NAAC CRITERIA - 2
Student Centric Methods- Experiential Learning
Integrated Theory cum Lab Courses

PRINCIPAL

M.KUMARASAMY
COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 Certified Institution
Thalavapalayam, Karur – 639 113.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

CURRICULAM AND SYLLABUS

INTEGRATED THEORY AND LAB COURSES

Semester I

S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH101J	Technical English	2	0	2	3
3	B	18CYB101J	Chemistry	3	1	2	5
4	S	18EES101J(R)	Basic Electrical and Electronics Engineering	3	0	2	4
5	S	18CSS101J (R)	Programming for Problem Solving	2	0	2	3

Semester II

S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH102J	Professional English	2	0	2	3
3	B	18PYB101J	Physics	3	1	2	5
4	S	18MES102J	Basic Civil and Mechanical Engineering	3	0	2	4
5	S	18MES101J(R)	Engineering Graphics	1	0	4	3
6	C	18AIC101J	Python Programming	2	0	2	3

Semester III

S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
3	C	18AIC201J	**Foundation of Artificial Intelligence & Data Science&**	2	0	2	3
5	C	18AIC203J	Data Structures and Algorithms	3	0	2	4
6	C	18AIC204J(R)	Object Oriented Programming with Java	3	0	2	4

Semester IV

S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
4	C	18AIC207J	Operating Systems and Virtualization	3	0	2	4
5	C	18AIC208J(R)	Database Management Systems	3	0	2	4

Semester V							
S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	C	18AIC301J	**Machine Learning and AI Services&**	2	0	2	3
2	C	18AIC302J	**Data Analytics and Business Intelligence&**	2	0	2	3
3	C	18AIC303J	Computer Networks	3	0	2	4

Semester VI							
S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	C	18AIC305J	**Predictive Modelling and Analytics&**	2	0	2	3
2	C	18AIC306J	Analytics in Cloud Computing	3	0	2	4

Semester VII							
S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
2	C	18AIC402J	**Deep Learning Models and AI Analyst &**	3	0	2	4

HOD/AI

Department of Artificial Intelligence & Data Science
M. Kumarasamy College of Engineering,
Thalavapalayam, Karur- 639 113

Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH101J	TECHNICAL ENGLISH (Common to all UG programmes except CSBS)	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Analyze the importance of communication in personal, professional contexts. Identify proper English pronunciation
CLR-2	Strengthen vocabulary and grammar. Enhance listening and writing comprehension. Review films and documentaries
CLR-3	Writing brief paragraphs using appropriate techniques. Enhance their English fluency in speaking
CLR-4	Write effective essays, stories. Experience workplace communication aspects
CLR-5	Research on a topic and write a comprehensible academic project reports. Make effective presentations

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify types, modes, channels and barriers of communication. distinguish different speech sounds, pronounce correctly
CO2	Identify, rectify the errors in the use of grammar and vocabulary. Improve listening and writing skills
CO3	Develop a topic idea into a cohesive paragraph with examples. Improve the fluency of speaking skills
CO4	Develop ideas into logical and coherent essays. Understand better the workplace culture
CO5	Identify the steps involved in writing an academic project report. List and practice skills need for making a presentation

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO3	1	3	1	3	3	2	1	3	3	3	-	3	-	-	-
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO (Avg)	1	3	1	3	3	2.8	1	3	3	3	-	3	-	-	-

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

UNIT I	COMMUNICATION	6

Definition, Process of communication - (Filling in-Class Worksheets) - Verbal and Non-Verbal Communication(Individual and Group Activities - Role play)-Other Types of Communication: General-Technical-Formal, Informal- External, Internal (Write upon a selected type of communication)- Listening, Speaking, Reading, Writing(Group activity (Newspaper) – Discussion and Feedback)- Communication and Language Barriers(Individual Activity- Sharing of Personal Experiences)-Body language(Mime).

UNIT II	VOCABULARY AND GRAMMAR	7

Words with Foreign Roots, Word Formation – Inflectional, Derivational Prefixes, Suffixes(Quiz - Identifying the Borrowed roots and Their Meanings-Worksheet Exercise)-Synonyms and Antonyms and Standard Abbreviations(Context Based Activity / Learner Compiling Standard Abbreviations from Core Subject)-Homonyms and Homophones(Fun Activities – Worksheets- Cross Words)-Articles, Tenses(Exercise through Worksheets- Individual Activity -Peer Correction- Open Discussion)- Noun-Pronoun Agreement and Subject-Verb Agreement(Identifying and Learning through Error Analysis – Worksheets)-Misplaced Modifiers - Prepositions- Prepositional verbs and Phrasal verbs(Learn through Practice – Placing Same Modifier in Different Places in a Sentence)-Prepositions- Prepositional Verbs and Phrasal Verbs(Filling in-Class Worksheets)

UNIT III	DISCOURSE TECHNIQUES	7

Sentence Structure, Phrases and Clauses(Exercise: Worksheet, Identifying Phrases, Clauses, Compound, Complex Sentences)-Developing Ideas into Paragraphs –Cohesion Markers(Identify Topic sentence in a Paragraph; Writing a Paragraph Based on a Topic)- -Inputs on Writing Precisely, Redundancies, Wordiness-Repetition-Clichés(Error Analysis and Editing)-Defining, Describing Technical Terms(Writing Definitions-Product and Process Description)-Inputs on Classifying/Categorising and Sequencing Ideas with Relevant Diagrams(Writing a Passage on the Given hints, Tree Diagram, Classification Table and Flow Chart)-Importance of Punctuation – Miscommunication –(Fun Activities - Worksheets for Appropriate Punctuation – Written)- Errors in Punctuation(Fun Activities - Worksheets for Appropriate Punctuation – Written)

UNIT IV	WORKPLACE COMMUNICATION	6

Reading Comprehension, Guidelines questions (Referential, Critical,Interpretative)(Practice Excercise) - Précis-writing Guidelines(Practice Excercise) - Summarising(Group Activity (Oral/Written) on the Given Passages)-Essay Writing Guidelines: Introduction, Elaboration and Conclusion with Examples(Individual Activity (Written) on the Given Topic)-Organisational Report Writing - Progress Report- Guidelines(Writing a Progress Report)-Interview Skills(Mock Interview).

UNIT V	PROJECT WRITING	5

Topics for Project Writing(Discussion)- Collection of Data – Avoiding Plagiarism-Authenticity and Credibility of Data(Collection of Data for Verification)- Guidelines for Writing: Outline- Objectives-Background- Methodology-Discussion-Documentation(Drafting an Outline & Preparing References)-Discussion Using Sample Project(Writing the First Draft on the Selected Topic)-Checklist for Project Format (PPT)(Self-Verification and Submission of Final Draft).

LIST OF EXPERIMENTS	14

1. Often Mispronounced sounds (Audio Visual Material - Listening to minimal pairs and reproducing)
2. Barriers of communication- Language barriers – videos (Identifying the Language Barriers of communication –Written)
3. Short Biographical Account on Famous Personalities –Video(Oral Paraphrasing of the Content Shown)
4. Listening to Long Conversations, Daily Life (Identify Various Communication Contexts and Answering Questions – Collocation)
5. Introduction to Englishes -British and American –Videos (Discussion on Differences between British and American Words)
6. Speaking - Practice Activity – Brain Storming – Mind Mapping (Just a Minute)

7. Describing a Scene or Event –Videos (String Narration – Describing an Event or a Scene) 8. Technical Communication – Interpreting Data (Group Activity - Interpretation of Data - Oral Presentation) 9. Sample Case Studies for Work Ethics – Videos (Debate on the Videos Shown) 10. Learning Interview Techniques through Models (Mock Interview) 11. Guidelines for Preparing a PPT; Presentation Techniques (Preparing PPT on the Topic of Learners' Choice) 12. Formal Presentation	
Text Book (s)	
1	Abirami K ,Technical English , R.K.Publishers, Coimbatore.
Reference (s)	
1	Swan, Michael. Practical English Usage. OUP, 1995
2	Kumar Sanjay and PushpaLata. Communication Skills. OUP, 2011
3	CIEFL, Hyderabad. Exercises in Spoken English. Parts I-III. OUP
4	Anbazhagan K, Cauveri B, Devika M.P., English for Engineers. Cengage, 2016
5	www.mmm.english.com
6	www.onlinewriting.com/purdue
7	www.ieee.org/index.html

M. KUMARASAMY COLLEGE OF ENGG.(AUTONOMOUS)
Approved By
Board of Science & Humanities
02 NOV 2020
KARUR - 639 113

Regulation 2018		Semester I /Semester II	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18CYB101J	CHEMISTRY (Common for all UG Programmes except CSBS)	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- Apply the basic principles of chemistry at both atomic and molecular levels in understanding the concepts related to the engineering field.
- Integrate the chemical principles in their projects undertaken in their respective fields
- Enhance the quality of a materials used in the product from the technological aspects for societal applications

Course Outcome (s) (Cos):

At the end of this course, learners will be able to:

CO1	Identify the suitable polymeric materials fabrication processes in various application
CO2	Apply the basic principle of inorganic chemistry at the atomic and molecular levels
CO3	Apply the various thermodynamic and kinetics concepts to real system
CO4	Assemble a battery through the understanding of electrochemical principles
CO5	Catagorize the Engineering materials for their applications

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-	-	-

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2: Moderate (Medium) 3: Substantial (High)

UNIT I	ENGINEERING ORGANIC MATERIALS	9+3

Polymer – Introduction- Classification(Based on Molecular Weight, Structure and Usage) - Types of Polymerization (Addition, Condensation and Copolymerisation) -Crystallinity, Melting Point and Glass Transition temperature-Mechanism of Polymerization(Free Radical Addition Polymerization) -Elastomer-Structure and Curing (Vulcanization)- Fabrication and Molding of Polymers (Injection Molding and Blow Molding)- Engineering Plastics – PE, PVC, PMMA, Phenol Formaldehyde Resin , Urea Formaldehyde Resin (Preparation, Properties and Uses)- Industrial Applications of Polymers.

UNIT II	COORDINATION AND ORGANOMETALLIC COMPOUNDS	9+3

Co-Ordination compounds – Introduction- Nomenclature- Types of Ligands (Mono, Di and Polydendate Ligands)-Isomerism (Structural and Stereo Isomerism) – Theories of Bonding (Werner and Sidgwick Pouvell Theory (EAN Rule)) – Applications – EDTA Titration – Organometallic Compounds - Synthesis (Organo Zinc, Organo Lithium and Organo Magnesium) – Applications (18 Electron Rule, Ziegler Natta Catalyst and Hydroformylation)

UNIT III	THERMODYNAMICS AND KINETICS	9+3

Introduction- First and Second Law of Thermodynamics – Gibbs –Helmholtz Equation – Clausius Clapeyron Equation – Maxwell Relations – Vant Hoff Isotherm and Isochore (Problems also)- Kinetics- Introduction-Types of Reactions (Opposing, Consecutive and Parallel Reactions) - Chain Reactions (HBr and HCl formation)- Applications of Kinetics and Thermodynamics.

UNIT IV	ENGINEERING ELECTROCHEMISTRY	9+3

Introduction- Conductors and its types - Cells (Electrolytic and Electrochemical cells) – Standard electrode potential- Nernst equation of an electrode- Types of electrodes (SHE and Calomel electrode)- Batteries – Types (Primary, Secondary, Flow and Reserve battery)- Examples (Lead acid battery, Ni-Cd battery, Lithium battery, Lithium sulphur battery and Hydrogen- Oxygen fuel cells)- Graphene.

UNIT V	INDUSTRIAL APPLICATIONS OF CHEMISTRY	9+3

Cement (Types, manufacture and properties) – Paints (constitutions and functions)- Lubricants- types-mechanism – properties-Abrasives – types –Diamond, Corundum, Emery, Garnet, Quartz, Silicon carbide, Carborundum-Boron Carbide, Alundum (preparation, properties and uses) –Applications – Basics of Biosensor and Biochips.

LIST OF EXPERIMENTS	30

1. Determination of total , permanent and temporary hardness of water sample (EDTA method)
2. Determination of alkalinity in water sample - Indicator method
3. Determination of chloride content of water sample by Argentometric method (Mohr's method)
4. Determination of dissolved oxygen content of water sample by winkler's method

5. Conductometric titration of strong acid with strong base
6. Conductometric titration of mixture of acids
7. Determination of strength and amount of Hydrochloric acid- pH metry
8. Estimation of strength and amount of ferrous ion by potentiometric method
9. Determination of molecular weight of a polymer by viscometry method
10. Estimation of ferrous ion by colorimetry.
11. Cement analysis

Text books / Reference books:

1	B.L.Tembe, Kamaluddin and M.S.Krishnan , "Engineering Chemistry"
2	S.S. Dara "A Text book of Engineering Chemistry" S.Chand & Co.Ltd, New Delhi (2009).
3	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., NewDelhi (2012).
4	Shashi Chawla, Engineering Chemistry: Dhanpat Rai &Co., 3rd Edition, 2015
5	www.nptel.ac.in

Regulation 2018		Semester I	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18EES101J(R)	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Gain knowledge about the D.C and A.C circuits.
2	Impart the fundamentals of electrical machines.
3	Study the fundamentals of semiconductor devices
4	Study the working concepts of measuring instruments.
5	Know about digital logic concepts and operational amplifier.

Course Outcome (s) (COs):

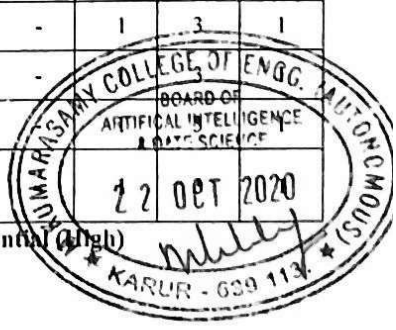
At the end of this course, learners will be able to:

CO1	Apply the concepts of ohm's law and Kirchhoff's law in DC and AC circuits
CO2	Explain the basic concepts of DC motor, DC generator, Transformer and Induction motor.
CO3	Summarize the nature of semiconductor devices.
CO4	Interpret the concept of measuring devices like PMMC, MI, energy meter and wattmeter.
CO5	Infer the concept of electronics devices and conversion techniques

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	1	1	-	1	3	1
CO2	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO3	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO4	3	-	1	1	1	-	-	-	1	1	-			
CO5	3	-	1	1	1	-	-	-	1	1				
CO (Avg)	3	0.4	1	1	1	-	-	-	1	1				

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



UNIT I	ELECTRICAL CIRCUITS	9
Electrical quantities: Resistors, Inductors, Capacitors - Ohm's Law - Kirchoff's Laws -Series and Parallel circuits - Analysis of DC circuits: Mesh & Nodal analysis, Thevenin's Theorem, Norton's Theorem & Maximum Power Transfer Theorem, Star delta Transformation, RL & RC Transient Analysis. Introduction to AC Circuits: Waveforms and RMS Value – Power and Power factor- Introduction to three phase systems – Types of connections, Relationship between line and phase values		
UNIT II	**ELECTRICAL MACHINES**	**9**
Faraday's laws- Construction, Principle of Operation, Basic Equations of DC Generators, DC Motors – Two Point & Three Point Starter – Construction, Working and EMF Equation of Single Phase Transformer – Construction and Working of AC Generator – Three Phase Induction Motor: Construction and Working of Squirrel Cage and Slip Ring Induction Motor – Single Phase Induction Motor (Split Phase, Capacitor Start Induction Motor)		
UNIT III	**ELECTRONIC DEVICES**	**9**
Intrinsic and Extrinsic Semiconductors – PN junction diode , Zener diode and its Characteristics – Operation of Half Wave, Full Wave and Bridge Type Rectifiers – Bipolar Junction Transistor: Configurations and Characteristics of CB, CE, CC – Construction and Operation of JFET, MOSFET..		
UNIT IV	**MEASUREMENTS**	**9**
Basic Principles and Classification of Instruments – Construction and Working of PMMC, MI Instruments (Attraction & Repulsion type) – Principle of Operation of Dynamometer Type Wattmeter, Induction Type Energy Meter – Instrument transformer – CRO – Megger		
UNIT V	**DIGITAL & INTEGRATED DEVICES**	**9**
Number Systems – Boolean Theorems– Logic Gates – Half Adder and Full Adder Circuit – Flip-Flops: RS, JK,T and D – A/D Converter (Successive Approximation Type) – D/A Converter (Binary Weighted Type) – Op-Amp : Functional Block and Types (Inverting , Non-Inverting & Differential Amplifier)		
	LIST OF EXPERIMENTS	**15**
1. Verification of Ohm's & Kirchoff's Laws 2. Types of Wiring (Fluorescent Lamp & Staircase) 3. Verification of Thevenin's Theorem 4. Verification of Norton's Theorem 5. Characteristics of PN Junction Diode 6. Characteristics of Common Base Configuration. 7. Characteristics of Common Emitter Configuration. 8. Measurement of Ripple Factor : Half Wave & Full Wave Rectifier. 9. Study of AC and DC Machines 10. Verification of Logic Gates 11. Study of PMMC and MI Meters		

Text Book (s)	
1	R. Muthusubramanian, S. Salivahanan,"Basic Electrical and Electronics Engineering," Tata McGraw-Hill, 2012
2	Sawhney, A.K., "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2011.
Reference (s)	
1	Dash.S.S, Subramani.C, Vijayakumar.K, "Basic Electrical Engineering", Vijay Nicole, 1st Edition, 2013.
2	Jegatheesan.R, "Analysis of Electric Circuits", Tata McGraw-Hill, 2014.
3	Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI Learning Private Ltd, 2nd Edition, 2010.

Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18CSS101J (R)	PROGRAMMING FOR PROBLEM SOLVING	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CO1	Learn programming using a structured programming language.
CO2	Provide exposure on C programming.
CO3	Introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

Course Outcome (s) (COs):

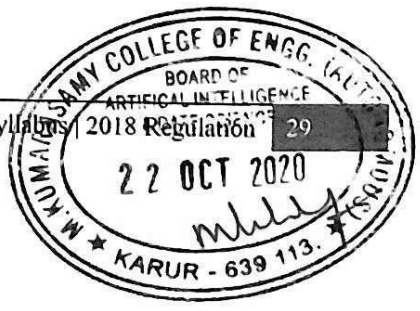
At the end of this course, learners will be able to:

CO1	Apply the problem solving techniques for solving numeric and string problems
CO2	Solve basic numeric problems using control statements in C
CO3	Develop the C program using the concepts of array and string.
CO4	Apply the concept of function prototypes and pointers.
CO5	Compare the performance of structures and union in memory management.

CO-PO Mapping

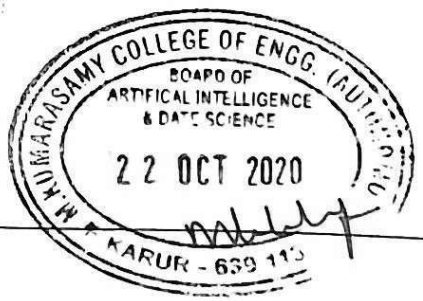
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	1	-	1	3	3	3
CO2	3	3	3	3	3	1	-	-	1	-	1	3	3	3
CO3	3	3	3	3	3	1	-	-	1	-	1	3	3	3
CO4	3	3	3	3	3	1	-	-	1	-	1	3	3	3
CO5	3	3	3	3	3	1	-	-	1	-	1	3	3	3
CO (Avg)	3	3	3	3	3	1	-	-	1	-	1	3	3	3

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

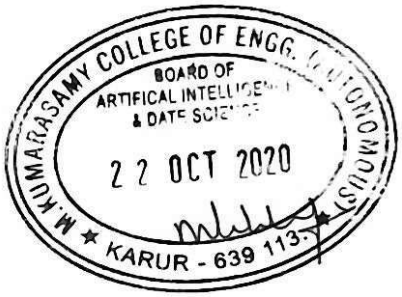


UNIT I	INTRODUCTION	6
Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems – Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.		
UNIT II	**C PROGRAMMING BASICS**	**6**
Structure of 'C' program – Tokens – Data Types – Operators – Input and Output operations – Decision Making and Branching – Looping Statement.		
UNIT III	**ARRAYS AND STRING**	**6**
Arrays: Declaration – Initialization – One dimensional and Two dimensional arrays – String: String Declaration and Initialization – String Function.		
UNIT IV	**STRUCTURES AND POINTERS**	**6**
Introduction to Structures-Needs for Structure Data type – Structure: Definition, Declaration – Structure vs Union. Pointers – Definition – Initialization – Pointer and arrays – Null Pointer – Pointer to Structure		
UNIT V	**FUNCTIONS**	**6**
Function – Definition of function – Declaration of function – Function Prototype – Pass by value – Pass by reference.		
	LIST OF EXPERIMENTS	**15**

1. Programs on Operators
2. Programs on Control statements
3. Programs on one Dimensional Array
4. Programs on Two Dimensional Array
5. Programs on String Handling
6. Programs on Function using Call by Value
7. Programs on Function using Call by Reference
8. Programs on Pointers
9. Programs on Structure
10. Programs on Union



Text Book (s)	
1	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley(India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2	PradipDey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition,Oxford University Press, 2009
Reference (s)	
1	Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill,2006.
2	Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
3	Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, PearsonEducation, 2006.
4	Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.



Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH102J	PROFESSIONAL ENGLISH (Common to all UG programmes except CSBS)	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Develop team spirit and stress management skill
CLR-2	Demonstrate the interpersonal skills of the learners
CLR-3	Make learners perform well in interviews
CLR-4	Enable them to listen well and express their ideas, opinions effectively in official contexts
CLR-5	Sharpen their reading comprehension skill
CLR-6	Strengthen their official written communication skill.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Work in a team under any situation.
CO2	Practice interpersonal relationships in workplace
CO3	Face interviews confidently and successfully
CO4	Participate and excel in role plays, presentations and formal conversations.
CO5	Read and infer the meanings of technical and aesthetic passages.
CO6	Draft official letters, reports, memos, emails, etc.,

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO3	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO6	1	1	3	3	3	3	1	3	3	3	-	3	-	-	-
CO (Avg)	1	2.66	1.33	3	3	3	1	3	3	3	-	3	-	-	-

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

UNIT I	SOFT SKILLS	7
Introduction to Soft Skills(MCQ on Soft Skills)- Leadership Skills(Handling a Team) - Optimism & Business Etiquettes(Presentations on How to Handle Situations Effectively)- Team Management (Motivational Videos on Positive Thinking)- Time Management(Discussion on Real Time Hardships) -StressManagement(Handling Criticism)- Organizational Communication - Channels of Communication(Case Study).		
UNIT II	**LISTENING**	**7**
Listening Skills: Active Listening, Passive Listening(Classroom Listening Activities)-Methods for improving Listening Skills, Listening and its process – Barriers to Listening(Innovative Practices and Strategies for Better Listening) – Listening to Pre-Recorded video/audio (Listening to Famous Motivational Speeches)- Listening to Reading in the Class - for Vocabulary - for Complete Understanding – for Better Pronunciation(Read aloud a Story or an Article to Listen and Complete the Task) - Listening for General Content – Listening to fill up Information(Listening –fill in the Form Activity) – Intensive Listening for Specific Purpose-Listening to Monologues(Listening to Announcements) -Extensive Listening(Listening to Business News).		
UNIT III	**SPEAKING**	**5**
Defining Presentation and its Purpose; Audience & Local; Organizing Contents; Preparing Outline(Mini presentation)- Audio-Visual Aids; Nuances of Delivery; Body Language;(PPT Presentation) - Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice(Voice Modulation Practice)-Interviews &Its Types- Role Play(Mock Interview) - Group Discussion-Oral Presentations -Formal Conversations(Group Discussion Practice) .		
UNIT IV	**READING**	**5**
Reading & Its Types- Techniques for Good Comprehension, Reading Comprehension(Reading Comprehension Exercises) - Cloze Test ,Reading Newspaper- Editorials & Business Articles (Cloze Test Exercises)- Inferring Meaning- Improving Comprehension Skills(Reading for Meaning) - Skimming and Scanning– Structure of the Text – Structure of Paragraphs(Skimming and Scanning Exercises) - Interpreting Visual Communication(Graphs, Charts, Tables)(Interpreting the Graphical images).		
UNIT V	**WRITING**	**5**
Writing Official Letters(Invitation Letter (Accepting & Declining),Quotation, Ordering, Complaining, Seeking Clarification)(Business Letter Writing Exercises), Writing Official Letters(Permission – In-Plant Training)- Writing CV (Job Application)(Job Application Letter Exercise)- Essay Writing- Email Writing - Writing Reports & Proposal(Writing a Business Report)- Writing Circulars, Memos, Agenda & Minutes(Exercises on Writing Circulars, Memos, Agenda & Minutes).		
	LIST OF EXPERIMENTS	**16**

1. Videos on Stress Management (Stress Management Activities)
2. Videos on Team Spirit (Team Activities)
3. Listening to TED Talks(Listening to Business Interviews)
4. Listening to Business Presentation (Listening to Business Interviews)
5. Telephonic Conversation (Organizing a Meeting)
6. Product Launch (Persuasive Speech)
7. Business Conversations
8. Business Role Play Activities
9. Reading for Pleasure(Intensive Reading)
10. Extensive Reading(Briefing Favourite Self Help Books)

	11. Reading Newspaper articles(Reading Business Reports) 12. Reading Business Legends Success Formula(Read Between the Lines) 13. Writing an Advertisement (Writing Slogans for Products) 14. Error Correction Exercises (Formal Language expressions) 15. Business Vocabulary (Writing Official E-mails) 16. Writing Business Proposals (Writing Permission Letters)
Text Book (s)	
1	Abirami K, "Professional English", First Edition, R.K.Publishers, Coimbatore, 2019.
Reference (s)	
1	Lina Muhkopadhyay, et al., "English for Jobseekers" ,Cambridge University Press, New Delhi,2013
2	Brook Hart Guy , Business Benchmark Advanced Personal Study Book for BEC and BULATS, Cambridge
3	Mascull , Bill, Business Vocabulary in Use, Third Edition, Nov 2017
4	Emerson Paul, Business English Handbook ,Advanced, Macmillan
5	www.Business English Site.com
6	www.businessenglishpod.com

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02 NOV 2020
KARUR - 639 113

Regulation 2018		Semester I/Semester II	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18PYB101J	PHYSICS (Common for all UG Programmes except CSBS)	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):
The purpose of learning this course is to:

CLR-1	Identify the applications of electric field on materials
CLR-2	Identify the applications of magnetic field on materials
CLR-3	Identify the significance of quantum theory
CLR-4	Create insights to the concepts of optical effects
CLR-5	Analyze the working principle of lasers and optical fibers

Course Outcome (s) (Cos):
At the end of this course, learners will be able to:

CO1	Identify the effect of charge dynamics
CO2	Analyze electromagnetic induction
CO3	Apply quantum mechanics to basic physical problems
CO4	Apply ray propagation and optical effects
CO5	Identify the applications of lasers and optical fiber

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-

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

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UNIT I	ELECTROSTATICS AND DIELECTRIC MATERIALS	9+3

Del-divergence-curl and gradient operations in vector calculus-Gauss-divergence and Stoke's theorem-Electric field and electrostatic potential for a charge distribution-Gauss' law and its applications-Laplace's equations for electrostatic potential-Poisson's equations for electrostatic potential-Solving Problems-Concepts of electric current-Continuity equation-Laws of magnetism-Faraday's law-Ampere's law-Maxwell's equations-Solving Problems-Polarizations, permeability and dielectric constant -Polar and non-polar dielectrics -Types of polarization-Frequency and temperature dependence-Internal field in a field-Clausius-Mossotti equation-Solving Problems.

UNIT II	MAGNETIC AND SUPERCONDUCTING MATERIALS	9+3

Magnetization, permeability and susceptibility-Classification of magnetic materials-Ferromagnetism-Concepts of ferromagnetic domains –Hysteresis-Solving Problems -Properties and applications of ferromagnetic materials -Hard and soft magnetic materials -Ferrimagnetic materials - Magnetic bubbles – Ferrites- Solving Problems-Superconductivity -Properties of superconductivity -Type I & Type II superconductors-High Tc superconductors – SQUID – CRYOTRON-MAG LEV-Solving Problems.

UNIT III	QUANTUM PHYSICS	9+3

Introduction to Quantum mechanics-Explanation of wave nature of particles-Black body radiation-Compton effect-Solving Problems-Photoelectric effect-de Broglie hypothesis for matter waves - Physical Significance of wave function -Time independent Schrödinger's wave equation -Time dependent Schrödinger's wave equation -Solving Problems-Particle in a 1 D box -Normalization - Born interpretation of wave function -Properties of Matter waves-Verification of matter waves-G.P. Thomson Experiment-Solving Problems.

UNIT IV	WAVE OPTICS	9+3

Introduction to interference-Introduction to diffraction-Fresnel diffraction-Fraunhofer diffraction-Fraunhofer diffraction at single slit-Fraunhofer diffraction at double slit-Solving Problems-Fraunhofer diffraction at multiple slit-Diffraction grating-Characteristics of diffraction grating-Applications of diffraction grating-Polarization by reflection-Polarization by double refraction-Solving Problems -Scattering of light-Circular polarization-Elliptical polarization-Optical activity-Fresnel's relation -Brewster's angle--Solving Problems.

UNIT V	LASER AND FIBER OPTICS	9+3

Absorption and emission processes-two level-Einstein's theory of matter radiation A and B coefficients-Characteristics of laser beams-Amplification of light by population inversion-Threshold population inversion-Essential components of laser system and pumping mechanisms-Solving Problems-Nd: YAG laser-Semiconductor laser-CO_2laser Vibrational modes- CO_2 laser-energy level-Optical fiber-physical structure-Total internal reflection-Solving Problems-Numerical aperture - Acceptance angle-Losses associated with optical fibers-Classification of optical fibers-Optical fiber communications system-Optical sensors-Solving Problems.

LIST OF EXPERIMENTS	30

1. Basics of experimentation
2. Determine dielectric constant of the sample
3. Calibrate Ammeter using Potentiometer
4. Calibrate voltmeter using Potentiometer
5. Determine the energy loss of magnetic materials using B-H curve experiment
6. Determine Planck's Constant
7. Study of I-V characteristics of a light dependent resistor (LDR)
8. Determine wavelength of monochromatic light by Newton's ring
9. Determine particle size using laser
10. Determine wavelength of using diffraction grating
11. Determine wavelength for a given laser source
12. Study of numerical aperture and acceptance angle of optical fiber
13. Mini project

Text books/ References:

1	David Jeffery Griffiths, Introduction to Electrodynamics, Revised edition, Pearson, 2013
2	Ajay Ghatak, Optics, Tata McGraw Hill Education, 5th edition, 2012
3	David Halliday, Fundamentals of Physics, 7th edition, John Wiley & Sons Australia, Ltd, 2004
4	Berg and Resnick, Quantum Physics: Of Atoms, Molecules, Solids, Nuclei and Particles, 2nd Edition, 1985

Regulation 2018		Semester II	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES102J	BASIC CIVIL AND MECHANICAL ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Select building materials and identify the components of a building
2	Identify the various transportation systems, bridges, dams and water supply system
3	Apply the concept of Harnessing energy from various energy sources
4	Know the working of IC engines and identify the sub system requirements
5	Apply manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the building materials and its applications
CO2	Identify different transportation system, water supply system and its applications
CO3	List the basic components and analyze the working of major power plants
CO4	Identify the working of IC engines and understand the need of various auxiliary systems
CO5	Identify manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	3	3	-	-	-	-	3	1	-
CO2	3	3	3	2	2	3	3	-	-	-	-	3	1	-
CO3	3	3	3	2	2	-	3	-	-	-	-	1	1	-
CO4	3	3	3	2	2	-	3	-	-	-	-	1	3	1
CO5	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO (Avg)	3	3	3	2	2	1.2	2.4	-	-	-	-	1.8	1.8	0.6

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

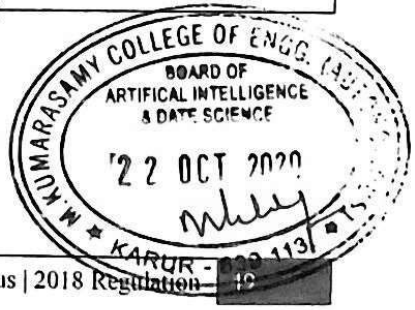
UNIT I	BUILDING MATERIALS	9
Introduction to Civil Engineering, Building Materials, History, Disciplines in Civil Engineering, Early constructions and development over time, Ancient Monuments: Peruvudaiyar or Brihadeeswarar Temple, Kallanai dam Grand Anicut, Taj Mahal, Golconda fort, Angkor Wat, Pyramids of Giza, Colosseum Development of various materials, Methods of Construction, Building Materials - Stone – Classification of Rocks, Quarrying, Dressing, Properties and Uses of Stone Mortar, Plain and Reinforced Cement, Concrete Grade and properties and uses, Necessity of Special Concrete, Self Compacting Concrete, Construction Chemicals (Plasticizers), Recycling: construction, demolition wastes, Buildings, Classification of Buildings, Selection of site for a building, Components of Buildings, Soil, General types of soil, Bearing Capacity, Factors affecting bearing capacity, Foundations: Functions, General types of, foundation, Shallow foundations		
UNIT II	**RANSPORTATION AND WATER SYSTEM**	**9**
Cement concrete flooring, Marble flooring, Granite flooring, Ceramic tile flooring, Roofs: Types of roofs, Madras terrace roof, Reinforced concrete roofs, Trussed roof, Roof Coverings: Types, Weathering course: Types, Mode of Transportation - Highways - Classification of Roads, Cross section details of flexible pavements, Railways – Zone and Headquarters, Permanent way and its requirement, Components of Permanent way, Bridges: Components of Bridge, Types, Dams: Purpose, Classification, Gravity dams - Advantages and Disadvantages, Elements of protected Water Supply system, Objective, Quantity of water, Design period, Per-capita demand, Factor affecting per capita demand, Sources of Water Supply, Standards of Drinking water, Drinking Water Treatment: Objectives, Treatment plant process, Sewage: Method of collection, Sewage treatment and disposal		
UNIT III	**POWER PLANTS**	**9**
Coal based thermal Power Plant: layout, components description, working, advantages, disadvantages, Hydro Electric power plant: layout, components description, working, advantages and disadvantages, Nuclear power plant: Nuclear fission and fusion reactions, Nuclear reactor, components description, Layout, working, merits and demerits of boiling water reactor , Layout, working, merits and demerits of pressurized water reactor, Gas turbine power plants: components description, working and types gas turbines, methods to improve performance, Layout and working of open cycle plant with intercooling, reheating, regeneration, Solar Thermal power plant: layout of Flat plate collector based plant, central receiver type plant, advantages, disadvantages, Wind energy conversion system – wind turbine types, Working, advantages and disadvantages		
UNIT IV	**INTERNAL COMBUSTION ENGINES**	**9**
Engine: Classification, operations of 2 stroke & 4 stroke, Comparison of SI & CI engines, Fuel supply system and Battery ignition system, Magneto ignition system of SI engine, Working of a simple carburetor, GDI, MPFI, CRDI, Lubrication system of an engine, Functions and Working of mist and forced feed lubrication system, Cooling system of an engine – Working of air cooled (fins), Water cooled engines (forced circulation), Alternate fuels for IC Engines. Liquid fuels: methanol, ethanol, vegetable oil, Biodiesel, Gaseous fuel: Hydrogen, CNG, LPG, properties, advantages, disadvantages, Emissions from engine – Emission standards – Euro, BS, Emission control measures – Catalytic converter, Exhaust gas recirculation, Introduction to electric vehicles, Hybrid and autonomous vehicles		

UNIT V	CASTING AND FORMING PROCESS	9

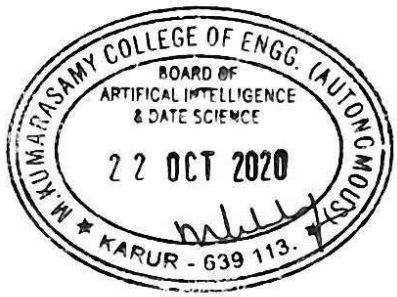
Casting introduction and history, Expandable mold casting process , Production steps in a typical sand-casting process, terms including patterns and core, Other expendable mold casting: shell molding, vacuum molding, expanded polystyrene process, Investment casting, Permanent mold casting: hot chamber and cold chamber die casting & Permanent moldcasting: Semi centrifugal and centrifuge casting, Metal forming introduction and its classification, metals and alloys, Bulk deformation: hot, cold forging processes, hot rolling processes, cold rolling processes, Rolling mill classification, hot and cold extrusion processes, wire and bar drawing processes, Sheet metal working, applications. Cutting operations: shearing, blanking, punching, cutoff, parting, slotting, perforating, notching, trimming, shaving, fine blanking, Bending operations: V-bending, edge bending, flanging, hemming, seaming, curling, spring back effect, Drawing operations, its defects, coining, embossing, ironing, lancing, twisting

LIST OF EXPERIMENTS	30

1. Study about Brick, Stone & Cement: Types, Uses, Structural steel, Timber properties and uses
2. Study about Water Supply, Distribution System, Water Treatment Plant, Sewerage System
3. Study about basics of Casting, processes, Equipment"s, To make the mould using stepped flange
4. Basics of Metal Arc welding operations, Equipment"s, Tools, Butt joint of two metal plates using arc welding process
5. Welding-Lap joint of two metal plates overlapping on one another using arc welding process.
6. Basics of fitting practice, tools and method of producing models, Tools, Step fitting of two metal plates using fitting tools
7. Half Round, Vee fitting of two metal plates using fitting tools
8. Basics of Carpentry operations, Equipment"s, Tools, Cross halving joint of two wooden pieces at perpendicular direction
9. To make duster from wooden piece using carpentry tools.
10. Basics of Sheet metal operations, Equipment"s, Tools and demonstration of producing models, To make geometrical shape like frustum
11. Sheet metal operations - To make geometrical shape like square tray, rectangulat tray
12. Sheet metal operations - To make geometrical shape like Cone , Funnel
13. Study the basics of moulding and processes, Equipment"s, To make plastic models using injection moulding of simple part
14. Basics of Plumbing practices for G.I and P.V.C., Tools and demonstration of producing models
15. Plumbing of bathroom/ kitchen fittings using G.I. fittings, P.V.C. fittings



Text Book (s)	
1	Dr.V. Rameshbabu,"Basic of Civil and Mechanical Engineering", VRB Publishers pvt ltd, 2017
Reference (s)	
1	SeropeKalpakjian, Steven Schmid," Manufacturing Processes for Engineering Materials", Pearson, 2016
2	Drbal, Larry F. Boston, Patricia G. Westra, Kayla L. Black, Veatch, "Power Plant Engineering", Kluwer Academic Pub., 1995
3	Andy Walker, "Solar Energy", John Wiley & Sons, 2013
4	John B. Heywood, "Internal Combustion Engine Fundamentals", Tata McGraw Hill Education, 2017
5	Kumar. T, LeenusJesu Martin and Murali. G, "Basic Mechanical Engineering", Suma Publications Chennai, 2007.



Regulation 2018		Semester I / II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES101J (R)	ENGINEERING GRAPHICS	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):

- Construct ellipse, Parabola, hyperbola, cycloid and involutes.
- Sketch the projection of points, straight lines and plane surfaces.
- Sketch the Projection of simple solids like prisms, pyramids, cylinder and cone
- Sketch the sectional solids and developing the lateral surfaces of simple solids
- Understand the three dimensional drawing of simple solid by isometric projection and perspective projection, and convert isometric projection to orthographic projection.

Course Outcome (s) (COs):

CO1	Construct the ellipse, Parabola, hyperbola, cycloid, and involutes
CO2	Draw the projection of point, straight line, and plane surface inclined to both reference plane
CO3	Draw the projection of solid objects prisms, cylinders, pyramids, and cones inclined to one reference plane
CO4	Develop the lateral surfaces of the sectional solids
CO5	Build 3D part models using isometric and perspective projection

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3		1			1	2	2		2	-	-	-
CO2	3	3	3		2			1	2	2		2	-	-	-
CO3	3	2	3		2			1	2	2		2	-	-	-
CO4	3	2	3		2			1	2	2		2	-	-	-
CO5	3	2	3		2			1	2	3		2	-	-	-

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

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UNIT I	PLANE CURVES	12

Principles of Engineering Graphics - Lettering - dimensioning - Curves used in engineering practices: Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes – Drawing of tangents and normal to the above curves.

UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	12

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations.
Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III	PROJECTION OF SOLIDS	12

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	12

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	12

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.
Perspective projection of prisms, pyramids and cylinders by visual ray method. Isometric to orthographic multi-view.

Text Book (s)

1	K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai. 2016
2	C. Ramesh, SC Prasanna & M. Karthe "Engineering Graphics", R.K.Publishers, Coimbatore, 2020

Reference (s)

1	K. Venugopal & V. Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 15th edition (2018)
2	K. R. Gopalakrishnana, "Engineering Drawing" (Vol.I&II), Subhas Publications, 2010.
3	R. L Jhala "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, New Delhi, 2015.
4	Dhananjay A.Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2008.
5	Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2012.
6	M.S. Kumar, "Engineering Graphics", D.D. Publications, 2012.

List of Laboratory Expertiments

1	Draw the Spiral & involutes using B Spline or cubic spline by using AutoCAD
2	Draw the Plan of residential building by using AutoCAD
3	Draw the Simple Steel Truss by using AutoCAD
4	Draw the projection of line with inclined to both reference plane by AutoCAD
5	Draw the projection of plane with inclined to both reference plane by using AutoCAD
6	Draw the Projection of simple solids like prism, Pyramid, Cone, Cylinder by using AutoCAD
7	Draw the Sectional top view, front view & true shape of prism, Pyramid, Cone, Cylinder by using AutoCAD
8	Draw the Development of lateral surfaces of Solids by using AutoCAD
9	Draw the Isometric projections of simple solids by using AutoCAD
10	Creation of 3D model by using AutoCAD

Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC101J	PYTHON PROGRAMMING	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):
The purpose of learning this course is to:

1	Understand the fundamentals of Python programming
2	Handle list, tuples, sets and Dictionaries data types
3	Learn function prototypes and string functions
4	Use files and modules for data processing
5	Understand packages in Python and data visualization

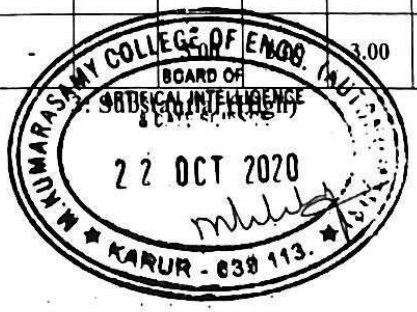
Course Outcome (s) (Cos):
At the end of this course, learners will be able to:

CO1	Develop basic Python programs using conditional and control statements
CO2	Perform operations on list, tuples, sets and Dictionaries
CO3	Implement function prototypes and string functions
CO4	Apply files and modules and perform operations on CSV files
CO5	Perform data visualization and apply Python packages

CO-PO Mapping

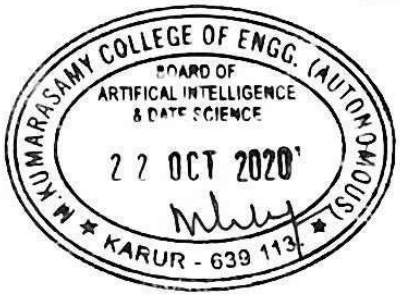
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO2	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO3	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO4	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO5	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO (Avg)	3.00	3.00	3.00	3.00	3.00	1.00	-	-	-	-	3.00	3.00	3.00	2.00

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

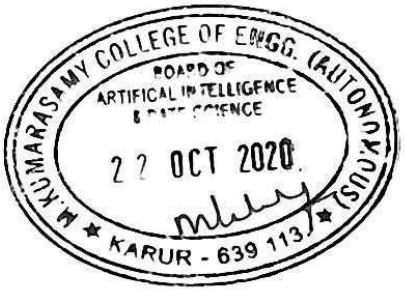


UNIT I	INTRODUCTION TO PYTHON	6
Introduction to Python, features, installing Python, writing and executing Python program — native data types, comments, constants, variables, operators, expression, conditional statements, control statements, continue, pass, break.		
UNIT II	**LISTS, TUPLES, SETS AND DICTIONARIES**	**6**
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Sets: methods and operators, Dictionaries: operations and methods.		
UNIT III	**FUNCTIONS AND STRINGS**	**6**
Functions definition, declaration, arguments, parameters – formal and local, parameter passing methods - function prototypes, recursion; Strings: string slices, immutability, string functions and methods, string module, regular expressions.		
UNIT IV	**FILES AND MODULES**	**6**
Files and exception: Text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, accessing CSV file.		
UNIT V	**PACKAGES AND DATA VISUALIZATION**	**6**
Text processing, Numerical processing: numpy package – mean, medium and mode, pandas package – vector, dataframe, data visualization: matplotlib, Time operations.		
LIST OF EXPERIMENTS		**15**

1. Finding factorial of n
2. Generating Fibonacci series
3. Exchange the values of two variables
4. Calculating student grade
5. Sum and average of n elements, linear search, printing a pattern.
6. Find minimum in a list, list operations, create and insert elements in a Dictionary, operations on sets and tuples
7. Counting the vowels and consonants in a given string, exchanging of two values using recursion
8. File operations: accessing a CSV file and generate reports
9. Display a data frame from a dictionary input using Pandas
10. Create a 3x3 matrix with values from 2 to 10 using numpy



Text Book (s)	
1	Anurag Gupta,G.P BISWAS ," Python Programming – Problem solving, packages and Libraries, Edition 1, Tata McGraw Hill, 2018
2	E Balagurusamy, "Problem Solving and Python Programming", Edition1 , TataMcGraw Hill, 2018
3	Reema Thareja, "Python Programming using Problem Solving Approach", OXFORD University Press, 2017.
Reference (s)	
1	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist,,,,, 2nd edition, Updated for Python 3, Shroff/O,,Reilly Publishers, 2016.
2	John V Guttag, —Introduction to Computation and Programming Using Python,,,,, Revised and expanded Edition, MIT Press , 2013
3	John V. Guttag,, Introduction to Computation and Programming using Pythonl, Prentice Hall of India, 2014.



Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC201J	FOUNDATION OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE	2	0	2	3

Prerequisite Course (s)

Python Programming

Course Objective (s):

The purpose of learning this course is to:

1	Understand the scientific method for science projects, and the data science team key roles.
2	Acquire technical expertise using popular open-source data science frameworks including jupyter notebook.
3	Data Engineering and data modelling practices using machine learning concepts.
4	Explore data science industry case studies.
5	Engage in role-playing challenge-based scenarios to propose real-world solutions.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand the evolution and relevance of Data science in the world today.
CO2	Explore end-to-end data science industry use cases using the data analytics lifecycle.
CO3	Data modelling practices using machine learning.
CO4	Gain a competitive edge using popular low-code-cloud-based platform for data science – IBM Watson studio.
CO5	Build Machine Learning Models.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	2	1	3	2
CO2	3	3	3	2	2	-	-	-	-	-	2	1	3	2
CO3	2	3	3	2	2	-	-	-	-	-	2	1	3	2
CO4	2	3	3	2	2	-	-	-	-	-	2	1	3	2
CO5	3	3	3	2	2	-	-	-	-	-	2	1	3	2
CO (Avg)	2.6	3	3	2	2	-	-	-	-	-	2	1	3	2

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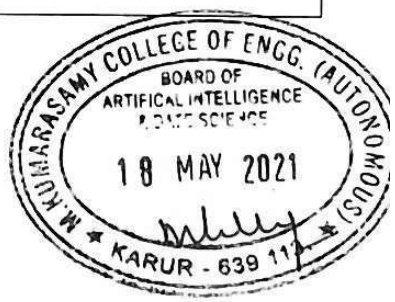
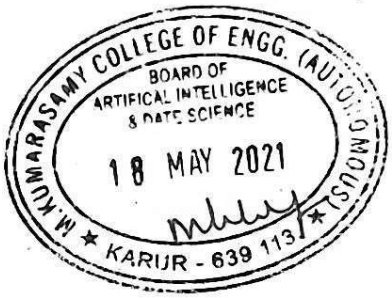
BOARD OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE
18 MAY 2021

UNIT I	OVER VIEW OF DATASCIENCE AND AI	5
Data science Introduction and overview-Data science domains-data science roles-Data science methodology-data analytics lifecycle-Business Analytics-Business Understanding-Data Science Methodology– History and evolution of AI – AI impact in the world today – AI technologies –AI Industry impact		
UNIT II	**EXPLORE AND PREPARE DATA**	**8**
Business understanding – Explore data – Accessing data from various source –Data Science using python, Over view of python - Web Scraping – Tidy data – Handling Missing data -Data Analysis-Data Visualization		
UNIT III	**REPRESENT AND TRANSFORM DATA**	**8**
Statististical and representation techniques –-Descriptive and inferential statistics – Data Transformation Techniques – Tokenization, Bucketization, Feature Standardization – Data Normalization – Represent and transform unstructured data - Data Transformation tools		
UNIT IV	**DATA SCIENCE ON THE CLOUD**	**8**
Introduction to IBM cloud – Integrated Environment for data science Projects-Cloud based data science Lifecycle-Introduction to IBM Watson studio – Integrated visual recognition – Data analytics and Visualization Using Watson-Introduction to natural language processing, Natural language processing concepts and components, Natural language processing evaluation metrics, Natural language processing and IBM Watson.		
UNIT V	**DATA MODELING AND MACHINE LEARNING ALGORITHMS**	**8**
Overview of modelling techniques – Machine learning techniques – Accuracy, precision and recall – Model Deployment – About machine learning algorithms – From regression to Neural Nets – Decision Tree classifier – Machine Learning framework – Deep Learning methodologies		
LIST OF EXPERIMENTS		**8**

1. Accessing IBM cloud
2. Exploring and preparing auto data
3. Validating automotive data
4. Data Refinery visualization
5. Visualizing automotive data
6. Predict heart failure
7. Apply models to attrition
8. Chatbot using Watson Studio



Text Book (s)	
1	IBM Course ware
Reference (s)	
1	Data Science for Beginners – by Leonard Deep
2	Python Data Science Handbook - Jake VanderPlas
3	Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow-AurelienGeron
4	Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython" ,Oreilly, 2011
5	Andreas C. Muller, Sarah Guido, "Introduction to Machine Learning with Python: A Guide for Data Scientists", Oreilly, 2016



Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC203J	DATA STRUCTURES AND ALGORITHMS	3	0	2	4

Prerequisite Course (s)

Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

1	Implement abstract data types for linear data structures.
2	Apply the different linear and non-linear data structures to problem solutions.
3	Solve problems using data structures binary trees, heaps, binary search trees and writing programs for these solutions.
4	Understand the Tree ADT and types of balancing the tree.
5	Critically analyze the various sorting algorithms.

Course Outcome (s) (COs):

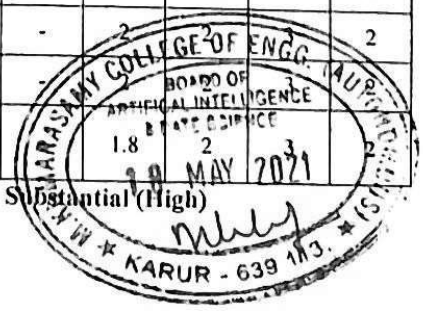
At the end of this course, learners will be able to:

CO1	Identify the basic concept of data structure and identify the need for list data structures and its operations.
CO2	Exemplify the concept of stacks and queues with suitable applications.
CO3	Classify the types of tree data structures and explain its functionalities.
CO4	Outline the concept of graph data structures with examples.
CO5	Design the algorithms for searching and sorting techniques.

CO-PO Mapping

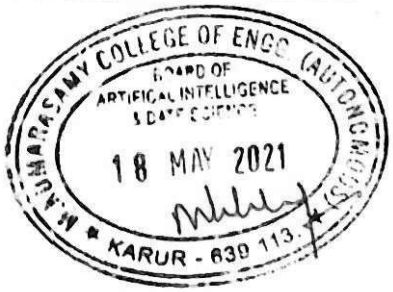
Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO2	3	2	3	3	3	-	-	-	-	-	1	2	3	2
CO3	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO4	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO5	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO (Avg)	3	2.8	3	3	3	-	-	-	-		1.8	2	3	2

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

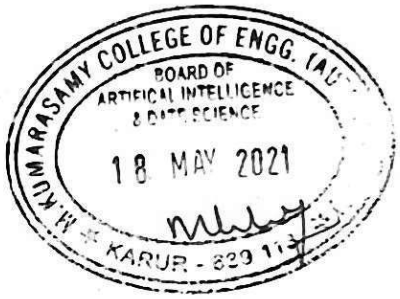


UNIT I	LINEAR DATA STRUCTURES – LIST	9
Pseudo code-Algorithm efficiency -Designing recursive algorithms - Recursive examples. -Abstract Data Types (ADTs) - List ADT - array-based implementation - linked list implementation -singly linked lists - circularly linked lists- doubly-linked lists -applications of lists -Polynomial Manipulation -All operations (Insertion, Deletion, Merge, Traversal).		
UNIT II	**LINEAR DATA STRUCTURES - STACKS, QUEUES**	**9**
Stack ADT - Operations - Applications - Evaluating arithmetic expressions- Conversion of Infix to postfix expression - Queue ADT - Operations - Circular Queue - Priority Queue- deQueue - applications of queues.		
UNIT III	**NON-LINEAR DATA STRUCTURES – TREES**	**9**
Tree ADT - tree traversals - Binary Tree ADT - expression trees - applications of trees - binary search tree ADT - AVL Trees – B-Tree - Heap - Applications of heap.		
UNIT IV	**SEARCHING, SORTING AND HASHING TECHNIQUES**	**9**
Searching- Linear Search - Binary Search. Sorting - Bubble sort - Selection sort - Insertion sort – Shell sort - Radix sort. Hashing- Hash Functions - Separate Chaining - Open Addressing - Rehashing - Extendible Hashing.		
UNIT V	**NON-LINEAR DATA STRUCTURES – GRAPHS**	**9**
Definition - Representation of Graph - Types of graph - Breadth-first traversal - Depth-first traversal - Topological Sort - Shortest Path Algorithms: Unweighted Shortest Paths - Dijkstra's Algorithm. Minimum Spanning Tree: Prim's Algorithm Kruskal's Algorithm.		
LIST OF EXPERIMENTS		**15**

1. Array Implementation of List ADT.
2. Array Implementation of Stack and Queue ADTs.
3. Linked list Implementation of Stack, Queue and List ADTs.
4. Implementation of Binary Search Tree.
5. Implementation of AVL Tree.
6. Implementation of Heaps.
7. Graph representation and Traversal algorithms.
8. Applications of graphs.
9. Implementation of Searching and sorting algorithms.
10. Hashing – any two collision techniques.



Text Book (s)	
1	Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 4th Edition, Pearson Education, 2014.
Reference (s)	
1	Richard F. Gilberg, and Behrouz A. Forouzan, Data Structures - A Pseudocode Approach with C, Thomson 2011.
2	Aho, J.E.Hopcroft and J.D.Ullman, Data Structures and Algorithms, Pearson education, Asia, 2010.



Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC204J(R)	OBJECT ORIENTED PROGRAMMING WITH JAVA	3	0	2	4

Prerequisite Course (s)

Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

1	To understand Object Oriented Programming concepts and basic characteristics of Java.
2	To know the principles of packages, inheritance and interfaces.
3	To define exceptions and use I/O streams.
4	To develop a java application with threads and generics classes.
5	To design and build simple Graphical User Interfaces.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Develop Java programs using OOP principles.
CO2	Develop Java programs with the concepts inheritance and interfaces.
CO3	Build Java applications using exceptions and I/O streams.
CO4	Develop Java applications with threads and generics classes.
CO5	Develop interactive Java programs using Applet.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	3	2	3	3
CO2	3	3	3	3	3	1	-	-	-	-	3	2	3	3
CO3	3	3	3	3	3	2	-	-	-	-	3	2	2	3
CO4	3	3	3	3	3	1	-	-	-	-	3	2	2	3
CO5	3	3	3	3	3	2	-	-	-	-	3	2	3	3
CO (Avg)	3	3	3	3	3	1.4	-	-	-	-	3	2	2.6	3

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

UNIT I	INTRODUCTION TO OOP AND JAVA FUNDAMENTALS	9
Object Oriented Programming - Abstraction – objects and classes - Encapsulation- Inheritance - Polymorphism- OOP in Java – Characteristics of Java – The Java Environment - Java Source File - Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays , Packages - JavaDoc comments.		
UNIT II	**INTERFACES**	**9**
Abstract classes and methods - final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces - Object cloning -inner classes, Array Lists – Strings		
UNIT III	**EXCEPTION HANDLING AND I/O**	**9**
Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files		
UNIT IV	**MULTITHREADING AND GENERIC PROGRAMMING**	**9**
Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.		
UNIT V	**EVENT DRIVEN PROGRAMMING**	**9**
Applet Basics - Applet Architecture - Applet Display Methods - Event Handling Mechanisms - Event Classes - Event Listener – AWT : Working with Windows, Graphics, Colours and Fonts - AWT Controls.		
	LIST OF EXPERIMENTS	**15**

1. Implementing Object Oriented Concepts.
2. Implementing Control Statements
3. Implementation of Interface and Package program.
4. Implement the concept of Exception Handling using predefined exception
5. Implement the concept of Exception Handling by creating user defined exceptions
6. Implement Multithreading concepts.
7. Implementation of Collection interfaces
8. Implement conversion of InputStream into Byte Array
9. Implement a simple calculator. Use a grid Layout to arrange buttons for the digits and for the +, -, *, / operations. Add a text field to display the results.
10. Implement Mouse events and Keyboard event.

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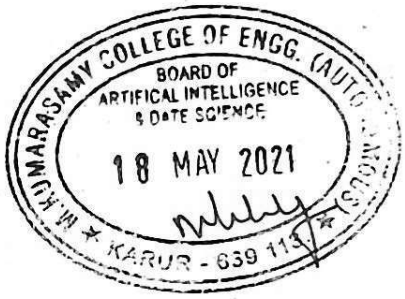
Text Book (s)	
1	Herbert Schildt, —Java The complete reference, 8th Edition, McGraw Hill Education, 2011
2	Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.
Reference (s)	
1	Paul Deitel, Harvey Deitel, —Java SE 8 for programmersl, 3rd Edition, Pearson, 2015.
2	Steven Holzner, —Java 2 Black bookl, Dreamtech press, 2011.
3	Timothy Budd, —Understanding Object-oriented programming with Javal, Updated Edition, Pearson Education, 2000.



Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC207J	OPERATING SYSTEMS AND VIRTUALIZATION	3	0	2	4

Prerequisite Course (s)

Data structures

Course Objective (s):

The purpose of learning this course is to:

1	To understand the basic concepts and functions of operating systems.
2	To understand Processes and Threads and Scheduling algorithms.
3	To understand the concept of Deadlocks.
4	To analyze various memory and storage management schemes.
5	To understand basic concepts of virtualization.

Course Outcome (s) (COs):

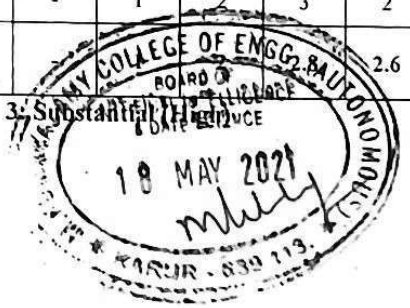
At the end of this course, learners will be able to:

CO1	Illustrate the operating system concepts and its functionalities.
CO2	Compare various CPU scheduling algorithms.
CO3	Explain the need for process synchronization.
CO4	Identify the issues in memory management.
CO5	Illustrate how to optimize the performance of virtualization.

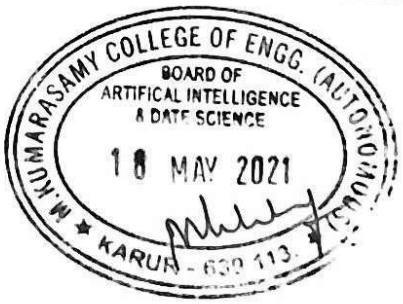
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	2	-	-	-	-	-	1	1	2	3
CO2	3	2	3	2	3	-	-	-	-	-	1	2	3	3
CO3	3	2	2	3	3	-	-	-	-	-	1	2	3	3
CO4	3	2	2	2	3	-	-	-	-	-	1	3	3	2
CO5	3	2	2	3	2	-	-	-	-	-	1	2	3	2
CO (Avg)	3	2	2	3	3	-	-	--	-					2.6

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

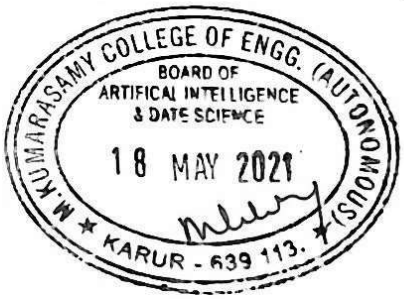


UNIT I	INTRODUCTION	9
Introduction-History of Operating Systems-Operating System Structure – Operating System - Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Computing Environments – System Structures: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs.		
UNIT II	**PROCESS MANAGEMENT AND COORDINATION**	**9**
Process Concept: Process Scheduling – Operations on Processes – Inter-process Communication. **Multithreaded Programming**: Overview – Multithreading Models – Threading Issues **CPU Scheduling**: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Synchronization – The Critical-Section Problem – Peterson's Solution – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Monitors.		
UNIT III	**DEADLOCKS AND MEMORY MANAGEMENT**	**9**
Deadlocks: System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock **Memory Management Strategies**: Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation		
UNIT IV	**VIRTUAL MEMORY AND STORAGE MANAGEMENT**	**9**
Virtual Memory Management: Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing. **File System:** File Concept – Access Methods – Directory Structure – File Sharing – Protection - File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. **Secondary Storage Structure**: Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Devices – Device controllers- Device drivers.		
UNIT V	**VIRTUALIZATION**	**9**
Virtualization Concepts: Virtual machines - supporting multiple operating systems simultaneously on a single hardware platform - running one operating system on top of another - True or pure virtualization – Para virtualization – optimizing performance of virtualization system - hypervisor call interface		



LIST OF EXPERIMENTS	15
1. Study of LINUX - Basic Commands 2. Shell programming (Using looping, control constructs etc.,) 3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid 4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc). 5. Implementation of CPU scheduling algorithms: FCFS & SJF 6. Implementation of CPU scheduling algorithms: Round Robin & Priority Scheduling 7. Implement the Producer – Consumer problem using semaphores. 8. Implementation of Banker`s algorithm 9. Implement some memory management schemes (First fit, Best fit & Worst fit) 10. Implement some page replacement algorithms (FIFO & LRU)	

Text Book (s)	
1	Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", John Wiley & Sons Inc., 2010.
Reference (s)	
1	Andrew S. Tanenbaum, "Modern Operating Systems", Second Edition, Addison Wesley, 2001.
2	Charles Crowley, "Operating Systems: A Design-Oriented Approach", Tata McGraw Hill Education", 1996.
3	D M Dhamdhere, " Operating Systems: A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.
4	William Stallings, "Operating Systems: Internals and Design Principles", Seventh Edition, Prentice Hall, 2011.



Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC208J(R)	DATABASE MANAGEMENT SYSTEMS	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To infer the essentials of data models to intellectualize and illustrate a database system using ER diagram.
2	To conceptualize the relational database implementation using SQL with effective relational database design concepts.
3	To elaborate the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
4	To demonstrate Query evaluation and optimization techniques.
5	To signify the concepts of Database Storage and Security

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Distinguish database systems from file systems and describe data models and DBMS architecture.
CO2	Demonstrate with understanding of SQL Programming language and normalization theory.
CO3	Identify the basic issues of transaction processing and concurrency control.
CO4	Practice the basic query evaluation techniques and query optimization.
CO5	Study the fundamental methods for accessing and storing data in databases.

CO-PO Mapping

Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	1	-	-	-	-	-	2	2	3	2
CO2	3	2	3	3	1	-	-	-	-	-	2	2	3	2
CO3	3	3	3	3	1	-	-	-	-	-	2	2	3	2
CO4	3	3	3	3	1	-	-	-	-	-	2	2	3	2
CO5	3	3	3	3	1	--	-	-	-	-	2	2	3	2
CO (Avg)	3	3	2	3	1	-	-	-	-	-	2	2	3	2

1: Slight (Low) 2: Moderate (Medium)

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UNIT I	INTRODUCTION	9
Introduction to Database. Hierarchical, Network and Relational Models. Three-Schema Architecture and Data Independence– The Database System Environment– Data models: Entity-relationship model, network model, relational and object oriented data models, SQL Fundamentals – Advanced SQL features – Triggers – Embedded SQL.		
UNIT II	**RELATIONAL QUERY LANGUAGES AND DATABASE DESIGN**	**9**
Relational algebra, Relational Calculus, DDL and DML constructs. Relational Database Design: Domain and data dependency, Armstrong's axioms, Functional Dependencies, Normal forms, Dependency preservation, Lossless design.		
UNIT III	**TRANSACTION PROCESSING**	**9**
Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery		
UNIT IV	**PROCESSING & OPTIMIZATION**	**9**
Query Processing Overview – Algorithms for SELECT and JOIN operations - Evaluation of relational algebra expressions, Query equivalence, Query optimization algorithms.		
UNIT V	**DATABASE STORAGE STRATEGIES & SECURITY**	**9**
RAID – File Organization - Indexing – Single level and Multi-level Indexes – B+ tree – Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.		
Contents for Further Reading		
NoSQL: Overview and History of NoSQL Databases - Definition of the Four Types of NoSQL Database - Comparison of relational databases to new NoSQL stores -		
LIST OF EXPERIMENTS		**15**

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.
3. Creation of Views, Synonyms, Sequence, Indexes, Save point.
4. Creating an Employee database to set various constraints.
5. Creating relationship between the databases.
6. Study of PL/SQL block.
7. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
8. Write a PL/SQL block that handles all types of exceptions.
9. Creation of Procedures.
10. Creation of database triggers and functions.

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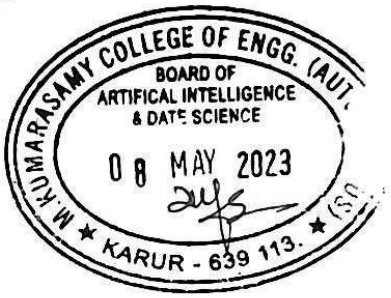
Text Book (s)	
1	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 7th Edition, Tata McGraw Hill, March 2019.
2	R. Elmasri and S. Navathe ,"Fundamentals of Database Systems", Pearson 7th Edition,2017.
Reference (s)	
1	J. D. Ullman,"Principles of Database and Knowledge – Base Systems", Vol 1,Computer Science Press ,Inc. New York, 1998.
2	Gupta G K, "Database Management Systems", Tata McGraw Hill Education Private Limited, New Delhi, 2011
3	Serge Abiteboul, Richard Hull, VictorVianu ,"Foundations of Databases", Addison-Wesley Publishing Company, 1995.



Regulation 2018		Semester V	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC301J	MACHINE LEARNING AND AI SERVICES	2	0	2	3

Prerequisite Course (s)

Advance Python

Course Objective (s):
The purpose of learning this course is to:

1	To understand the basic theory underlying machine learning.
2	To be able to formulate machine learning problems corresponding to different applications
3	To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.
4	To Understand the basic principles, techniques, and applications of Artificial Intelligence.
5	Investigate applications of AI techniques in expert systems, artificial neural networks and other machine learning models.

Course Outcome (s) (COs):
At the end of this course, learners will be able to:

CO1	Understand a very broad collection of machine learning algorithms and problems
CO2	Apply structured thinking to unstructured problems
CO3	Develop an appreciation for what is involved in learning from data.
CO4	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO5	Demonstrate proficiency developing applications in an 'AI language', expert system shell, or data mining tool.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	1	-	-	-	-	-	2	3	1
CO2	3	3	2	2	2	-	-	-	-	-	-	1	3	1
CO3	3	3	3	2	2	-	-	-	-	-	-	-	3	1
CO4	3	2	2	1	1	2	-	-	-	-	-	1	3	1
CO5	3	2	3	2	2	1	-	-	-	-	-	1	3	1
CO (Avg)	3	2.6	2.2	1.6	1.6	0.8	-	-	-	-	-	1	3	1

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

UNIT I	INTRODUCTION TO MACHINE LEARNING	6
Machine learning Introduction - Types of Machine learning - Supervised, Unsupervised and reinforcement - Over fitting and Linear Regression – Classification - Parametric vs non Parametric models - Linear models		
UNIT II	**CLUSTERING AND REGRESSION MODELS**	**6**
Hierarchical clustering - K-Means clustering - Logistic Regression - Bayesian Classifier - Support Vector Machines - Model evaluation Methods - Maximum Likelihood estimation (least squares) - Measuring (dis)similarity - Evaluating the output of clustering method		
UNIT III	**TREE LEARNING**	**6**
Directed and Undirected trees - Decision tree representation-Basic decision tree learning algorithm - Issues in decision tree - Classification and regression trees(CART) - Random forest - Multivariate adaptive regression trees(MART)		
UNIT IV	**MACHINE LEARNING USING WATSON**	**6**
Introduction to Watson - Prebuilt Watson application - Watson API's - Watson Solutions – Watson Studio – Watson Studio Components - Watson knowledge studio and catalog - Watson Discovery Services - Watson Auto AI - Watson OpenScale		
UNIT V	**NATURAL LANGUAGE PROCESSING**	**6**
NLP Introduction - Natural language Understanding (NLU) - Conversational AI - Building blocks of chatbot - Watson Assistant - Speech to Text - Text to speech		
Case Study : "Multi-Lingual Voice Translator"		
LIST OF EXPERIMENTS		**15**
1. Group the similar data items using the ML algorithm. 2. Implement k-Nearest Neighbour algorithm to classify the iris data set. 3. Construct a Bayesian network considering student data. 4. Implement a K-Means Clustering 5. Create a chart bot for student help center college. 6. Create a model to Convert Audio note to Text by using Watson API. 7. Analyse the Airbnb(client review) Data using Watson Discovery		

Text Book (s)

1	IBM Course ware

Reference (s)

1	Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012.
2	Tom Mitchell, "Machine Learning", McGraw-Hill, 2013.
3	AI as a Service ,Peter Elger, Eóin Shanaghy, Manning Publications, 2020.

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Regulation 2018		Semester V	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC302J	DATA ANALYTICS AND BUSINESS INTELLIGENCE	2	0	2	3

Prerequisite Course (s)

Python and any reporting tool

Course Objective (s):
The purpose of learning this course is to:

1	Understand Data analytics in the real world.
2	Apply data Analysis concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively,
3	Interpret results/solutions and identify appropriate courses of action for a given managerial situation whether a problem or an opportunity.
4	Identify, model and solve decision problems in different settings.
5	Create viable solutions to decision making problems

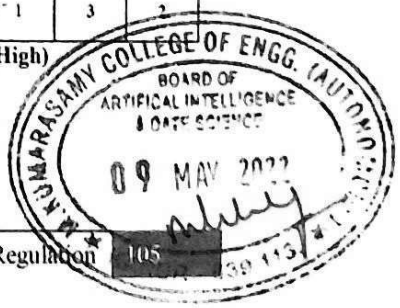
Course Outcome (s) (COs):
At the end of this course, learners will be able to:

CO1	Describe the concepts and components of Data Analytics.
CO2	Develop the ability to build and assess data-based models.
CO3	Understand and use the technologies and tools that make up BI (e.g., Data warehousing, Data reporting and use of Online analytical processing (OLAP)).
CO4	Understand and design the technological architecture that underpins BI systems.
CO5	Plan the implementation of a BI system.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	1	1	1	-	-	-	-	-	1	3	2
CO2	3	2	2	2	2	-	-	-	-	-	-	1	3	2
CO3	3	3	3	2	2	-	-	-	-	-	-	1	3	2
CO4	3	2	2	1	1	1	-	-	-	-	2	1	3	2
CO5	3	2	3	2	2	1	-	-	-	-	-	1	3	2
CO (Avg)	3	2.4	2.2	1.6	1.6	0.6	-	-	-	-	0.4	1	3	2

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



UNIT I	OVERVIEW OF ANALYTICS AND DECISION SUPPORT	6
Introduction to Data Analytics-Ways to use Data Analytics-Process steps-Data Analytics Tools-Applications-Types of Analytics-Case study- Phases of the Decision, Making Process -Decision Support Systems: Capabilities, Classification, components.		
UNIT II	**DATA ANALYTICS USING PYTHON**	**6**
Python Libraries for Data Analytics -Numpy for N-Dimensional arrays-Pandas for Mathematical operation and manipulate data -Matplotlib for Plotting Data - Scipy for scientific computing-Scikit-Learn for build analytics model.		
UNIT III	**OVERVIEW OF IBM COGNOS BI**	**6**
Introduction to the reporting application-examine report studio and its interface- explore- format-group and sort list reports- options for aggregating data- report with repeated data		
UNIT IV	**FOCUS REPORTS USING FILTERS, CROSSTAB AND GRAPHS**	**6**
Filters to narrow the focus of reports-detail and summary filters- filters on aggregate data-format and sort crosstab reports- list to a crosstab-crosstabs using unrelated data items-complex crosstabs using drag and drop functionality-charts containing peer and nested items-present data using different chart type -add context - Create and reuse custom chart palettes.		
UNIT V	**CALCULATION AND CONDITIONAL FORMATTING**	**6**
Calculations based on data - add run-time information - expressions using functions- highlight exceptional data-show and hide data- conditionally render objects in reports-conditionally format one crosstab measure - multilingual reports-highlight exceptional data-conditionally rendered column-conditionally format one crosstab measure based on another		
LIST OF EXPERIMENTS		**15**

1. To Perform exploratory data analysis using Pandas and Matplotlib library functions to manipulate and visualize the data and find insights.
2. Explore IBM Cognos BI and Create List Reports.
3. Focus Reports using Filters .
4. Create Crosstab Reports .
5. Present Data Graphically.
6. Focus Reports using Prompts.
7. Extend Reports using Calculations.

