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

Prerequisite: *Basic Knowledge in Data Structures.*

Course Outcomes: On Completion of this course, the student will be able to	***Cognitive level***
CO1: Design and implement a database schema for real time applications.	*Apply*
CO2: Populate and query a database.	*Apply*
CO3: Create and maintain tables using PL/SQL.	*Apply*
CO4: Utilize function and procedures on any application.	*Apply*
CO5: Apply trigger and generate report.	*Apply*

List of Experiments:

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

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

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

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

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

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

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

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

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

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

Total: 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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>

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

Prerequisite *Basic knowledge about the C Programming.*

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

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

List of Experiments:

1. Implementations of basic Linux commands and shell programming.

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

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

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

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

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

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

8. Write a C program to implement page replacement algorithms

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

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

Total: 45 Periods

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

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
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**

<u>**SEMESTER - IV**</u>

20EE425	**MICROPROCESSORS AND MICROCONTROLLERS LABORATORY**	L	T	P	C
	(Common To CS & IOT)	0	0	3	1

Prerequisite: *Basic knowledge in Computer Organization and Architecture*

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

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

LIST OF EXPERIMENTS

8085 Microprocessor

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

8086 Microprocessor

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

8051 Microcontroller

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

Peripheral interfacing using 8085/8051

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

Total = 45 Periods

K.S.R. COLLEGE OF ENGINEERING, TIRUCHENGODE – 637215
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B.E – COMPUTER SCIENCE AND ENGINEERING(IOT)
<u>**CO-PO MAPPING**</u>

Regulation: **R 2020**

Course Code: **20EE425**

Course Name: **MICROPROCESSORS AND MICROCONTROLLERS LABORATORY**

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

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

K.S.R. COLLEGE OF ENGINEERING (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

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

Regulation: **R 2020**

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

CO	Course 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**	**-**	-

(Programme Outcomes spans PO1–PSO2)

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