Text Book (s)

1	IBM Course ware

Reference (s)

1	Foster Provost, Tom Fawcett-Data Science for Business-August 2013
2	Sangeeta Gautam - IBM Cognos Business Intelligence v10: The Complete Guide (IBM Press) 1st Edition (2012).
3	Dan Volitich and Gerard Ruppert - IBM Cognos Business Intelligence 10: The Official Guide (India) Private Ltd, 2012

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Regulation 2018		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC303J	COMPUTER NETWORKS	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To develop an understanding of computer networking basics.
2	To introduce the basic taxonomy and terminology of computer networking.
3	To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications
4	To build an understanding of the fundamental concepts of computer networking
5	To introduce advanced networking concepts.

Course Outcome (s) (Cos):

At the end of this course, learners will be able to:

CO1	Explain data communication system, components and the purpose of layered architecture.
CO2	Illustrate the functionality of each layer of OSI and TCP/IP reference model.
CO3	Explain the data link layer and network layer protocols.
CO4	Outline the functions of transport layer protocols.
CO5	Summarize application layer protocols.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO2	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO3	3	3	3	3	3	-	-	3	-	-	1	1	3	2
CO4	3	3	3	3	3	-	-	-	-	-	1	1	2	3
CO5	3	3	3	3	3	-	-	-	-	1	1	1	3	3
CO (Avg)	3	3	3	3	3	-	-	0.6	-	0.2	1	1	3	2

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

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09 MAY 2022

UNIT I	DATA COMMUNICATIONS	9
Data Communication- Networks-The OSI Model- Layers in the OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media.		
UNIT II	**DATA LINK LAYER**	**9**
Link and Medium Access protocols – Framing – Error Detection – Reliable Transmission – IEEE 802 Standards – Ethernet – Token Rings – Wireless LANs.		
UNIT III	**NETWORK LAYER**	**9**
Circuit Switching – Packet Switching – Switching and Forwarding – Bridges and LAN Switches – Cell Switching – Internetworking – Routing Techniques: Distance vector (RIP) – Link state (OSPF) – Subnetting – CIDR- BGP - IPv6.		
UNIT IV	**TRANSPORT LAYER**	**9**
UDP – TCP – Congestion Control and Resource Allocation –TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service- Integrated Services – Differentiated Services.		
UNIT V	**APPLICATION LAYER**	**9**
Domain Name System – Electronic Mail – File Transfer- WWW and HTTP-Network Management System – Simple Network Management Protocol.		
LIST OF EXPERIMENTS		**15**

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Write a program to implement RPC (Remote Procedure Call)
6. Implementation of Subnetting
7. Applications using TCP Sockets like

a. Echo client and echo server

b. Chat

c. File Transfer

8. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.

a. Link State routing

b. Flooding

c. Distance vector

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Text Books	
1	Larry Peterson, Bruce Davie, "Computer Networks: A Systems Approach", Elsevier, Online Edition, 2019.
2	William Stallings, Data and Computer Communications, Tenth Edition, Prentice Hall, 2014.
Reference (s)	
1	James F. Kurose, Keith W. Ross, "Computer Networking – A Top-Down Approach Featuring the Internet", Pearson Education, Seventh Edition, 2017.
2	Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, Second Edition, 2015.
3	Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, "Computer Networks: An Open Source Approach ", McGraw Hill Publisher, 2011.
4	Behrouz A. Forouzan, Data Communication and Networking, Fifth Edition, McGraw Hill Education (India) Private Limited, 2013.
Web References	
1	http://nptel.ac.in/courses/106105081

Regulation 2018		Semester VI	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC305J	PREDICTIVE MODELLING AND ANALYTICS	2	0	2	3

Prerequisite Course (s)

Advance Analytics

Course Objective (s): The purpose of learning this course is to:

1	To define and understand the business problem and the predictive analytics goals.
2	To understand and apply predictive modelling technique.
3	To learn how to develop models to predict categorical and continuous outcomes, using such techniques as neural networks, decision trees, logistic regression, support vector machines and Bayesian network models.
4	To know the use of the binary classifier and numeric predictor nodes to automate model selection.
5	To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Understand design, build, evaluate and implement predictive models for various business applications.
CO2	Compare the underlying predictive modelling techniques.
CO3	Select appropriate predictive modelling approaches.
CO4	Apply predictive modelling approaches using a suitable package such as SPSS Modeler.
CO5	To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	1	-	-	-	2	1	3	3
CO2	3	2	2	2	3	1	-	-	-	-	2	1	3	2
CO3	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO4	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO5	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO (Avg)	3	2.8	2.8	2.8	3	1.2	0.2	-	-	-	2	1	3	2.2

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

UNIT I	INTRODUCTION TO PREDICTIVE MODELLING	6

What is Predictive Analytics? - What does a predictive model do? - Descriptive v/s Predictive v/s Prescriptive Analytics - The need for a methodology CRISP-DM

UNIT II	INTRODUCTION TO SPSS MODELER	6

IBM SPSS Modeler (Nodes, Streams), Manager Pane and Project Pane-collecting Initial Data-Understand data- Set the unit of Analysis (DISTINCT, AGGREGATE, SETTOFLAG)- Integrate data (APPEND, MERGE), Relationship between a categorical and continuous field, Relationship between two continuous fields.

UNIT III	USING FUNCTIONS IN SPSS	6

Date and Time Functions-Conversion Functions-String Functions-Statistical Functions, Measure of Central Tendency, Measures of Variability-Missing Value Functions, Undefined and Blank Values Function.

UNIT IV	DATA FIELD TRANSFORMATION	6

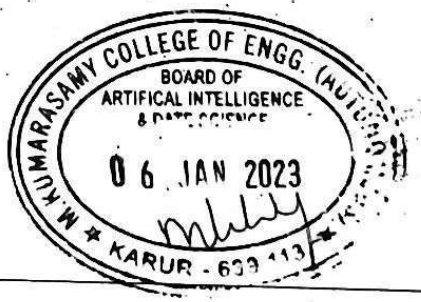
Field transformation- Additional Field Transformation-Sequence, Data-Sampling- balancing- partitioning data, Derive, Binning, Reclassify, Control Language for Expression Manipulation (CLEM), Filler, Transform, Sequence Functions, Restructure Data.

UNIT V	INTRODUCTION TO MODEL	6

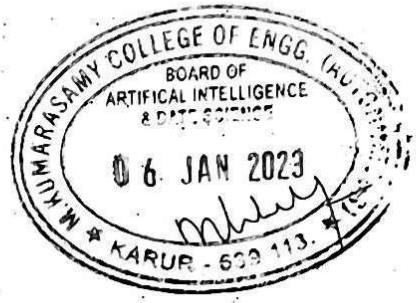
Modelling Algorithms-Supervised Models- Partition the data- Segmentation Models-Creating a model in IBM SPSS Modeler-Introduction to Linear Regression-Introduction to Logistic Regression-Introduction to Neural Networks-Multilayer Perceptron (MLP)-Radial Basis Function (RBF).

LIST OF EXPERIMENTS	15

1. Collect initial data for the telecom firm
2. Understand the telecommunications data
3. Set the unit of analysis for the data
   a) Remove duplicate records
   b) Aggregate transactional data
   c)Create flag fields and aggregate the data
4. Identify relationships in the data
   a) Examine the relationship between categorical fields
   b) Examine the relationship between a categorical and continuous field
5. Predict customer churn in telecom dataset
   a) Build Model using CHAID
   b) Examine the CHAID Model
   c) Apply the model to new data
6. Create a Segmentation Model
   a) Create homogeneous groups (clusters) of customers based on usage patterns.
7. Using functions in IBM SPSS Modeler
   a)Date and Time Functions
   b)String Functions
   c)Statistical Functions
   d)Missing Value Function
8. Add fields to the data
   a)Derive fields as formula
   b)Derive fields as flag or nominal



	c)Reclassify categorical fields d)Bin a continuous field into a categorical field with equal counts 9. Create a Linear Regression Model to Predict Employee Salaries 1. Use Logistic Regression to Predict Response to a Charity Promotion Campaign
Text Book (s)	
1	IBM Course ware
Reference (s)	
1	IBM SPSS Modeler Essentials ,by Jesus Salcedo, Keith McCormick
2	Fundamentals of Machine Learning for Predictive Data Analytic, by john D Kelleher
3	Applied Predictive Modelling, by Max Kuhn



Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC306J	ANALYTICS IN CLOUD COMPUTING	3	0	2	4

Prerequisite Course (s)

Computer Networks

Course Objective (s):

The purpose of learning this course is to:

1	Understand the protocols and mechanisms necessary to support cloud computing.
2	Understand the architecture and features of different cloud models.
3	Analyze the basic concepts of virtualization technology to derive the best practice model for deploying cloud-based applications.

Course Outcome (s) (Cos):

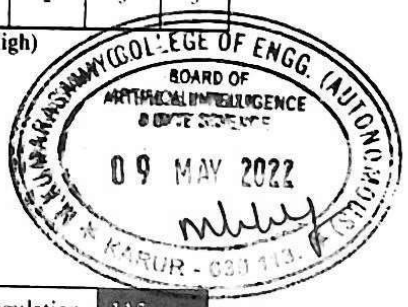
At the end of this course, learners will be able to:

CO1	Understand the different types of cloud models and services for building an efficient cloud computing environment.
CO2	Design and develop highly scalable cloud-based applications by creating and configuring virtual machines on the cloud.
CO3	Analyze the key concepts of cloud storage for load balancing in cloud architecture.
CO4	Understand the concept web services in cloud applications
CO5	Explore the cloud security concerns and examine the risks involved in cloud security.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	2	2	3	3
CO2	3	3	3	3	3	-	-	-	-	-	2	2	3	3
CO3	3	3	3	3	3	-	-	-	-	-	2	2	3	3
CO4	3	3	3	3	3	-	-	-	-	-	2	2	3	3
CO5	3	3	3	3	3	-	-	-	-	-	2	2	3	3
CO (Avg)	3	3	3	3	3						2	2	3	3

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

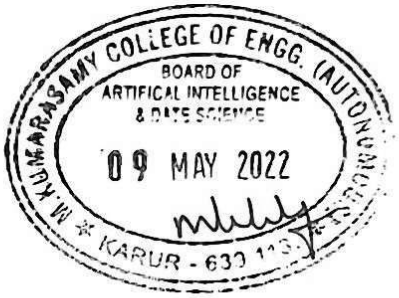


UNIT I	INTRODUCTION TO CLOUD COMPUTING	9
Introduction to Cloud Computing - The NIST Cloud Reference Model- Architectural Design Challenges- Deployment Models-Service Models-Essential Characteristics - Benefits - Measuring Cloud Computing Costs.		
UNIT II	**CLOUD ENABLING TECHNOLOGIES**	**9**
Service Oriented Architecture - REST and Systems of Systems - Web Services - Publish Subscribe Model – Basics of Virtualization - Types of Virtualization - Implementation Levels of Virtualization - Virtualization Structures - Tools and Mechanisms - Virtualization of CPU - Memory - Network- I/O Devices- Application - Virtualization Support - Disaster Recovery		
UNIT III	**ANALYTICS IN CLOUD**	**9**
Introduction to Cloud Analytics - Working with Models - Benefits – Challenges - Analytics as a service. Analytical Tools in Cloud: Google Web Services (BigQuery, DataPrep, Data Proc) - Amazon web services(Athena, Cloud Search, Kinesis) - Microsoft Azure services(Synapse, Databricks).		
UNIT IV	**VISUALIZATION IN CLOUD**	**9**
Data Visualization- Types- Methods- Benefits-Challenges – Introduction to Google Charts, Tableau, Whatagraph, Sisense, Wrapper, Infogram, Chartblocks.		
UNIT V	**TOOLS IN CLOUD FOR REAL TIME SIMULATIONS**	**9**
Introduction to Cloud Simulator - CloudSim Architecture (User code, CloudSim, GridSim, SimJava) - Understanding Working platform for CloudSim - Introduction to GreenCloud - Cloud APIs		
FOR FURTHER READING		
Cloud evolution- Data center requirements- VMware virtualization- Google Infrastructure- Google Cloud Security, Case study on Amazon, Google and IBM cloud services		

List of Experiments

1. Install VirtualBox/VMware Workstation with different flavors of Linux or windows OS on top of windows7 or 8. Install a C compiler in the virtual machine and execute a sample program.
2. Install Bare Metal Hypervisor and create different VMs loaded with different flavours of OS on top of Baremetal Hyperviosr.
3. Configure internetworking Components.
4. Setting up Google Cloud & Big Query Environment and Create a project on Google Cloud Platform's one of the Analytics services named as Big Query.
5. Install and configure MySQL Server/MariaDB in the virtual machine and Access/Connect the database through SQLYOG.
6. Install Google App Engine. Create hello world app and other simple web applications using python/java
7. Show the virtual machine migration from one node to the other.
8. Write a program to use the API of Hadoop to interact with it.
9. Install and configure two different visualization tools in cloud and Visualize using different data sets.
10. Study and Install Cloud Sim. create different nodes and VMs. Perform VM Migration between the hosts.

Text Books	
1	George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice), O'Reilly, 2009., CRC Press, 2017
2	Rittinghouse, John W., and James F. Ransome, —Cloud Computing: Implementation, Management and Security, CRC Press, 2017.
References	
3	Barrie Sosinsky, Cloud Computing Bible, Wiley-India, 2014.
4	Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, —Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
5	Ronald L.Krutz and Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley-India, 2013.
Web References	
1	https://www.edureka.co/blog/hadoop-tutorial/
2	https://www.simplilearn.com/tutorials/hadoop-tutorial
3	https://www.pragimtech.com/blog/cloud/cloud-tutorial-for-beginners/



Regulation 2018		Semester VII	Total Hours			60
Category	Course Code	Course Name	Hours / Week			Category
			L	T	P	
C	18AIC402J	DEEP LEARNING MODELS AND AI ANALYST	3	0	2	4

Prerequisite Course (s)

Advance Python and basics of Machine Learning

Course Objective (s): The purpose of learning this course is to:

1	Understand the concepts of Advanced machine learning and Deep Learning
2	Understand the Artificial Intelligence Components
3	Apply the algorithms to implement Neural Networking models.
4	Understand the techniques of Face recognition, self-driving cars
5	Investigate applications of Multilayer perceptron, CNN and RNN

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Understand collections of Advanced Machine learning algorithms and AI basics
CO2	Identify the Deep learning Algorithm which is more appropriate for various types of modern datasets
CO3	Understanding Perceptron's and how it is used along Computer Vision
CO4	Apply basic principles of neural network to solve the problems with AI
CO5	Demonstrate Deep learning Application in Tensor flow and Keras and AI's Future workforce

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
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CO4	3	2	2	1	1	1	-	-	-	-	2	1	3	2
CO5	3	2	3	2	1	1	-	-	-	-	-	-	3	2
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1: Slight (Low) 2: Moderate (Medium)

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UNIT I	PREFACE TO ML – DL MODELS & IBM CLOUD	9
Machine Learning-Deep Learning-Difference between Machine Learning and Deep Learning--Supervised, Unsupervised and reinforcement-Over fitting and Regression-Classification-Clustering-Parametric vs non-Parametric models-Linear model - Introduction to IBM cloud- Resources-IBM Cloud Infrastructure-Security-IBM Cloud Foundry-Cloud Park for data- IBM cloud vs Amazon cloud - Cloud Native Storage and Data Service		
UNIT II	**NLP AND WATSON STUDIO**	**9**
Introduction to Watson studio- Project creation- Storage- Access control- Prebuilt Watson application-Watson Solutions- Catalog and govern data - NLP Overview - NLP Explained – Virtual Agents Overview - Virtual Agents for the Enterprise – Implementing NLP.		
UNIT III	**COMPUTER VISIONS WITH WATSON STUDIO S**	**9**
Watson knowledge studio and Watson knowledge catalog-Watson Discovery Services-Watson Auto AI-Watson Open Scale- Visual recognition- Watson API - Computer Vision Overview - AI Vision through Deep Learning - Computer Vision for the Enterprise - Deep learning ecosystem.		
UNIT IV	**MODEL IMPLEMENTATION USING TENSORFLOW**	**9**
TensorFlow Introduction-Tensor Data Structure -Various Dimensions-Tensor handling and Manipulation-Tensor flow implementation of CNN and RNN-Tensor flow-Word Embedding- evaluating a machine learning model		
UNIT V	**IMAGE RECOGNITION AND FUTURE OF AI**	**9**
Image Classification -Tensor flow features- import tensor or other libraries-Pickle-Sklearn-Explore Dataset -Load data using Keras Utility-Visualize the data - Artificial Intelligence Trends - Limits of machine and human - AI predictions in the next 5 years -Building a network		
LIST OF EXPERIMENTS		**15**

1. Decision tree Classification using Scikit Learn.
2. Theano for computing a Logistic function.
3. Calculate Data Loss using Tensor.
4. Classify Handwritten digits using MNIST dataset .
5. Image Manipulation using Scipy.
6. Predict the color red or white using Keras.
7. Classify objects using Tensor flow.
8. Speech to Text and Text to Speech using IBM and Google APIs
9. Implementing Linear Regression using Python
10. Evaluating Logistic Regression
11. Performance Evaluation using K-Means Clustering
12. Weather Prediction using Naive Bayes classification

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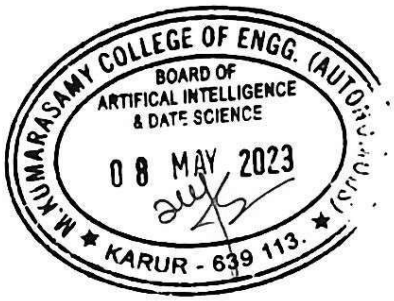
Text Book (s)	
1	IBM Course ware
Reference (s)	
1	Deep Learning From Scratch: Building with Python from First Principles by Seth Weidman published by O`Reilley
2	Deep learning in Python/ Pytorch by Manning Publications
3	Artificial Intelligence: A Modern Approach by Stuart Russell, Peter Norvig
4	Introduction to Artificial Intelligence by Philip C. Jackson Jr.



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M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

FINAL INTERNAL MARK REPORT

Course Name : OBJECT ORIENTED PROGRAMMING WITH JAVA

Name : LAVANYA S

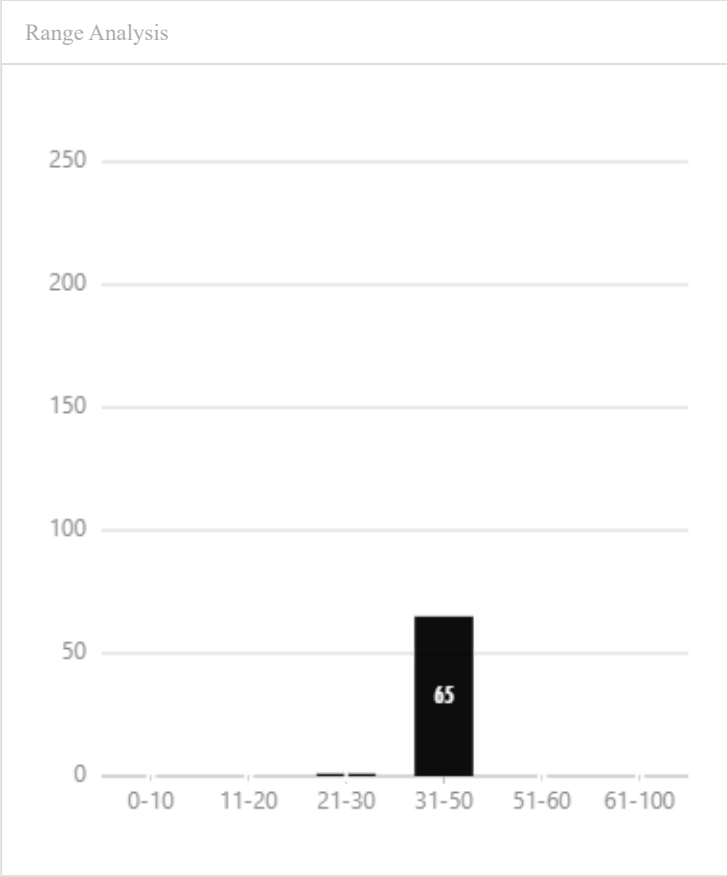
Course Code : 18AIC204J

Report : Final Internal Mark

Batch : 2022-2023 3rd Semester AI&DS A

Date : 9-2-2024

SNo	Register Number	Name	Marks	Attendance Percentage
1.	927621BAD001	AADHIGOWTHAM V S	35.00	86.67
2.	927621BAD002	AARTHI B	36.00	91.67
3.	927621BAD003	ABISHAK D	39.00	93.33
4.	927621BAD004	AKHIL S T	41.00	86.67
5.	927621BAD005	ASWIN SIDHARTH V S	37.00	93.33
6.	927621BAD006	BOOBESHAN AC	40.00	91.67
7.	927621BAD007	DEVAPRASADH B	29.00	91.67
8.	927621BAD008	DHANUSH G	38.00	91.67
9.	927621BAD009	DHARANIDHARAN R	38.00	90.00
10.	927621BAD010	DHINAGARAN V P	39.00	91.67
11.	927621BAD011	DINESH S	39.00	90.00
12.	927621BAD012	GURUMEETA S R	36.00	85.00
13.	927621BAD013	HARIPRIYA I	36.00	96.67
14.	927621BAD014	HARISH SRIRAJ N	42.00	88.33
15.	927621BAD015	HARISH V	39.00	95.00
16.	927621BAD016	HARSHINI M	41.00	93.33
17.	927621BAD017	HEMANTH B	42.00	93.33
18.	927621BAD018	JOTHIKA MANGAI B	40.00	86.67
19.	927621BAD019	JOTHIKA R	43.00	93.33
20.	927621BAD020	KANIYAMUDHAN Y	43.00	95.00
21.	927621BAD021	KAVIN K V	38.00	91.67
22.	927621BAD022	KAVIN M	34.00	85.00
23.	927621BAD023	KAVINKUMAR A	42.00	91.67
24.	927621BAD024	KEERTHIKA S	41.00	91.67
25.	927621BAD025	KRISHNA N	34.00	86.67
26.	927621BAD026	LAVANYA DEVI K	38.00	98.33
27.	927621BAD027	LIBERNA ASUWATHA A	37.00	90.00
28.	927621BAD028	LINGESH S	36.00	86.67
29.	927621BAD029	MADHUMITHRA M	42.00	96.67
30.	927621BAD030	MAHALAKSHMI R	42.00	96.67
31.	927621BAD031	MATHAN KUMAR K	33.00	91.67
32.	927621BAD032	MOHANAWARMA M G	39.00	83.33
33.	927621BAD033	NAVANEETH S	37.00	86.67
34.	927621BAD034	NAVANEETHA KRISHNAN P S	38.00	91.67
35.	927621BAD035	NIKITHA Y S	42.00	91.67
36.	927621BAD036	NIVEDHA M	39.00	95.00
37.	927621BAD037	PRANISHKA N	39.00	95.00
38.	927621BAD038	PRASANNA R	39.00	95.00



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
21 - 30	1
31 - 50	65
51 - 60	0
61 - 100	0

SNo	Register Number	Name	Marks	Attendance Percentage
39.	927621BAD039	PRASANTH S	37.00	96.67
40.	927621BAD040	PRAVEEN T	35.00	91.67
41.	927621BAD041	RAHUL R	34.00	83.33
42.	927621BAD042	SAI SETHU MLA	34.00	98.33
43.	927621BAD043	SAIPRASHANNA P	32.00	86.67
44.	927621BAD044	SANJAY S	35.00	91.67
45.	927621BAD045	SATHEESHKUMAR K	37.00	91.67
46.	927621BAD046	SAYNANE R M	36.00	96.67
47.	927621BAD047	SHARAN ADHITHYA S	36.00	96.67
48.	927621BAD048	SHURUTHI R S	40.00	96.67
49.	927621BAD049	SHYAM B	34.00	80.00
50.	927621BAD050	SOWNDHAR S	42.00	86.67
51.	927621BAD051	SREE ASWIN RAJHA R S	34.00	85.00
52.	927621BAD052	SUBAA R	38.00	91.67
53.	927621BAD053	SUBASH S	40.00	96.67
54.	927621BAD054	SUJAY V A	40.00	86.67
55.	927621BAD055	SUPRIYA G	35.00	88.33
56.	927621BAD056	SURYA N	37.00	95.00
57.	927621BAD057	THAMIZHARASAN P	45.00	95.00
58.	927621BAD058	THANISH SURIYA T	37.00	95.00
59.	927621BAD059	VIMAL MATHEW B	41.00	88.33
60.	927621BAD060	VINOHARSITHA A S	39.00	85.00
61.	927621BAD061	VISHAL R	35.00	88.33
62.	927621BAD062	VISHNU PRIYA C	41.00	93.33
63.	927621BAD063	YUVASHREE S	35.00	98.33
64.	927621BAD301	HAREESH KUMAR A	36.00	91.67
65.	927621BAD302	ROHITH U	33.00	86.67
66.	927621BAD303	SARATHI S	36.00	88.33

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
CURRICULAM AND SYLLABUS
INTEGRATED THEORY /LAB COURSES

Semester I

S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH101J	Technical English	2	0	2	3
3	B	18CYB101J	Chemistry	3	1	2	5
4	S	18EES101J(R)	Basic Electrical and Electronics Engineering	3	0	2	4
5	S	18CSS101J (R)	Programming for Problem Solving	2	0	2	3

Semester II

S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH102J	Professional English	2	0	2	3
3	B	18PYB101J	Physics	3	1	2	5
4	S	18MES102J	Basic Civil and Mechanical Engineering	3	0	2	4
5	S	18MES101J(R)	Engineering Graphics	1	0	4	3
6	C	18AIC101J	Python Programming	2	0	2	3

Semester III

S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
3	C	18AMC202J	Object oriented Programming using JAVA	3	0	2	4

Semester V

S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	C	18AMC301J	Fundamentals of Deep Learning	3	0	2	4
3	C	18AIC303J	Computer Networks (Common to DS and ML)	3	0	2	4

Semester VI

S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	C	18AIC305J	Predictive Modelling and Analytics (Common to DS and ML)	2	0	2	3

HOD/AI
Head of The Department
Department of Artificial Intelligence & Machine Learning
M. Kumarasamy College of Engineering.
Thalavapalayam, Karur - 639 113.

Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH101J	TECHNICAL ENGLISH	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Analyze the importance of communication in personal, professional contexts. Identify proper English pronunciation
CLR-2	Strengthen vocabulary and grammar. Enhance listening and writing comprehension. Review films and documentaries
CLR-3	Writing brief paragraphs using appropriate techniques. Enhance their English fluency in speaking
CLR-4	Write effective essays, stories. Experience workplace communication aspects
CLR-5	Research on a topic and write a comprehensible academic project reports. Make effective presentations

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify types, modes, channels and barriers of communication. distinguish different speech sounds, pronounce correctly
CO2	Identify, rectify the errors in the use of grammar and vocabulary. Improve listening and writing skills
CO3	Develop a topic idea into a cohesive paragraph with examples. Improve the fluency of speaking skills
CO4	Develop ideas into logical and coherent essays. Understand better the workplace culture
CO5	Identify the steps involved in writing an academic project report. List and practice skills need for making a presentation

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO3	1	3	1	3	3	2	1	3	3	3	-	3	-	1
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO (Avg)	1	3	1	3	3	2.8	1	3	3	3	-	3	-	1

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

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UNIT I	COMMUNICATION	6

Definition, Process of communication - (Filling in-Class Worksheets) - Verbal and Non-Verbal Communication (Individual and Group Activities - Role play)-Other Types of Communication: General-Technical-Formal, Informal- External, Internal (Write upon a selected type of communication)- Listening, Speaking, Reading, Writing(Group activity (Newspaper) – Discussion and Feedback)- Communication and Language Barriers(Individual Activity- Sharing of Personal Experiences)-Body language(Mime).

UNIT II	VOCABULARY AND GRAMMAR	7

Words with Foreign Roots, Word Formation – Inflectional, Derivational Prefixes, Suffixes(Quiz - Identifying the Borrowed roots and Their Meanings-Worksheet Exercise)-Synonyms and Antonyms and Standard Abbreviations(Context Based Activity / Learner Compiling Standard Abbreviations from Core Subject)-Homonyms and Homophones(Fun Activities – Worksheets- Cross Words)-Articles, Tenses(Exercise through Worksheets- Individual Activity -Peer Correction- Open Discussion)- Noun-Pronoun Agreement and Subject-Verb Agreement(Identifying and Learning through Error Analysis – Worksheets)-Misplaced Modifiers - Prepositions- Prepositional verbs and Phrasal verbs(Learn through Practice – Placing Same Modifier in Different Places in a Sentence)-Prepositions- Prepositional Verbs and Phrasal Verbs(Filling in-Class Worksheets)

UNIT III	DISCOURSE TECHNIQUES	7

Sentence Structure, Phrases and Clauses(Exercise: Worksheet, Identifying Phrases, Clauses, Compound, Complex Sentences)-Developing Ideas into Paragraphs –Cohesion Markers(Identify Topic sentence in a Paragraph; Writing a Paragraph Based on a Topic)- -Inputs on Writing Precisely, Redundancies, Wordiness-Repetition-Clichés(Error Analysis and Editing)-Defining, Describing Technical Terms(Writing Definitions-Product and Process Description)-Inputs on Classifying/Categorising and Sequencing Ideas with Relevant Diagrams(Writing a Passage on the Given hints, Tree Diagram, Classification Table and Flow Chart)-Importance of Punctuation – Miscommunication –(Fun Activities - Worksheets for Appropriate Punctuation – Written)- Errors in Punctuation(Fun Activities - Worksheets for Appropriate Punctuation – Written)

UNIT IV	WORKPLACE COMMUNICATION	6

Reading Comprehension, Guidelines questions (Referential, Critical,Interpretative)(Practice Excercise) - Précis-writing Guidelines(Practice Excercise) - Summarising(Group Activity (Oral/Written) on the Given Passages)-Essay Writing Guidelines: Introduction, Elaboration and Conclusion with Examples(Individual Activity (Written) on the Given Topic)-Organisational Report Writing - Progress Report- Guidelines(Writing a Progress Report)-Interview Skills(Mock Interview).

UNIT V	PROJECT WRITING	5

Topics for Project Writing(Discussion)- Collection of Data – Avoiding Plagiarism-Authenticity and Credibility of Data(Collection of Data for Verification)- Guidelines for Writing: Outline- Objectives-Background- Methodology-Discussion-Documentation(Drafting an Outline & Preparing References)-Discussion Using Sample Project(Writing the First Draft on the Selected Topic)-Checklist for Project Format (PPT)(Self-Verification and Submission of Final Draft)

LIST OF EXPERIMENTS	14

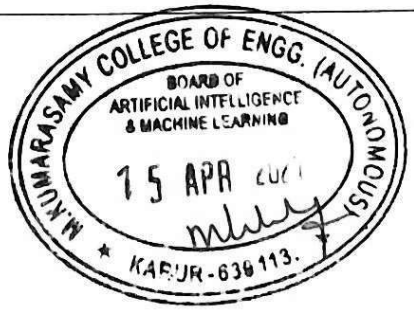
1. Often Mispronounced sounds (Audio Visual Material - Listening to minimal pairs and reproducing)
2. Barriers of communication Language barriers – videos (Identifying the Language Barriers of communication –Written)
3. Short Biographical Account on Famous Personalities –Video(Oral Paraphrasing of the Content Shown)
4. Listening to Long Conversations, Daily Life (Identify Various Communication Contexts and Answering Questions – Collocation)
5. Introduction to Englishes -British and American –Videos (Discussion on Difference between British and American Words)
6. Speaking - Practice Activity – Brain Storming – Mind Mapping (Just a Minute)
7. Describing a Scene or Event –Videos (String Narration – Describing an Event or a Scene)
8. Technical Communication – Interpreting Data (Group Activity - Interpretation of Data - Oral Presentation)
9. Sample Case Studies for Work Ethics – Videos (Debate on the Videos Shown)
10. Learning Interview Techniques through Models (Mock Interview)
11. Guidelines for Preparing a PPT; Presentation Techniques (Preparing PPT on the Topic of Learners' Choice)
12. Formal Presentation

Text Book (s)

1	Abirami K ,Technical English –, R.K.Publishers, Coimbatore.

Reference (s)

1	Swan, Michael. Practical English Usage. OUP, 1995
2	Kumar Sanjay and PushpaLata. Communication Skills. OUP, 2011
3	CIEFL, Hyderabad. Exercises in Spoken English. Parts I-III. OUP
4	Anbazhagan K, Cauveri B, Devika M.P., English for Engineers. Cengage, 2016
5	www.mmm.english.com
6	www.onlinewriting.com/purdue
7	www.ieee.org/index.html



Regulation 2018		Semester II	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18CYB101J	CHEMISTRY	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- Apply the basic principles of chemistry at both atomic and molecular levels in understanding the concepts related to the engineering field.
- Integrate the chemical principles in their projects undertaken in their respective fields
- Enhance the quality of a materials used in the product from the technological aspects for societal applications

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the suitable polymeric materials fabrication processes in various application
CO2	Apply the basic principle of inorganic chemistry at the atomic and molecular levels
CO3	Apply the various thermodynamic and kinetics concepts to real system
CO4	Assemble a battery through the understanding of electrochemical principles
CO5	Catagorize the Engineering materials for their applications

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO2	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO3	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO4	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO5	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO (Avg)	3.00	3.00	1	1	1	-	-	-	-	-	-	-	1	1

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

M.KUMARASAMY COLLEGE OF ENGG. (AUTONOMOUS) BOARD OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 15 APR KARUR-639113.

UNIT I	ENGINEERING ORGANIC MATERIALS	9+3

Polymer – Introduction- Classification(Based on Molecular Weight, Structure and Usage)- Types Of Polymerization(Addition, Condensation and Copolymerisation)-Crystallinity, Melting Point and Glass Transition temperature-Mechanism of Polymerization(Free Radical Addition Polymerization)-Elastomer- Structure and Curing(Vulcanization)- Fabrication and Molding of Polymers(Injection Molding and Blow Molding)- Engineering Plastics – PE, PVC, PMMA, Phenol Formaldehyde Resin, Urea Formaldehyde Resin(Preparation, Properties and Uses)- Industrial Applications of Polymers.

UNIT II	COORDINATION AND ORGANOMETALLIC COMPOUNDS	9+3

Co-Ordination compounds – Introduction- Nomenclature- Types of Ligands (Mono, Di And Poly Dendate Ligands)-Isomerism(Structural And Stereo Isomerism) – Theories of Bonding(Werner And Sidgwick Pouvell Theory(EAN Rule)) – Applications – EDTA Titration – Organometallic Compounds - Synthesis(Organo Zinc, Organo Lithium And Organo Magnesium) – Applications (18 Electron Rule, Ziegler Natta Catalyst and Hydroformylation)

UNIT III	THERMODYNAMICS AND KINETICS	9+3

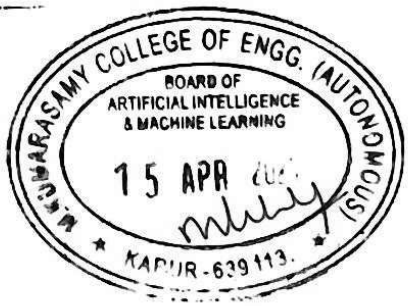
Introduction- First and Second Law of Thermodynamics – Gibbs –Helmholtz Equation – Clausius Clapeyron Equation – Maxwell Relations – Vant Hoff Isotherm and Isochore (Problems also)- Kinetics- Introduction- Types of Reactions(Opposing, Consecutive and Parallel Reactions)- Chain Reactions (HBr and HCl formation)- Applications of Kinetics and Thermodynamics.

UNIT IV	ENGINEERING ELECTROCHEMISTRY	9+3

Introduction- Conductors and its types - Cells (Electrolytic and Electrochemical cells) – Standard electrode potential- Nernst equation of an electrode- Types of electrodes (SHE and Calomal electrode)- Batteries –Types (Primary, Secondary, Flow and reserve battery)- Examples (Lead acid battery, Ni-Cd battery, Lithium battery, Lithium sulphur battery and Hydrogen- Oxygen fuel cells)- Graphene.

UNIT V	INDUSTRIAL APPLICATIONS OF CHEMISTRY	9+3

Cement (Types, manufacture and properties) – Paints (constitutions and functions)- Lubricants-types- mechanism – properties-abrasives – types –Diamond, Corundum, Emery, Garnet, Quartz, Silicon carbide, Carborundum-Boron Carbide, Alundum (preparation, properties and uses) – Applications – Basics of Biosensor and Biochips.

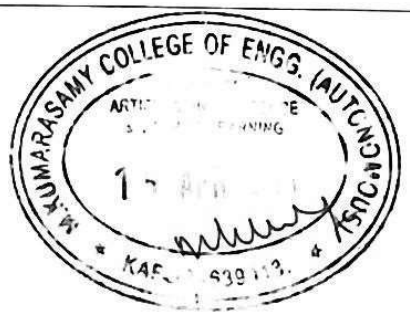


LIST OF EXPERIMENTS	30

1. Determination of total , permanent and temporary hardness of water sample (EDTA method)
2. Determination of alkalinity in water sample- Indicator method
3. Determination of chloride content of water sample by Argentometric method(Mohr's method)
4. Determination of dissolved oxygen content of water sample by winkler's method
5. Conductometric titration of strong acid with strong base
6. Conductometric titration of mixture of acids
7. Determination of strength and amount of Hydrochloric acid- pH metry
8. Estimation of strength and amount of ferrous ion by potentiometric method
9. Determination of molecular weight of a polymer by viscometry method
10. Estimation of ferrous ion by colorimetry.
11. Cement analysis

Text books / Reference books:

1	B.L.Tembe, Kamaluddin and M.S.Krishnan , "Engineering chemistry"
2	S.S. Dara "A Text book of Engineering Chemistry" S.Chand & Co.Ltd, New Delhi (2009).
3	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., NewDelhi (2012).
4	Shashi Chawla, Engineering Chemistry: Dhanpat Rai &Co., 3rd Edition, 2015
5	www.nptel.ac.in



Regulation 2018		Semester I	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18EES101J(R)	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Gain knowledge about the D.C and A.C circuits.
2	Impart the fundamentals of electrical machines.
3	Study the fundamentals of semiconductor devices
4	Study the working concepts of measuring instruments.
5	Know about digital logic concepts and operational amplifier.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Apply the concepts of ohm's law and Kirchhoff's law in DC and AC circuits
CO2	Explain the basic concepts of DC motor, DC generator, Transformer and Induction motor.
CO3	Summarize the nature of semiconductor devices.
CO4	Interpret the concept of measuring devices like PMMC, MI, energy meter and wattmeter.
CO5	Infer the concept of electronics devices and conversion techniques

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	1	1	-	1	3	1
CO2	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO3	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO4	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO5	3	-	1	1	1	-	-	-				1	3	1
CO (Avg)	3	0.4	1	1	1	-	-						3	1

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

UNIT I	ELECTRICAL CIRCUITS	9

Electrical quantities: Resistors, Inductors, Capacitors - Ohm's Law - Kirchoff's Laws -Series and Parallel circuits - Analysis of DC circuits: Mesh & Nodal analysis, Thevenin's Theorem, Norton's Theorem & Maximum Power Transfer Theorem, Star delta Transformation, RL & RC Transient Analysis. Introduction to AC Circuits: Waveforms and RMS Value – Power and Power factor. Introduction to three phase systems – Types of connections, Relationship between line and phase values

UNIT II	ELECTRICAL MACHINES	9

Faraday's laws- Construction, Principle of Operation, Basic Equations of DC Generators, DC Motors – Two Point & Three Point Starter – Construction, Working and EMF Equation of Single Phase Transformer – Construction and Working of AC Generator – Three Phase Induction Motor: Construction and Working of Squirrel Cage and Slip Ring Induction Motor – Single Phase Induction Motor (Split Phase, Capacitor Start Induction Motor)

UNIT III	ELECTRONIC DEVICES	9

Intrinsic and Extrinsic Semiconductors – PN junction diode , Zener diode and its Characteristics – Operation of Half Wave, Full Wave and Bridge Type Rectifiers – Bipolar Junction Transistor: Configurations and Characteristics of CB, CE, CC – Construction and Operation of JFET, MOSFET..

UNIT IV	MEASUREMENTS	9

Basic Principles and Classification of Instruments – Construction and Working of PMMC, MI Instruments (Attraction & Repulsion type) – Principle of Operation of Dynamometer Type Wattmeter, Induction Type Energy Meter – Instrument transformer – CRO – Megger

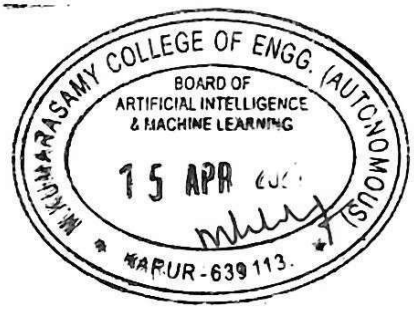
UNIT V	DIGITAL & INTEGRATED DEVICES	9

Number Systems – Boolean Theorems– Logic Gates – Half Adder and Full Adder Circuit – Flip-Flops: RS, JK,T and D – A/D Converter (Successive Approximation Type) – D/A Converter (Binary Weighted Type) – Op-Amp : Functional Block and Types (Inverting , Non-Inverting & Differential Amplifier)

LIST OF EXPERIMENTS	15

1. Verification of Ohm's & Kirchoff's Laws
2. Types of Wiring (Fluorescent Lamp & Staircase)
3. Verification of Thevenin's Theorem
4. Verification of Norton's Theorem
5. Characteristics of PN Junction Diode
6. Characteristics of Common Base Configuration.
7. Characteristics of Common Emitter Configuration.
8. Measurement of Ripple Factor : Half Wave & Full Wave Rectifier.
9. Study of AC and DC Machines
10. Verification of Logic Gates
11. Study of PMMC and MI Meters

Text Book (s)	
1	R. Muthusubramanian, S. Salivahanan,"Basic Electrical and Electronics Engineering," Tata McGraw-Hill, 2012
2	Sawhney, A.K., "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2011.
Reference (s)	
1	Dash.S.S, Subramani.C, Vijayakumar.K, "Basic Electrical Engineering", Vijay Nicole, 1st Edition, 2013.
2	Jegatheesan.R, "Analysis of Electric Circuits", Tata McGraw-Hill, 2014.
3	Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI Learning Private Ltd, 2nd Edition, 2010.



Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18CSS101J (R)	PROGRAMMING FOR PROBLEM SOLVING	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CO1	Learn programming using a structured programming language.
CO2	Provide exposure on C programming.
CO3	Introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Apply the problem solving techniques for solving numeric and string problems
CO2	Solve basic numeric problems using control statements in C
CO3	Develop the C program using the concepts of array and string.
CO4	Apply the concept of function prototypes and pointers.
CO5	Compare the performance of structures and union in memory management.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO2	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO3	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO4	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO5	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO (Avg)	3	3	3	3	3	-	-	-	2	1	-	3	3	3

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

UNIT I	INTRODUCTION	6
Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems – Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.		
UNIT II	**C PROGRAMMING BASICS**	**6**
Structure of 'C' program – Tokens – Data Types – Operators – Input and Output operations – Decision Making and Branching – Looping Statement.		
UNIT III	**ARRAYS AND STRING**	**6**
Arrays: Declaration – Initialization – One dimensional and Two dimensional arrays – String: String Declaration and Initialization – String Function.		
UNIT IV	**STRUCTURES AND POINTERS**	**6**
Introduction to Structures-Needs for Structure Data type – Structure: Definition, Declaration – Structure vs Union. Pointers – Definition – Initialization – Pointer and arrays – Null Pointer – Pointer to Structure		
UNIT V	**FUNCTIONS**	**6**
Function – Definition of function – Declaration of function – Function Prototype – Pass by value – Pass by reference.		
	LIST OF EXPERIMENTS	**15**

1. Programs on Operators
2. Programs on Control statements
3. Programs on one Dimensional Array
4. Programs on Two Dimensional Array
5. Programs on String Handling
6. Programs on Function using Call by Value
7. Programs on Function using Call by Reference
8. Programs on Pointers
9. Programs on Structure
10. Programs on Union

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Text Book (s)	
1	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley(India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2	PradipDey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition,Oxford University Press, 2009
Reference (s)	
1	Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill,2006.
2	Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
3	Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, PearsonEducation, 2006.
4	Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.

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Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH102J	PROFESSIONAL ENGLISH	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Develop team spirit and stress management skill
CLR-2	Demonstrate the interpersonal skills of the learners
CLR-3	Make learners perform well in interviews
CLR-4	Enable them to listen well and express their ideas, opinions effectively in official contexts
CLR-5	Sharpen their reading comprehension skill
CLR-6	Strengthen their official written communication skill.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Work in a team under any situation.
CO2	Practice interpersonal relationships in workplace
CO3	Face interviews confidently and successfully
CO4	Participate and excel in role plays, presentations and formal conversations.
CO5	Read and infer the meanings of technical and aesthetic passages.
CO6	Draft official letters, reports, memos, emails, etc.,

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CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO2	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO3	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO4	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO5	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO6	1	1	3	3	3	2	1	3	3	3	-	3	1	1
CO (Avg)	1	1	1.33	3	3	2	1	3	3	3	-	3	1	1

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

UNIT I	SOFT SKILLS	7

Introduction to Soft Skills(MCQ on Soft Skills)-Leadership Skills(Handling a Team) -Optimism & Business Etiquettes(Presentations on How to Handle Situations Effectively)-Team Management (Motivational Videos on Positive Thinking)- Time Management(Discussion on Real Time Hardships) -StressManagement(Handling Criticism)-Organizational Communication - Channels of Communication(Case Study).

UNIT II	LISTENING	7

Listening Skills: Active Listening, Passive Listening(Classroom Listening Activities)-Methods for improving Listening Skills, Listening and its process – Barriers to Listening(Innovative Practices and Strategies for Better Listening) – Listening to Pre-Recorded video/audio (Listening to Famous Motivational Speeches)- Listening to Reading in the Class - for Vocabulary - for Complete Understanding – for Better Pronunciation(Read aloud a Story or an Article to Listen and Complete the Task) - Listening for General Content – Listening to fill up Information(Listening –fill in the Form Activity) – Intensive Listening for Specific Purpose-Listening to Monologues(Listening to Announcements) -Extensive Listening(Listening to Business News).

UNIT III	SPEAKING	5

Defining Presentation and its Purpose; Audience & Local; Organizing Contents; Preparing Outline(Mini presentation)- Audio-Visual Aids; Nuances of Delivery; Body Language;(PPT Presentation) - Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice(Voice Modulation Practice)-Interviews &Its Types-Role Play(Mock Interview) - Group Discussion-Oral Presentations -Formal Conversations(Group Discussion Practice).

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UNIT IV	READING	5

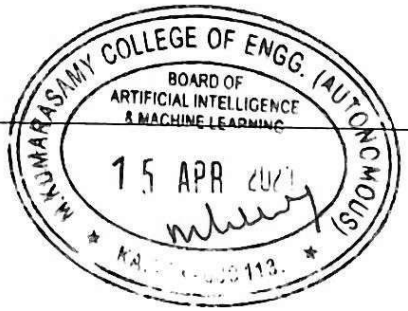
Reading & Its Types- Techniques for Good Comprehension, Reading Comprehension(Reading Comprehension Exercises) - Cloze Test ,Reading Newspaper- Editorials & Business Articles (Cloze Test Exercises)- Inferring Meaning- Improving Comprehension Skills(Reading for Meaning) - Skimming and Scanning– Structure of the Text – Structure of Paragraphs(Skimming and Scanning Exercises) - Interpreting Visual Communication(Graphs, Charts, Tables)(Interpreting the Graphical images)

UNIT V	WRITING	5

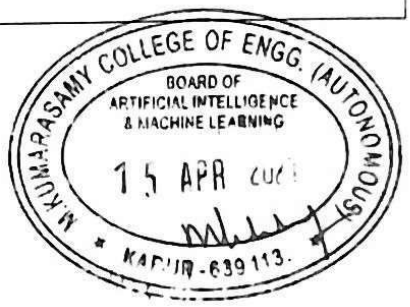
Writing Official Letters(Invitation Letter (Accepting & Declining),Quotation, Ordering, Complaining, Seeking Clarification)(Business Letter Writing Exercises), Writing Official Letters(Permission – In-Plant Training)- Writing CV (Job Application)(Job Application Letter Exercise)- Essay Writing-Email Writing -Writing Reports & Proposal(Writing a Business Report)- Writing Circulars, Memos, Agenda & Minutes(Exercises on Writing Circulars, Memos, Agenda & Minutes).

LIST OF EXPERIMENTS	16

1. Videos on Stress Management (Stress Management Activities)
2. Videos on Team Spirit (Team Activities)
3. Listening to TED Talks(Listening to Business Interviews)
4. Listening to Business Presentation (Listening to Business Interviews)
5. Telephonic Conversation (Organizing a Meeting)
6. Product Launch (Persuasive Speech)
7. Business Conversations
8. Business Role Play Activities
9. Reading for Pleasure(Intensive Reading)
10. Extensive Reading(Briefing Favourite Self Help Books)
11. Reading Newspaper articles(Reading Business Reports)
12. Reading Business Legends Success Formula(Read Between the Lines)
13. Writing an Advertisement (Writing Slogans for Products)
14. Error Correction Exercises (Formal Language expressions)
15. Business Vocabulary (Writing Official E-mails)
16. Writing Business Proposals (Writing Permission Letters)



Text Book (s)	
1	Abirami K, "Professional English", First Edition, R.K.Publishers, Coimbatore, 2019.
Reference (s)	
1	Lina Muhkopadhyay, et al., "English for Jobseekers" ,Cambridge University Press, New Delhi,2013
2	Brook Hart Guy, Business Benchmark Advanced Personal Study Book for BEC and BULATS, Cambridge
3	Mascull , Bill, Business Vocabulary in Use, Third Edition, Nov 2017
4	Emerson Paul, Business English Handbook ,Advanced, Macmillan
5	www.Business English Site.com
6	www.businessenglishpod.com



Regulation 2018		Semester I	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18PYB101J	PHYSICS	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Identify the applications of electric field on materials
CLR-2	Identify the applications of magnetic field on materials
CLR-3	Identify the significance of quantum theory
CLR-4	Create insights to the concepts of optical effects
CLR-5	Analyze the working principle of lasers and optical fibers

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the effect of charge dynamics
CO2	Analyze electromagnetic induction
CO3	Apply quantum mechanics to basic physical problems
CO4	Apply ray propagation and optical effects
CO5	Identify the applications of lasers and optical fiber

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	-	-	-	-	-	1	-	1	1
CO2	3	3	3	3	1	-	-	-	-	-	1	-	1	1
CO3	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO4	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO5	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO (Avg)	3.00	3.00	3.00	3.00	2.2	-	-	-	-	-	1	-	1	1

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

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UNIT I	ELECTROSTATICS AND DIELECTRIC MATERIALS	9+3

Del-divergence-curl and gradient operations in vector calculus-Gauss-divergence and Stoke's theorem-Electric field and electrostatic potential for a charge distribution-Gauss' law and its applications-Laplace's equations for electrostatic potential-Poisson's equations for electrostatic potential-Solving Problems-Concepts of electric current-Continuity equation-Laws of magnetism-Faraday's law-Ampere's law-Maxwell's equations-Solving Problems-Polarizations, permeability and dielectric constant -Polar and non-polar dielectrics -Types of polarization-Frequency and temperature dependence-Internal field in a field-Clausius-Mossotti equation-Solving Problems.

UNIT II	MAGNETIC AND SUPERCONDUCTING MATERIALS	9+3

Magnetization, permeability and susceptibility-Classification of magnetic materials-Ferromagnetism-Concepts of ferromagnetic domains –Hysteresis-Solving Problems -Properties and applications of ferromagnetic materials -Hard and soft magnetic materials -Ferrimagnetic materials - Magnetic bubbles – Ferrites- Solving Problems-Superconductivity -Properties of superconductivity -Type I & Type II superconductors-High Tc superconductors – SQUID – CRYOTRON-MAG LEV-Solving Problems.

UNIT III	QUANTUM PHYSICS	9+3

Introduction to Quantum mechanics-Explanation of wave nature of particles-Black body radiation-Compton effect-Solving Problems-Photoelectric effect-de Broglie hypothesis for matter waves - Physical Significance of wave function -Time independent Schrödinger's wave equation -Time dependent Schrödinger's wave equation -Solving Problems-Particle in a 1 D box -Normalization - Born interpretation of wave function -Properties of Matter waves-Verification of matter waves-G.P. Thomson Experiment-Solving Problems.

UNIT IV	WAVE OPTICS	9+3

Introduction to interference-Introduction to diffraction-Fresnel diffraction-Fraunhofer diffraction-Fraunhofer diffraction at single slit-Fraunhofer diffraction at double slit-Solving Problems-Fraunhofer diffraction at multiple slit-Diffraction grating-Characteristics of diffraction grating-Applications of diffraction grating-Polarization by reflection-Polarization by double refraction-Solving Problems -Scattering of light-Circular polarization-Elliptical polarization-Optical activity-Fresnel's relation -Brewster's angle--Solving Problems.

UNIT V	LASER AND FIBER OPTICS	9+3

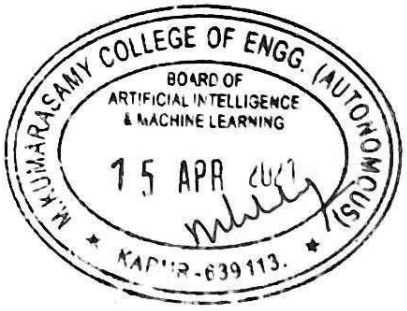
Absorption and emission processes-two level-Einstein's theory of matter radiation A and B coefficients-Characteristics of laser beams-Amplification of light by population inversion-Threshold population inversion-Essential components of laser system and pumping mechanisms-Solving Problems-Nd: YAG laser-Semiconductor laser-CO_2 laser-Vibrational modes-CO_2 laser-energy level-Optical fiber-physical structure-Total internal reflection-Solving Problems-Numerical aperture - Acceptance angle-Losses associated with optical fibers-Classification of optical fibers-Optical fiber communications system-Optical sensors-Solving Problems.

LIST OF EXPERIMENTS	30

1. Basics of experimentation
2. Determine dielectric constant of the sample
3. Calibrate Ammeter using Potentiometer
4. Calibrate voltmeter using Potentiometer
5. Determine the energy loss of magnetic materials using B-H curve experiment
6. Determine Planck's Constant
7. Study of I-V characteristics of a light dependent resistor (LDR)
8. Determine wavelength of monochromatic light by Newton's ring
9. Determine particle size using laser
10. Determine wavelength of using diffraction grating
11. Determine wavelength for a given laser source
12. Study of numerical aperture and acceptance angle of optical fiber
13. Mini project

Text books/ References:

1	David Jeffery Griffiths, Introduction to Electrodynamics, Revised edition, Pearson, 2013
2	Ajay Ghatak, Optics, Tata McGraw Hill Education, 5th edition, 2012
3	David Halliday, Fundamentals of Physics, 7th edition, John Wiley & Sons Australia, Ltd, 2004
4	Berg and Resnick, Quantum Physics: Of Atoms, Molecules, Solids, Nuclei and Particles, 2nd Edition, 1985



Regulation 2018		Semester II	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES102J	BASIC CIVIL AND MECHANICAL ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Select building materials and identify the components of a building
2	Identify the various transportation systems, bridges, dams and water supply system
3	Apply the concept of Harnessing energy from various energy sources
4	Know the working of IC engines and identify the sub system requirements
5	Apply manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the building materials and its applications
CO2	Identify different transportation system, water supply system and its applications
CO3	List the basic components and analyze the working of major power plants
CO4	Identify the working of IC engines and understand the need of various auxiliary systems
CO5	Identify manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	3	3	-	-	-	-	3	1	-
CO2	3	-	3	-	3	3	3	-	3	-	-	3	1	-
CO3	3	-	-	-	-	-	3	-	-	-	-	-	1	-
CO4	3	-	-	-	-	-	3	-	-	-	-	-	3	1
CO5	3	-	-	-	-	-	-	-	-	-	-	-	3	2
CO (Avg)	3	-	1.2	-	0.6	1.2	1.4	-	-	-	-	1.2	1.8	0.6

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

UNIT I	BUILDING MATERIALS	9

Introduction to Civil Engineering, Building Materials, History, Disciplines in Civil Engineering, Early constructions and development over time, Ancient Monuments: Peruvudaiyar or Brihadeeswarar Temple, Kallanai dam Grand Anicut, Taj Mahal, Golconda fort, Angkor Wat, Pyramids of Giza, Colosseum Development of various materials, Methods of Construction, Building Materials - Stone – Classification of Rocks, Quarrying, Dressing, Properties and Uses of Stone Mortar, Plain and Reinforced Cement, Concrete Grade and properties and uses, Necessity of Special Concrete, Self Compacting Concrete, Construction Chemicals (Plasticizers), Recycling: construction, demolition wastes, Buildings, Classification of Buildings, Selection of site for a building, Components of Buildings, Soil, General types of soil, Bearing Capacity, Factors affecting bearing capacity, Foundations: Functions, General types of, foundation, Shallow foundations

UNIT II	RANSPORTATION AND WATER SYSTEM	9

Cement concrete flooring, Marble flooring, Granite flooring, Ceramic tile flooring, Roofs: Types of roofs, Madras terrace roof, Reinforced concrete roofs, Trussed roof, Roof Coverings: Types, Weathering course: Types, Mode of Transportation - Highways - Classification of Roads, Cross section details of flexible pavements, Railways – Zone and Headquarters, Permanent way and its requirement, Components of Permanent way, Bridges: Components of Bridge, Types, Dams: Purpose, Classification, Gravity dams - Advantages and Disadvantages, Elements of protected Water Supply system, Objective, Quantity of water, Design period, Per-capita demand, Factor affecting per capita demand, Sources of Water Supply, Standards of Drinking water, Drinking Water Treatment: Objectives, Treatment plant process, Sewage: Method of collection, Sewage treatment and disposal

UNIT III	POWER PLANTS	9

Coal based thermal Power Plant: layout, components description, working, advantages, disadvantages, Hydro Electric power plant: layout, components description, working, advantages and disadvantages, Nuclear power plant: Nuclear fission and fusion reactions, Nuclear reactor, components description, Layout, working, merits and demerits of boiling water reactor , Layout, working, merits and demerits of pressurized water reactor, Gas turbine power plants: components description, working and types gas turbines, methods to improve performance, Layout and working of open cycle plant with intercooling, reheating, regeneration, Solar Thermal power plant: layout of Flat plate collector based plant, central receiver type plant, advantages, disadvantages, Wind energy conversion system – wind turbine types, Working, advantages and disadvantages

UNIT IV	INTERNAL COMBUSTION ENGINES	9

Engine: Classification, operations of 2 stroke & 4 stroke, Comparison of SI & CI engines, Fuel supply system and Battery ignition system, Magneto ignition system of SI engine, Working of a simple carburetor, GDI, MPFI, CRDI, Lubrication system of an engine, Functions and Working of mist and forced feed lubrication system, Cooling system of an engine – Working of air cooled (fins), Water cooled engines (forced circulation), Alternate fuels for IC Engines: Liquid fuels: methanol, ethanol, vegetable oil, Biodiesel, Gaseous fuel: Hydrogen, CNG, LPG, properties, advantages, disadvantages, Emissions from engine – Emission standards – Euro, BS, Emission control measures – Catalytic converter, Exhaust gas recirculation, Introduction to electric vehicles, Hybrid and autonomous vehicles

UNIT V	CASTING AND FORMING PROCESS	9

Casting introduction and history, Expandable mold casting process , Production steps in a typical sand-casting process, terms including patterns and core, Other expendable mold casting: shell molding, vacuum molding, expanded polystyrene process, Investment casting, Permanent mold casting: hot chamber and cold chamber die casting & Permanent moldcasting: Semi centrifugal and centrifuge casting, Metal forming introduction and its classification, metals and alloys, Bulk deformation: hot, cold forging processes, hot rolling processes, cold rolling processes, Rolling mill classification, hot and cold extrusion processes, wire and bar drawing processes, Sheet metal working, applications. Cutting operations: shearing, blanking, punching, cutoff, parting, slotting, perforating, notching, trimming, shaving, fine blanking, Bending operations: V-bending, edge bending, flanging, hemming, seaming, curling, spring back effect, Drawing operations, its defects, coining, embossing, ironing, lancing, twisting

LIST OF EXPERIMENTS	30

1. Study about Brick, Stone & Cement: Types, Uses, Structural steel, Timber properties and uses
2. Study about Water Supply, Distribution System, Water Treatment Plant, Sewerage System
3. Study about basics of Casting, processes, Equipment"s, To make the mould using stepped flange
4. Basics of Metal Arc welding operations, Equipment"s, Tools, Butt joint of two metal plates using arc welding process
5. Welding-Lap joint of two metal plates overlapping on one another using arc welding process.
6. Basics of fitting practice, tools and method of producing models, Tools, Step fitting of two metal plates using fitting tools
7. Half Round, Vee fitting of two metal plates using fitting tools
8. Basics of Carpentry operations, Equipment"s, Tools, Cross halving joint of two wooden pieces at perpendicular direction
9. To make duster from wooden piece using carpentry tools.
10. Basics of Sheet metal operations, Equipment"s, Tools and demonstration of producing models, To make geometrical shape like frustum
11. Sheet metal operations - To make geometrical shape like square tray, rectangulat tray
12. Sheet metal operations - To make geometrical shape like Cone , Funnel
13. Study the basics of moulding and processes, Equipment"s, To make plastic models using injection moulding of simple part
14. Basics of Plumbing practices for G.I and P.V.C., Tools and demonstration of producing models
15. Plumbing of bathroom/ kitchen fittings using G.I. fittings, P.V.C. fittings

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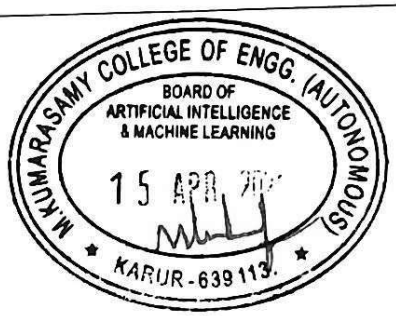
Text Book (s)	
1	Dr.V. Rameshbabu,"Basic of Civil and Mechanical Engineering", VRB Publishers pvt ltd, 2017
Reference (s)	
1	SeropeKalpakjian, Steven Schmid," Manufacturing Processes for Engineering Materials", Pearson, 2016
2	Drbal, Larry F. Boston, Patricia G. Westra, Kayla L. Black, Veatch, "Power Plant Engineering", Kluwer Academic Pub., 1995
3	Andy Walker, "Solar Energy", John Wiley & Sons, 2013
4	John B. Heywood, "Internal Combustion Engine Fundamentals", Tata McGraw Hill Education, 2017
5	Kumar. T, LeenusJesu Martin and Murali. G, "Basic Mechanical Engineering", Suma Publications Chennai, 2007.



Regulation 2018		Semester I / II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES101J (R)	ENGINEERING GRAPHICS	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):

- Construct ellipse, Parabola, hyperbola, cycloid and involutes.
- Sketch the projection of points, straight lines and plane surfaces.
- Sketch the Projection of simple solids like prisms, pyramids, cylinder and cone
- Sketch the sectional solids and developing the lateral surfaces of simple solids
- Understand the three dimensional drawing of simple solid by isometric projection and perspective projection, and convert isometric projection to orthographic projection.

Course Outcome (s) (COs):

CO1	Construct the ellipse, Parabola, hyperbola, cycloid, and involutes
CO2	Draw the projection of point, straight line, and plane surface inclined to both reference plane
CO3	Draw the projection of solid objects prisms, cylinders, pyramids, and cones inclined to one reference plane
CO4	Develop the lateral surfaces of the sectional solids
CO5	Build 3D part models using isometric and perspective projection

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3		1			1	2	2		2	-	-	-
CO2	3	3	3		2			1	2	2		2	-	-	-
CO3	3	2	3		2			1	2	2		2	-	-	-
CO4	3	2	3		2			1	2	2		2	-	-	-
CO5	3	2	3		2			1	2	3		2	-	-	-

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

M.KUMARASAMY COLLEGE OF ENGG.(AUTONOMOUS) Approved by Board of Mechanical Engg.on

UNIT I	PLANE CURVES	12

Principles of Engineering Graphics - Lettering - dimensioning - Curves used in engineering practices: Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes – Drawing of tangents and normal to the above curves.

UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	12

Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations.

Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT III	PROJECTION OF SOLIDS	12

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	12

Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	12

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms, pyramids and cylinders by visual ray method. Isometric to orthographic multi-view.

Text Book (s)	
1	K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai. 2016
2	C. Ramesh, SC Prasanna & M. Karthe "Engineering Graphics", R.K.Publishers, Coimbatore, 2020

Reference (s)	
1	K. Venugopal & V. Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 15th edition (2018)
2	K. R. Gopalakrishnana, "Engineering Drawing" (Vol.I&II), Subhas Publications, 2010.
3	R. L Jhala "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, New Delhi, 2015.
4	Dhananjay A.Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2008.
5	Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2012.
6	M.S. Kumar, "Engineering Graphics", D.D. Publications, 2012.

List of Laboratory Expertiments

1	Draw the Spiral & involutes using B Spline or cubic spline by using AutoCAD
2	Draw the Plan of residential building by using AutoCAD
3	Draw the Simple Steel Truss by using AutoCAD
4	Draw the projection of line with inclined to both reference plane by AutoCAD
5	Draw the projection of plane with inclined to both reference plane by using AutoCAD
6	Draw the Projection of simple solids like prism, Pyramid, Cone, Cylinder by using AutoCAD
7	Draw the Sectional top view, front view & true shape of prism, Pyramid, Cone, Cylinder by using AutoCAD
8	Draw the Development of lateral surfaces of Solids by using AutoCAD
9	Draw the Isometric projections of simple solids by using AutoCAD
10	Creation of 3D model by using AutoCAD

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Board of Mecha cal Engg.on
26/04/2021

Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC101J	PYTHON PROGRAMMING	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):
The purpose of learning this course is to:

1	Understand the fundamentals of Python programming
2	Handle list, tuples, sets and Dictionaries data types
3	Learn function prototypes and string functions
4	Use files and modules for data processing
5	Understand packages in Python and data visualization

Course Outcome (s) (Cos):
At the end of this course, learners will be able to:

CO1	Develop basic Python programs using conditional and control statements
CO2	Perform operations on list, tuples, sets and Dictionaries
CO3	Implement function prototypes and string functions
CO4	Apply files and modules and perform operations on CSV files
CO5	Perform data visualization and apply Python packages

CO-PO Mapping

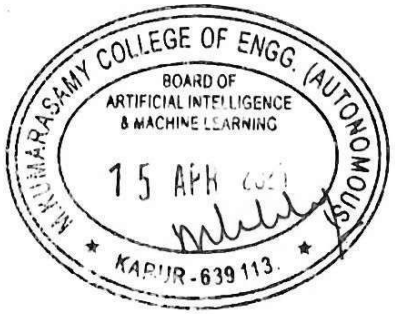
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO2	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO3	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO4	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO5	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO (Avg)	3.00	3.00	3.00	3.00	3.00	1.00	-	-	-	-	-	3	3.00	2

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

M.KUMARASAMY COLLEGE OF ENGG (AUTONOMOUS) ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 15 APR

UNIT I	INTRODUCTION TO PYTHON	6
Introduction to Python, features, installing Python, writing and executing Python program — native data types, comments, constants, variables, operators, expression, conditional statements, control statements, continue, pass, break.		
UNIT II	**LISTS, TUPLES, SETS AND DICTIONARIES**	**6**
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Sets: methods and operators, Dictionaries: operations and methods.		
UNIT III	**FUNCTIONS AND STRINGS**	**6**
Functions definition, declaration, arguments, parameters – formal and local, parameter passing methods - function prototypes, recursion; Strings: string slices, immutability, string functions and methods, string module, regular expressions.		
UNIT IV	**FILES AND MODULES**	**6**
Files and exception: Text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, accessing CSV file.		
UNIT V	**PACKAGES AND DATA VISUALIZATION**	**6**
Text processing, Numerical processing: numpy package – mean, medium and mode, pandas package – vector, dataframe, data visualization: matplotlib, Time operations.		
LIST OF EXPERIMENTS		**15**

1. Finding factorial of n
2. Generating Fibonacci series
3. Exchange the values of two variables
4. Calculating student grade
5. Sum and average of n elements, linear search, printing a pattern.
6. Find minimum in a list, list operations, create and insert elements in a Dictionary, operations on sets and tuples
7. Counting the vowels and consonants in a given string, exchanging of two values using recursion
8. File operations: accessing a CSV file and generate reports
9. Display a data frame from a dictionary input using Pandas
10. Create a 3x3 matrix with values from 2 to 10 using numpy



Text Book (s)	
1	Anurag Gupta,G.P BISWAS ," Python Programming – Problem solving, packages and Libraries, Edition 1, Tata McGraw Hill, 2018
2	E Balagurusamy, "Problem Solving and Python Programming", Edition1 , TataMcGraw Hill, 2018
3	Reema Thareja, "Python Programming using Problem Solving Approach", OXFORD University Press, 2017.
Reference (s)	
1	Allen B. Downey, "Think Python: How to Think Like a Computer Scientist,,,,, 2nd edition, Updated for Python 3, Shroff/O,,Reilly Publishers, 2016.
2	John V Guttag, —Introduction to Computation and Programming Using Python,,,,, Revised and expanded Edition, MIT Press , 2013
3	John V. Guttag,, Introduction to Computation and Programming using Pythonl, Prentice Hall of India, 2014.

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BOARD OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
15 APR 2021
KARUR-639 113.

Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC202J	OBJECT ORIENTED PROGRAMMING WITH JAVA using	3	0	2	4

Prerequisite Course (s)

Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

1	To understand Object Oriented Programming concepts and basic characteristics of Java.
2	To know the principles of packages, inheritance and interfaces.
3	To define exceptions and use I/O streams.
4	To develop a java application with threads and generics classes.
5	To design and build simple Graphical User Interfaces.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Develop Java programs using OOP principles.
CO2	Develop Java programs with the concepts inheritance and interfaces.
CO3	Build Java applications using exceptions and I/O streams.
CO4	Develop Java applications with threads and generics classes.
CO5	Develop interactive Java programs using Applets.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	1	-	1	2	3	3
CO2	3	3	3	3	3	1	-	-	1	-	1	2	3	3
CO3	3	3	3	3	3	2	-	-	2	-	1	2	2	3
CO4	3	3	3	3	3	1	-	-	2	-	1	2	2	3
CO5	3	3	3	3	3	2	-	-	3	-	1	3	3	3
CO (Avg)	3	3	3	3	3	1.4	-	-	1.8	-	1	2.2	2.6	3

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

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BOARD OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
09 MAY 2022

UNIT I	INTRODUCTION TO OOP AND JAVA FUNDAMENTALS	6

OOP in Java – Characteristics– The Java Environment - Java Source File - Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – Constructors, Methods - Access Specifier - Static Members - Comments, Data Types, Variables, Operators, Control Flow, Arrays , Packages - JavaDoc comments.

UNIT II	INHERITANCE AND INTERFACES	6

Inheritance – Super classes- Sub Classes – Protected Members – Constructors In Sub Classes- The Object Class – Abstract Classes and Methods - Final Methods and Classes – Interfaces – Defining an Interface, Implementing Interface, Differences Between Classes,Interfaces and Extending Interfaces - Object Cloning - Inner Classes

UNIT III	EXCEPTION HANDLING AND I/O	6

Exceptions - Exception Hierarchy - Throwing and Catching Exceptions – Built-In Exceptions, Creating Own Exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

UNIT IV	MULTITHREADING AND GENERIC PROGRAMMING	6

Multi-threading - Multitasking, Thread Life Cycle, Creating Threads, Synchronizing Threads, Inter-Thread Communication, Daemon Threads, Threads Groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.

UNIT V	EVENT DRIVEN PROGRAMMING	6

Applet Basics - Applet Architecture - Applet Display Methods - Event Handling Mechanisms - Event Classes - Event Listener - Working with Windows, Graphics, Colours and Fonts - AWT Controls – Database Connectivity and JDBC Concepts

LIST OF EXPERIMENTS	15

1. Implementing Object Oriented Concepts.
2. Implementing Control Statements
3. Implementation of Interface and Package program.
4. Implement the concept of Exception Handling using predefined and user defined exceptions
5. Implement Multithreading concepts.
6. Implementation of Collection interfaces
7. Implement conversion of InputStream into Byte Array
8. Implement a simple calculator. Use a grid Layout to arrange buttons for the digits and for the +, -, *, / operations. Add a text field to display the results.
9. Implement Mouse events and Keyboard event.
10. Create a database connectivity using any front end with Ms Access/JDBC

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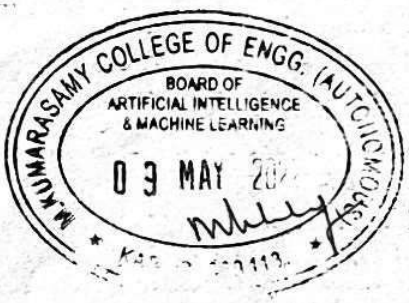
Text Book (s)	
1	Herbert Schildt, —Java The complete reference, 11th Edition, McGraw Hill Education, 2019
2	Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.
Reference (s)	
1	Paul Deitel, Harvey Deitel, —Java SE 8 for programmersl, 3rd Edition, Pearson, 2015.
2	Steven Holzner, —Java 2 Black bookl, Dreamtech press, 2011.
3	Timothy Budd, —Understanding Object-oriented programming with Javal, Updated Edition, Pearson Education, 2000.



Regulation 2018		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC301J	FUNDAMENTALS OF DEEP LEARNING	3	0	2	4

Prerequisite Course (s)

Machine Learning Algorithms

Course Objective (s):

The purpose of learning this course is to:

1	Learn paradigms and approaches representations and classifications.
2	Make students understand architectural designs and propagation algorithms.
3	Explain different belief networks and convolution neural networks.
4	Introduce deep learning architectures and algorithms.
5	Discuss various advanced techniques in Recurrent Neural Networks, BPTT, Natural language Processing.

Course Outcome (s) (COs):

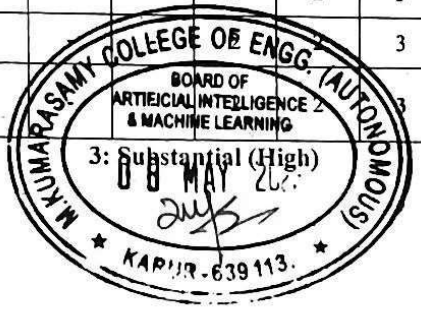
At the end of this course, learners will be able to:

CO1	Understand different methodologies to create application using deep nets.
CO2	Design the test procedures to assess the efficacy of the developed model.
CO3	Identify and apply appropriate deep learning models for analyzing the data for a variety of problems.
CO4	Implement different deep learning algorithms
CO5	Apply appropriate algorithms for the deep learning applications

CO-PO Mapping

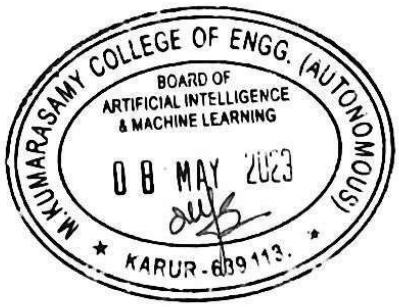
Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO2	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO3	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO4	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO5	3	3	3	3	3	-	-	-	-	-	2	2	3	2
CO (Avg)	3	3	3	3	3	-	-	-	-	-	2	2	3	2

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

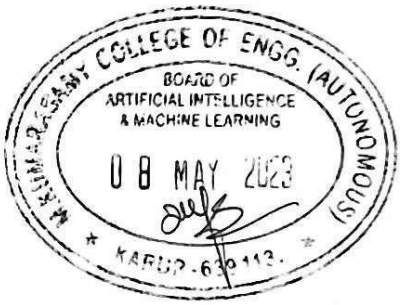


UNIT I	NEURAL NETWORKS	8
Basics of Neural Networks, Functions in Neural Networks, Deep Learning Framework, Deep learning Models, Convolutional Neural Networks, Feature Selection , Layers, Max Pooling, Filters, Parameter sharing, Popular CNN Architectures: ResNet, AlexNet.		
UNIT II	**RECURRENT AND RECURSIVE NETS**	**8**
Recurrent Neural Networks, Bidirectional RNNs, Encoder-decoder sequence to sequence architectures - BPTT for training RNN, Long Short-Term Memory Networks, Computer Vision – OpenCV, Natural language Processing - Speech Recognition		
UNIT III	**DEEP LEARNING ARCHITECTURES**	**10**
Machine Learning and Deep Learning, Representation Learning, Deep Learning Algorithms: Types, Capacity – Over fitting – Under fitting - Bayesian Classification - Activation Functions: RELU, LRELU, ERELU. Case studies in classification, Regression and deep networks		
UNIT IV	**ADVANCED NEURAL NETWORKS**	**10**
Deep Feedforward Networks: Gradient based learning - Hidden Units - Architectural design – Back Propagation algorithms - Semi supervised learning -Multitask learning, Reinforcement Learning, Q Learning, Applications		
UNIT V	**DEEP LEARNING WITH TENSOR FLOW**	**9**
Basics of Tensor Flow, Installation of Tensor Flow, Tensor Flow - Artificial Intelligence, Machine Learning, Deep Learning, Tensor Flow – CNN, Tensor Flow – RNN, Tensor Flow – Word2Vec		
LIST OF EXPERIMENTS		**15**

1. Install to python and Deep Learning Libraries
2. Object recognition from pre – trained model
3. Image classification using CNN Model from Tensorflow
4. Hand gesture recognition using deep learning models
5. Smart Attendance system using Deep learning model
6. Install to Computer vision libraries
7. Moving object detection using openCV
8. Face recognition using Computer vision libraries
9. Install to NLP libraries
10. Create a Chabot using NLP



Text Book (s)	
1	Ian Goodfellow, Yoshua Bengio, and Aaron Courville, "Deep Learning", First Edition, MIT Press, 2016.
2	Nikhil Buduma and Nicholas Lacascio, "Fundamentals of Deep Learning", First Edition, O.Reilly, 2017.
Reference (s)	
1	Josh Patterson, Adam Gibson "Deep Learning: A Practitioner's Approach", O'Reilly Media, 2017.
2	Laura Graesser, Wah Loon Keng "Foundations of Deep Reinforcement Learning: Theory and Practice in Python" Addison-Wesley Professional -2020
3	Jon Krohn, Grant Beyleveld, Aglaé Bassens "Deep Learning Illustrated: A Visual, Interactive Guide to Artificial Intelligence", 1st edition Addison-Wesley Professional 2019



Regulation 2018		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC303J	COMPUTER NETWORKS (Common to DS and ML)	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To develop an understanding of computer networking basics.
2	To introduce the basic taxonomy and terminology of computer networking.
3	To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications
4	To build an understanding of the fundamental concepts of computer networking
5	To introduce advanced networking concepts.

Course Outcome (s) (Cos):

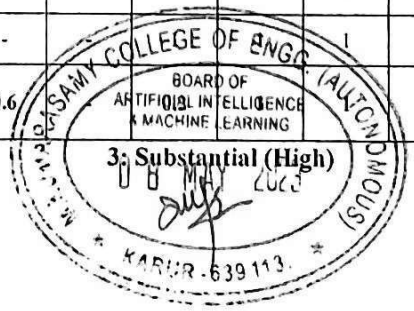
At the end of this course, learners will be able to:

CO1	Explain data communication system, components and the purpose of layered architecture.
CO2	Illustrate the functionality of each layer of OSI and TCP/IP reference model.
CO3	Explain the data link layer and network layer protocols.
CO4	Outline the functions of transport layer protocols.
CO5	Summarize application layer protocols.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO2	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO3	3	3	3	3	3	-	-	3	-	-	1	1	3	2
CO4	3	3	3	3	3	-	-	-	-	-	1	1	2	3
CO5	3	3	3	3	3	-	-	-	-	-	1	1	3	3
CO (Avg)	3	3	3	3	3	-	-	0.6	-	-	1	1	3	2

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



UNIT I	DATA COMMUNICATIONS	9
Data Communication- Networks-The OSI Model- Layers in the OSI Model – TCP/IP Protocol Suite – Addressing – Transmission Media.		
UNIT II	**DATA LINK LAYER**	**9**
Link and Medium Access protocols – Framing – Error Detection – Reliable Transmission – IEEE 802 Standards – Ethernet – Token Rings – Wireless LANs.		
UNIT III	**NETWORK LAYER**	**9**
Circuit Switching – Packet Switching – Switching and Forwarding – Bridges and LAN Switches – Cell Switching – Internetworking – Routing Techniques: Distance vector (RIP) – Link state (OSPF) – Subnetting – CIDR- BGP - IPv6.		
UNIT IV	**TRANSPORT LAYER**	**9**
UDP – TCP – Congestion Control and Resource Allocation –TCP Congestion Control – Congestion Avoidance Mechanisms – Quality of Service- Integrated Services – Differentiated Services.		
UNIT V	**APPLICATION LAYER**	**9**
Domain Name System – Electronic Mail – File Transfer- WWW and HTTP-Network Management System – Simple Network Management Protocol.		
LIST OF EXPERIMENTS		**15**

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Write a program to implement RPC (Remote Procedure Call)
6. Implementation of Subnetting
7. Applications using TCP Sockets like

a. Echo client and echo server

b. Chat

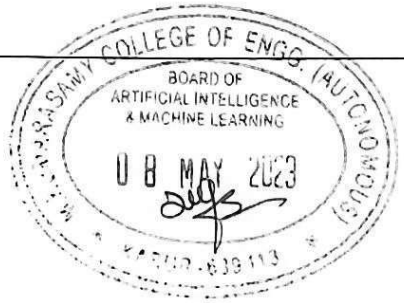
c. File Transfer

8. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.

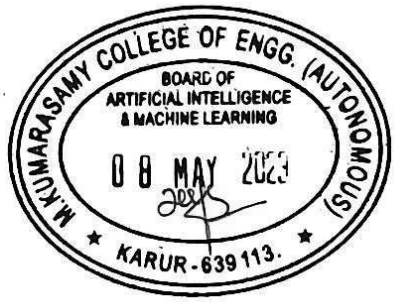
a. Link State routing

b. Flooding

c. Distance vector



Text Books	
1	Larry Peterson, Bruce Davie, "Computer Networks: A Systems Approach", Elsevier, Online Edition, 2019.
2	William Stallings, Data and Computer Communications, Tenth Edition, Prentice Hall, 2014.
Reference (s)	
1	James F. Kurose, Keith W. Ross, "Computer Networking – A Top-Down Approach Featuring the Internet", Pearson Education, Seventh Edition, 2017.
2	Nader. F. Mir, "Computer and Communication Networks", Pearson Prentice Hall Publishers, Second Edition, 2015.
3	Ying-Dar Lin, Ren-Hung Hwang and Fred Baker, "Computer Networks: An Open Source Approach ", McGraw Hill Publisher, 2011.
4	Behrouz A. Forouzan, Data Communication and Networking, Fifth Edition, McGraw Hill Education (India) Private Limited, 2013.
Web References	
1	http://nptel.ac.in/courses/106105081



Regulation 2018		Semester VI	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AIC305J	PREDICTIVE MODELLING AND ANALYTICS (Common to DS and ML)	2	0	2	3

Prerequisite Course (s)

Advance Analytics

Course Objective (s): The purpose of learning this course is to:

1	To define and understand the business problem and the predictive analytics goals.
2	To understand and apply predictive modelling technique.
3	To learn how to develop models to predict categorical and continuous outcomes, using such techniques as neural networks, decision trees, logistic regression, support vector machines and Bayesian network models.
4	To know the use of the binary classifier and numeric predictor nodes to automate model selection.
5	To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Understand design, build, evaluate and implement predictive models for various business applications.
CO2	Compare the underlying predictive modelling techniques.
CO3	Select appropriate predictive modelling approaches.
CO4	Apply predictive modelling approaches using a suitable package such as SPSS Modeler.
CO5	To advice on when and how to use each model. Also learn how to combine two or more models to improve prediction

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	1	-	-	-	2	1	3	3
CO2	3	2	2	2	3	1	-	-	-	-	2	1	3	2
CO3	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO4	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO5	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO (Avg)	3	2.8	2.8	2.8	3	1.2	0.2	-	-	-	2	1	3	2.2

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

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UNIT I	INTRODUCTION TO PREDICTIVE MODELLING	6

What is Predictive Analytics? - What does a predictive model do? - Descriptive v/s Predictive v/s Prescriptive Analytics - The need for a methodology CRISP-DM

UNIT II	INTRODUCTION TO SPSS MODELER	6

IBM SPSS Modeler (Nodes, Streams), Manager Pane and Project Pane-collecting Initial Data-Understand data- Set the unit of Analysis (DISTINCT, AGGREGATE, SETTOFLAG)- Integrate data (APPEND, MERGE), Relationship between a categorical and continuous field, Relationship between two continuous fields.

UNIT III	USING FUNCTIONS IN SPSS	6

Date and Time Functions-Conversion Functions-String Functions-Statistical Functions, Measure of Central Tendency, Measures of Variability-Missing Value Functions, Undefined and Blank Values Function.

UNIT IV	DATA FIELD TRANSFORMATION	6

Field transformation- Additional Field Transformation-Sequence, Data-Sampling- balancing- partitioning data, Derive, Binning, Reclassify, Control Language for Expression Manipulation (CLEM), Filler, Transform, Sequence Functions, Restructure Data.

UNIT V	INTRODUCTION TO MODEL	6

Modelling Algorithms-Supervised Models- Partition the data- Segmentation Models-Creating a model in IBM SPSS Modeler-Introduction to Linear Regression-Introduction to Logistic Regression-Introduction to Neural Networks-Multilayer Perceptron (MLP)-Radial Basis Function (RBF).

LIST OF EXPERIMENTS	15

1. Collect initial data for the telecom firm
2. Understand the telecommunications data
3. Set the unit of analysis for the data
   a) Remove duplicate records
   b) Aggregate transactional data
   c)Create flag fields and aggregate the data
4. Identify relationships in the data
   a) Examine the relationship between categorical fields
   b) Examine the relationship between a categorical and continuous field
5. Predict customer churn in telecom dataset
   a) Build Model using CHAID
   b) Examine the CHAID Model
   c) Apply the model to new data
6. Create a Segmentation Model
   a) Create homogeneous groups (clusters) of customers based on usage patterns.
7. Using functions in IBM SPSS Modeler
   a)Date and Time Functions
   b)String Functions
   c)Statistical Functions
   d)Missing Value Function
8. Add fields to the data
   a)Derive fields as formula
   b)Derive fields as flag or nominal

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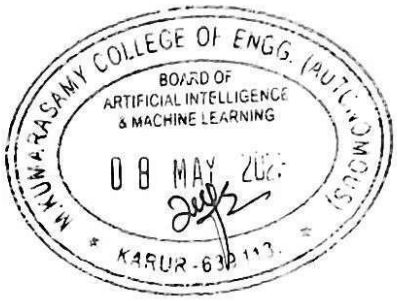
c)Reclassify categorical fields
d)Bin a continuous field into a categorical field with equal counts
9. Create a Linear Regression Model to Predict Employee Salaries
10. Use Logistic Regression to Predict Response to a Charity Promotion Campaign

Text Book (s)	
1	IBM Course ware
Reference (s)	
1	IBM SPSS Modeler Essentials ,by Jesus Salcedo, Keith McCormick
2	Fundamentals of Machine Learning for Predictive Data Analytic, by john D Kelleher
3	Applied Predictive Modelling, by Max Kuhn



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M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

FINAL INTERNAL MARK REPORT

Course Name : OBJECT ORIENTED PROGRAMMING USING JAVA

Name : LAVANYA S

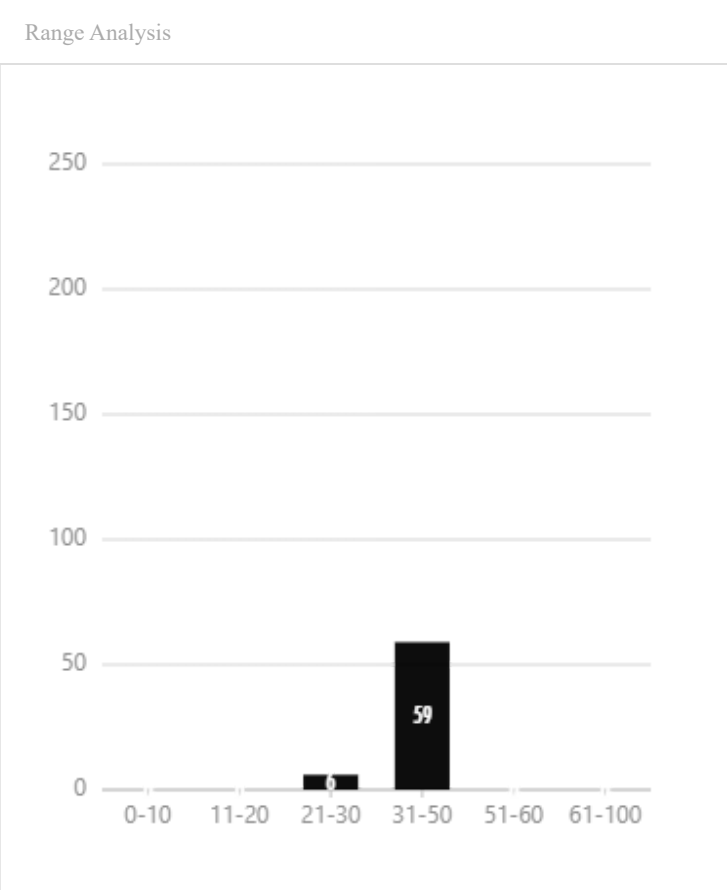
Course Code : 18AMC202J

Report : Final Internal Mark

Batch : 2022-2023 3rd Semester AI&ML A

Date : 9-2-2024

SNo	Register Number	Name	Marks	Attendance Percentage
1.	927621BAL001	ABISHEK S	29.00	85.00
2.	927621BAL002	ARTHI J S	35.00	96.67
3.	927621BAL003	ARUN KUMAR S	36.00	96.67
4.	927621BAL004	BALAJI P	28.00	85.00
5.	927621BAL005	BALAKUMAR M D	41.00	96.67
6.	927621BAL006	BHARANI B I	38.00	96.67
7.	927621BAL007	BHARATH PRIYAN S	33.00	90.00
8.	927621BAL008	CIBIRAJAN V	35.00	90.00
9.	927621BAL009	DEWADHARSHAN K	39.00	86.67
10.	927621BAL010	DHARSHINI B	43.00	96.67
11.	927621BAL011	GOUTHAM M	32.00	81.67
12.	927621BAL012	GOWSIDHARAN S T	39.00	95.00
13.	927621BAL013	HARI KISHORE S	42.00	95.00
14.	927621BAL014	HARINI M	41.00	83.33
15.	927621BAL015	HARISH MADHAVAN A	46.00	93.33
16.	927621BAL016	HARSHINNI V	46.00	93.33
17.	927621BAL017	HEMANTH M	40.00	83.33
18.	927621BAL018	INDHU PRAKASH S	37.00	88.33
19.	927621BAL019	JAMPUGESHWARAN S	34.00	96.67
20.	927621BAL020	JANANI SRI G	39.00	93.33
21.	927621BAL021	JAYASURYA K	46.00	93.33
22.	927621BAL022	JEYA KRISHNA G	42.00	88.33
23.	927621BAL023	KARTHICK P	43.00	90.00
24.	927621BAL024	KAVIYA N	37.00	95.00
25.	927621BAL025	KEERTHIVASAN E	35.00	96.67
26.	927621BAL026	KRITHICROSON R	42.00	96.67
27.	927621BAL027	MANOJ KUMAR G	36.00	91.67
28.	927621BAL028	MITHILESH G	41.00	93.33
29.	927621BAL029	MITHUN KRISHNA G S	33.00	91.67
30.	927621BAL030	MONISHA K M	46.00	96.67
31.	927621BAL031	NANDHINI S	47.00	96.67
32.	927621BAL032	NITHISH KUMAR M	32.00	80.00
33.	927621BAL033	NIVETHA N	40.00	95.00
34.	927621BAL034	PERIYASAMY M	40.00	96.67
35.	927621BAL035	PERIYASAMY T	45.00	95.00
36.	927621BAL036	PRASANTH S	42.00	93.33
37.	927621BAL037	RAGHU SASTHA P M	40.00	96.67
38.	927621BAL038	RAJESH V	36.00	88.33
39.	927621BAL040	RAMPRASANTH P S	45.00	90.00



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
21 - 30	6
31 - 50	59
51 - 60	0
61 - 100	0

SNo	Register Number	Name	Marks	Attendance Percentage
40.	927621BAL041	ROHAN KUMAR R	27.00	88.33
41.	927621BAL043	SAKTHIVEL S	39.00	90.00
42.	927621BAL044	SANCHANA S S	41.00	91.67
43.	927621BAL045	SARATHI S	40.00	91.67
44.	927621BAL046	SARAVANAHARIS S	40.00	93.33
45.	927621BAL047	SHAHANA S	42.00	91.67
46.	927621BAL048	SHANKARISREE S	40.00	93.33
47.	927621BAL049	SHARAN U	39.00	91.67
48.	927621BAL050	SHESHANTH R S	40.00	91.67
49.	927621BAL051	SIBHI SARAN S	40.00	85.00
50.	927621BAL052	SRI RAGAVENDIRAN N	36.00	95.00
51.	927621BAL053	SRINIVASA ARAVINDH S	45.00	88.33
52.	927621BAL054	SULAIMAAN S	37.00	83.33
53.	927621BAL055	SUWETHA K	43.00	96.67
54.	927621BAL056	TAMILSELVAN P	30.00	91.67
55.	927621BAL057	THARUN P V	42.00	85.00
56.	927621BAL058	THULASIDHARAN B	33.00	80.00
57.	927621BAL059	VAISHNAVI AS	43.00	95.00
58.	927621BAL060	VAISHNAVI N	38.00	86.67
59.	927621BAL061	VARSHIGA P S	40.00	90.00
60.	927621BAL062	VIGNESH S	34.00	80.00
61.	927621BAL063	VISHWAPRAVEEN J	33.00	93.33
62.	927621BAL301	ASWINKUMAR B	34.00	96.67
63.	927621BAL302	DHANUSH N	23.00	76.67
64.	927621BAL303	MOHAN KUMAR B	38.00	95.00
65.	927621BAL304	VEDHANTH B	23.00	78.33

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Thalavapalayam, Karur - 639 113.

DEPARTMENT OF CIVIL ENGINEERING

Integrated Theory cum Lab Course

2018 Regulation

Programme: B.E. - CIVIL ENGINEERING

Semester I & II

Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH101J	Technical English	2	0	2	3
B	18PYB101J	Physics	3	1	2	5
B	18CYB101J	Chemistry	3	1	2	5
S	18MES101J	Engineering Graphics	1	0	4	3
S	18CSS101J / 18CSS101J(R)	Programming for Problem Solving	2	0	2	3
S	18MES102J	Basic Civil and Mechanical Engineering	3	0	2	4
S	18EES101J / 18EES101J(R)	Basic Electrical and Electronics Engineering	3	0	2	4
H	18LEH102J	Professional English	2	0	2	3

Semester III

Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC201J	Fluid Mechanics and Hydraulic Machinery	3	0	2	4
PCC	18CEC203J	Surveying	3	0	2	4
PCC	18CEC204J	Environmental Engineering I	3	0	2	4

Semester IV

Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC205J	Strength of Materials	3	0	2	4
PCC	18CEC207J	Soil Mechanics	3	0	2	4

Semester VII

Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC401J	Estimation and Quantity Surveying	3	0	2	4

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Department of Civil Engineering
M. Kumarasamy College of Engineering
(Autonomous) Karur - 639113.

Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH101J	TECHNICAL ENGLISH	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Analyze the importance of communication in personal, professional contexts. Identify proper English pronunciation
CLR-2	Strengthen vocabulary and grammar. Enhance listening and writing comprehension. Review films and documentaries
CLR-3	Writing brief paragraphs using appropriate techniques. Enhance their English fluency in speaking
CLR-4	Write effective essays, stories. Experience workplace communication aspects
CLR-5	Research on a topic and write a comprehensible academic project reports. Make effective presentations

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify types, modes, channels and barriers of communication. distinguish different speech sounds, pronounce correctly
CO2	Identify, rectify the errors in the use of grammar and vocabulary. Improve listening and writing skills
CO3	Develop a topic idea into a cohesive paragraph with examples. Improve the fluency of speaking skills
CO4	Develop ideas into logical and coherent essays. Understand better the workplace culture
CO5	Identify the steps involved in writing an academic project report. List and practice skills need for making a presentation

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO3	1	3	1	3	3	2	1	3	3	3	-	3	-	-	-
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO (Avg)	1	3	1	3	3	2.8	1	3	3	3	-	3	-	-	-

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

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UNIT I	COMMUNICATION	6
Definition, Process of communication - (Filling in-Class Worksheets) - Verbal and Non-Verbal Communication(Individual and Group Activities - Role play)-Other Types of Communication: General-Technical-Formal, Informal- External, Internal (Write upon a selected type of communication)- Listening, Speaking, Reading, Writing(Group activity (Newspaper) – Discussion and Feedback)- Communication and Language Barriers(Individual Activity- Sharing of Personal Experiences)-Body language(Mime).		
UNIT II	**VOCABULARY AND GRAMMAR**	**7**
Words with Foreign Roots, Word Formation – Inflectional, Derivational Prefixes, Suffixes(Quiz - Identifying the Borrowed roots and Their Meanings-Worksheet Exercise)-Synonyms and Antonyms and Standard Abbreviations(Context Based Activity / Learner Compiling Standard Abbreviations from Core Subject)-Homonyms and Homophones(Fun Activities – Worksheets- Cross Words)-Articles, Tenses(Exercise through Worksheets- Individual Activity -Peer Correction- Open Discussion)- Noun-Pronoun Agreement and Subject-Verb Agreement(Identifying and Learning through Error Analysis – Worksheets)-Misplaced Modifiers - Prepositions- Prepositional verbs and Phrasal verbs(Learn through Practice – Placing Same Modifier in Different Places in a Sentence)-Prepositions- Prepositional Verbs and Phrasal Verbs(Filling in-Class Worksheets)		
UNIT III	**DISCOURSE TECHNIQUES**	**7**
Sentence Structure, Phrases and Clauses(Exercise: Worksheet, Identifying Phrases, Clauses, Compound, Complex Sentences)-Developing Ideas into Paragraphs –Cohesion Markers(Identify Topic sentence in a Paragraph; Writing a Paragraph Based on a Topic)- -Inputs on Writing Precisely, Redundancies, Wordiness-Repetition-Clichés(Error Analysis and Editing)-Defining, Describing Technical Terms(Writing Definitions-Product and Process Description)-Inputs on Classifying/Categorising and Sequencing Ideas with Relevant Diagrams(Writing a Passage on the Given hints, Tree Diagram, Classification Table and Flow Chart)-Importance of Punctuation – Miscommunication –(Fun Activities - Worksheets for Appropriate Punctuation – Written)- Errors in Punctuation(Fun Activities - Worksheets for Appropriate Punctuation – Written)		
UNIT IV	**WORKPLACE COMMUNICATION**	**6**
Reading Comprehension, Guidelines questions (Referential, Critical,Interpretative)(Practice Excercise) - Précis-writing Guidelines(Practice Excercise) - Summarising(Group Activity (Oral/Written) on the Given Passages)-Essay Writing Guidelines: Introduction, Elaboration and Conclusion with Examples(Individual Activity (Written) on the Given Topic)-Organisational Report Writing - Progress Report- Guidelines(Writing a Progress Report)-Interview Skills(Mock Interview).		
UNIT V	**PROJECT WRITING**	**5**
Topics for Project Writing(Discussion)- Collection of Data – Avoiding Plagiarism-Authenticity and Credibility of Data(Collection of Data for Verification)- Guidelines for Writing: Outline- Objectives-Background- Methodology-Discussion-Documentation(Drafting an Outline & Preparing References)-Discussion Using Sample Project(Writing the First Draft on the Selected Topic)-Checklist for Project Format (PPT)(Self-Verification and Submission of Final Draft).		
	LIST OF EXPERIMENTS	**14**

1. Often Mispronounced sounds (Audio Visual Material - Listening to minimal pairs and reproducing)
2. Barriers of communication Language barriers – videos (Identifying the Language Barriers of communication –Written)
3. Short Biographical Account on Famous Personalities –Video(Oral Paraphrasing of the Content Shown)
4. Listening to Long Conversations, Daily Life (Identify Various Communication Contexts and Answering Questions – Collocation)
5. Introduction to Englishes -British and American –Videos (Discussion on Difference between British

	and American Words) 6. Speaking - Practice Activity – Brain Storming – Mind Mapping (Just a Minute) 7. Describing a Scene or Event –Videos (String Narration – Describing an Event or a Scene) 8. Technical Communication – Interpreting Data (Group Activity - Interpretation of Data - Oral Presentation) 9. Sample Case Studies for Work Ethics – Videos (Debate on the Videos Shown) 10. Learning Interview Techniques through Models (Mock Interview) 11. Guidelines for Preparing a PPT; Presentation Techniques (Preparing PPT on the Topic of Learners' Choice) 12. Formal Presentation
Text Book (s)	
1	Abirami K ,Technical English –, R.K.Publishers, Coimbatore.
Reference (s)	
1	Swan, Michael. Practical English Usage. OUP, 1995
2	Kumar Sanjay and PushpaLata. Communication Skills. OUP, 2011
3	CIEFL, Hyderabad. Exercises in Spoken English. Parts I-III. OUP
4	Anbazhagan K, Cauveri B, Devika M.P., English for Engineers. Cengage, 2016
5	www.mmm.english.com
6	www.onlinewriting.com/purdue
7	www.ieee.org/index.html

Regulation 2018		SemesterI/Semester II	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18PYB101J	PHYSICS	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):
The purpose of learning this course is to:

CLR-1	Identify the applications of electric field on materials
CLR-2	Identify the applications of magnetic field on materials
CLR-3	Identify the significance of quantum theory
CLR-4	Create insights to the concepts of optical effects
CLR-5	Analyze the working principle of lasers and optical fibers

Course Outcome (s) (Cos):
At the end of this course, learners will be able to:

CO1	Identify the effect of charge dynamics
CO2	Analyze electromagnetic induction
CO3	Apply quantum mechanics to basic physical problems
CO4	Apply ray propagation and optical effects
CO5	Identify the applications of lasers and optical fiber

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-

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

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UNIT I	ELECTROSTATICS AND DIELECTRIC MATERIALS	9+3

Del-divergence-curl and gradient operations in vector calculus-Gauss-divergence and Stoke's theorem-Electric field and electrostatic potential for a charge distribution-Gauss' law and its applications-Laplace's equations for electrostatic potential-Poisson's equations for electrostatic potential-Solving Problems-Concepts of electric current-Continuity equation-Laws of magnetism-Faraday's law-Ampere's law-Maxwell's equations-Solving Problems-Polarizations, permeability and dielectric constant -Polar and non-polar dielectrics -Types of polarization-Frequency and temperature dependence-Internal field in a field-Clausius-Mossotti equation-Solving Problems.

UNIT II	MAGNETIC AND SUPERCONDUCTING MATERIALS	9+3

Magnetization, permeability and susceptibility-Classification of magnetic materials-Ferromagnetism-Concepts of ferromagnetic domains –Hysteresis-Solving Problems -Properties and applications of ferromagnetic materials -Hard and soft magnetic materials -Ferrimagnetic materials - Magnetic bubbles – Ferrites- Solving Problems-Superconductivity -Properties of superconductivity -Type I & Type II superconductors-High Tc superconductors – SQUID – CRYOTRON-MAG LEV-Solving Problems.

UNIT III	QUANTUM PHYSICS	9+3

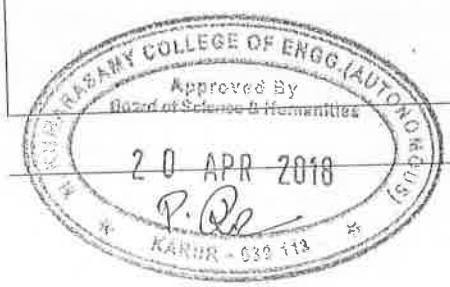
Introduction to Quantum mechanics-Explanation of wave nature of particles-Black body radiation-Compton effect-Solving Problems-Photoelectric effect-de Broglie hypothesis for matter waves - Physical Significance of wave function -Time independent Schrödinger's wave equation -Time dependent Schrödinger's wave equation -Solving Problems-Particle in a 1 D box -Normalization - Born interpretation of wave function -Properties of Matter waves-Verification of matter waves-G.P. Thomson Experiment-Solving Problems.

UNIT IV	WAVE OPTICS	9+3

Introduction to interference-Introduction to diffraction-Fresnel diffraction-Fraunhofer diffraction-Fraunhofer diffraction at single slit-Fraunhofer diffraction at double slit-Solving Problems-Fraunhofer diffraction at multiple slit-Diffraction grating-Characteristics of diffraction grating-Applications of diffraction grating-Polarization by reflection-Polarization by double refraction-Solving Problems -Scattering of light-Circular polarization-Elliptical polarization-Optical activity-Fresnel's relation -Brewster's angle--Solving Problems.

UNIT V	LASER AND FIBER OPTICS	9+3

Absorption and emission processes-two level-Einstein's theory of matter radiation A and B coefficients-Characteristics of laser beams-Amplification of light by population inversion-Threshold population inversion-Essential components of laser system and pumping mechanisms-Solving Problems-Nd: YAG laser-Semiconductor laser-CO_2laser Vibrational modes- CO_2 laser-energy level-Optical fiber-physical structure-Total internal reflection-Solving Problems-Numerical aperture - Acceptance angle-Losses associated with optical fibers-Classification of optical fibers-Optical fiber communications system-Optical sensors-Solving Problems.



LIST OF EXPERIMENTS	30
1. Basics of experimentation 2. Determine dielectric constant of the sample 3. Calibrate Ammeter using Potentiometer 4. Calibrate voltmeter using Potentiometer 5. Determine the energy loss of magnetic materials using B-H curve experiment 6. Determine Planck's Constant 7. Study of I-V characteristics of a light dependent resistor (LDR) 8. Determine wavelength of monochromatic light by Newton's ring 9. Determine particle size using laser 10. Determine wavelength of using diffraction grating 11. Determine wavelength for a given laser source 12. Study of numerical aperture and acceptance angle of optical fiber 13. Mini project	

Text books/ References:

1	David Jeffery Griffiths, Introduction to Electrodynamics, Revised edition, Pearson, 2013
2	Ajay Ghatak, Optics, Tata McGraw Hill Education, 5th edition, 2012
3	David Halliday, Fundamentals of Physics, 7th edition, John Wiley & Sons Australia, Ltd, 2004
4	Berg and Resnick, Quantum Physics: Of Atoms, Molecules, Solids, Nuclei and Particles, 2nd Edition, 1985

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KARUR - 639 113

Regulation 2018		Semester I /Semester II	Total Hours			90
			Hours / Week			C
Category	Course Code	Course Name	L	T	P	
B	18CYB101J	CHEMISTRY	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- Apply the basic principles of chemistry at both atomic and molecular levels in understanding the concepts related to the engineering field.
- Integrate the chemical principles in their projects undertaken in their respective fields
- Enhance the quality of a materials used in the product from the technological aspects for societal applications

Course Outcome (s) (Cos):

At the end of this course, learners will be able to:

CO1	Identify the suitable polymeric materials fabrication processes in various application
CO2	Apply the basic principle of inorganic chemistry at the atomic and molecular levels
CO3	Apply the various thermodynamic and kinetics concepts to real system
CO4	Assemble a battery through the understanding of electrochemical principles
CO5	Catagorize the Engineering materials for their applications

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-	-	-

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

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UNIT I	ENGINEERING ORGANIC MATERIALS	9*+3*

Polymer – Introduction- classification(based on molecular weight, structure and usage)- types of polymerization(Addition, Condensation and Copolymerisation)-crystallinity, melting point and glass transition temperature-mechnism of polymerization(free radical addition polymerization)-elastomer- structure and curing(vulcanization)- Fabrication and molding of polymers(Injection molding and blow molding)- Engineering plastics – PE, PVC, PMMA, Phenol formaldehyde resin , urea formaldehyde resin(Preparation, properties and uses)- Industrial applications of polymers.

UNIT II	COORDINATION AND ORGANOMETALLIC COMPOUNDS	9*+3*

Co-ordination compounds – Introduction- nomenclature- types of ligands (mono, di and poly dendate ligands)- isomerism(structural and stereo isomerism) – theories of bonding(Werner and Sidgwick Pouvell theory(EAN rule)) – applications – EDTA titration – Organometallic compounds - synthesis(organo zinc, organo Lithium and Organo magnesium) – Applications (18 electron rule, Ziegler Natta Catalyst and Hydroformylation)

UNIT III	THERMODYNAMICS AND KINETICS	9*+3*

Introduction- first and second law of thermodynamics – Gibbs –Helmholtz equation – Clausius clapeyron equation – Maxwell relations – Vant hoff isotherm and Isochore (problems also)- Kinetics- Introduction- types of reactions(opposing, consecutive and parallel reactions)- chain reactions (HBr and HCl formation)- Applications of kinetics and thermodynamics.

UNIT IV	ENGINEERING ELECTROCHEMISTRY	9*+3*

Introduction- Conductors and its types - cells (Electrolytic and Electrochemical cells) – Standard electrode potential- Nernst equation of an electrode- types of electrodes (SHE and Calomal electrode)- Batteries –Types (Primary, Secondary, Flow and reserve battery)- Examples (Lead acid battery, Ni-Cd battery, Lithium battery, Lithium sulphur battery and Hydrogen- Oxygen fuel cells)- Graphene.

UNIT V	INDUSTRIAL APPLICATIONS OF CHEMISTRY	9*+3*

Cement (Types, manufacture and properties) – Paints (constitutions and functions)- Lubricants- types- mechanism – properties-abrasives – types –Diamond, Corundum, emery, garnet, quartz, Silicon carbide, carborundum-boron carbide, alundum (preparation, properties and uses) –applications – Basics of biosensor and biochips.

LIST OF EXPERIMENTS	30

1. Determination of total , permanent and temporary hardness of water sample (EDTA method)
2. Determination of alkalinity in water sample- Indicator method
3. Determination of chloride content of water sample by Argentometric method(Mohr's method)
4. Determination of dissolved oxygen content of water sample by winkler's method
5. Conductometric titration of strong acid with strong base
6. Conductometric titration of mixture of acids

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7. Determination of strength and amount of Hydrochloric acid- pH metry
8. Estimation of strength and amount of ferrous ion by potentiometric method
9. Determination of molecular weight of a polymer by viscometry method
10. Estimation of ferrous ion by colorimetry.
11. Cement analysis

Text / Reference (s) books:

1	B.L.Tembe, Kamaluddin and M.S.Krishnan , "Engineering chemistry"
2	S.S. Dara "A Text book of Engineering Chemistry" S.Chand & Co.Ltd, New Delhi (2009).
3	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., NewDelhi (2012).
4	Shashi Chawla, Engineering Chemistry: Dhanpat Rai &Co., 3rd Edition, 2015
5	www.nptel.ac.in

Regulation 2018		Semester I /Semester II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES101J	ENGINEERING GRAPHICS (CIVIL)	1	0	4	3

Course Objective (s):

1. Construct ellipse, Parabola, hyperbola, cycloid and involutes.
2. Sketch the projection of points, straight lines and plane surfaces.
3. Sketch the Projection of simple solids like prisms, pyramids, cylinder and cone
4. Sketch the sectional solids and developing the lateral surfaces of simple solids
5. Understand the three dimensional drawing of simple solid by isometric projection and perspective projection, and convert isometric projection to orthographic projection.

Course Outcome (s) (COs):

CO1	Apply engineering graphic fundamentals to draw/evaluate engineering curves.
CO2	Draw the graphics of engineering parts with point, line and plane projections
CO3	Draw projection of solid objects like prisms, cylinders, pyramids and cones used in engineering objects
CO4	Develop the lateral surfaces of the sectional solids.
CO5	Create 3D part models using isometric and perspective projection.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	2	3	2	2	-	3	3	3
CO2	3	2	3	2	2	-	1	2	3	2	-	3	3	3
CO3	3	2	3	2	3	-	1	2	3	2	-	2	3	3
CO4	3	2	3	2	3	-	1	2	3	2	-	2	3	2
CO5	3	2	2	2	2	-	1	2	2	2	-	3	3	2
CO (Avg)	3	2	2.6	2	2.4	-	1.2	2.2	2.6	2	-	2.6	3	2.6

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

UNIT I	PLANE CURVES	9
Principles of Engineering Graphics - Lettering - dimensioning - Curves used in engineering practices: Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes – Drawing of tangents and normal to the above curves.		
UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	9
Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations. Projection of polygonal surface and circular lamina inclined to both reference planes.		
UNIT III	PROJECTION OF SOLIDS	9
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.		
UNIT IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	9
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.		
UNIT V	ISOMETRIC PERSPECTIVE AND ORTHOGRAPHICS PROJECTIONS	9
Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method. Isometric to orthographic multi-view.		

Text Book (s)

1	K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai (2010).
2	K. Venugopal& V. Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 15th edition (2018).

Reference (s)

1	1. K. R. Gopalakrishnana, "Engineering Drawing" (Vol.I&II), Subhas Publications, 2010.
2	2. R. L Jhala "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, New Delhi, 2015.
3	3. DhananjayA.Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2008.
4	4. Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2012.
5	5. M.S. Kumar, "Engineering Graphics", D.D. Publications, 2009.

List of Expertiments.

1	Spiral and involutes using bspline or cubic spline
2	Plan of residential building
3	Simple steel truss
4	Isometric projection of simple objects
5	Creation of 3D model
6	Orthographic projection of given 3D object
7	Projection of planes with inclination to reference plane
8	Solids with inclination to one reference plane
9	Section view of simple solids
10	Development of solids

Regulation 2018		Semester I / Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18CSS101J(R)	PROGRAMMING FOR PROBLEM SOLVING	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CO1	Learn programming using a structured programming language
CO2	Provide exposure on C programming.
CO3	Introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

Course Outcome (s) (COs):

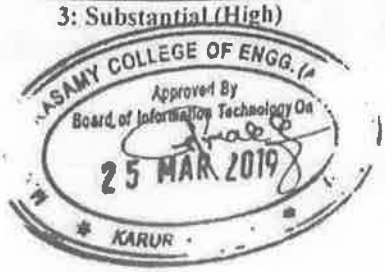
At the end of this course, learners will be able to:

CO1	Apply the problem solving techniques for solving numeric and string problems
CO2	Solve basic numeric problems using control statements in C
CO3	Develop the C program using the concepts of array and string.
CO4	Apply the concept of function prototypes and pointers.
CO5	Compare the performance of structures and union in memory management.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-
CO2	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-
CO3	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-
CO4	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-
CO5	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-
CO (Avg)	3	3	-	-	-	-	-	-	2	1	-	3	3	3	-

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



UNIT I	INTRODUCTION	6
Basic Organization of a Computer –Number System – Binary – Decimal – Conversion – Problems– Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.		
UNIT II	**C PROGRAMMING BASICS**	**6**
Structure of a 'C' program – Tokens – Data Types – Operators –Input and Output operations – Decision Making and Branching – Looping statements.		
UNIT III	**ARRAYS AND STRINGS**	**6**
Arrays: Declaration – Initialization – One dimensional and Two dimensional arrays – String: String Declaration and Initialization–String Functions.		
UNIT IV	**STRUCTURES AND POINTERS**	**8**
Introduction to Structures-Need for Structure Data type – Structure: Definition, Declaration – Structure vs Union. Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays –Null Pointer – Pointer to Structures.		
UNIT V	**FUNCTIONS**	**4**
Function – Definition of function – Declaration of function – Function Prototype – Pass by value – Pass by reference.		
LIST OF EXPERIMENTS		**15**
1. Programs on Operators 2. Programs on Control statements 3. Programs on one Dimensional Array 4. Programs on Two Dimensional Array 5. Programs on String Handling 6. Programs on Function using Call by Value 7. Programs on Function using Call by Reference 8. Programs on Pointers 9. Programs on Structures 10. Programs on Union		

Text Book (s)

1	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2	PradipDey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition, Oxford University Press, 2009

Reference (s)

1	Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill, 2006.
2	Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
3	Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, Pearson Education, 2006.
4	Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.

Regulation 2018		Semester I / II	Total 3ours			75
Category	Course Code	Course Name	3ours / Week			C
			L	T	P	
S	18MES102J	BASIC CIVIL AND MECHANICAL ENGINEERING (CIVIL)	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

- Select building materials and identify the components of a building
- Identify the various transportation systems, bridges, dams and water supply system
- Apply the concept of Harnessing energy from various energy sources
- Know the working of IC engines and identify the sub system requirements
- Apply manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

Course Outcome (s) (COs):

CO1	Identify the building materials and its applications
CO2	Identify different transportation system, water supply system and its applications
CO3	List the basic components and analyze the working of major power plants
CO4	Identify the working of IC engines and understand the need of various auxiliary systems
CO5	Identify manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	3	3	-	-	-	-	3	3	-
CO2	3	-	3	-	3	3	3	-	3	-	-	3	3	-
CO3	3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3		3		3	3	3		3			3	3	

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

UNIT I	BUILDING MATERIALS	9

Introduction to Civil Engineering, Building Materials, History, Disciplines in Civil Engineering, Early constructions and development over time, Ancient Monuments: Peruvudaiyar or Brihadeeswarar Temple, Kallanai dam Grand Anicut, Taj Mahal, Golconda fort, Angkor Wat, Pyramids of Giza, Colosseum Development of various materials, Methods of Construction, Building Materials - Stone – Classification of Rocks, Quarrying, Dressing, Properties and Uses of Stone Mortar, Plain and Reinforced Cement, Concrete Grade and properties and uses, Necessity of Special Concrete, Self Compacting Concrete, Construction Chemicals (Plasticizers), Recycling: construction, demolition wastes, Buildings, Classification of Buildings, Selection of site for a building, Components of Buildings, Soil, General types of soil, Bearing Capacity, Factors affecting bearing capacity, Foundations: Functions, General types of, foundation, Shallow foundations

UNIT II	TRANSPORTATION AND WATER SYSTEM	9

Cement concrete flooring, Marble flooring, Granite flooring, Ceramic tile flooring, Roofs: Types of roofs, Madras terrace roof, Reinforced concrete roofs, Trussed roof, Roof Coverings: Types, Weathering course: Types, Mode of Transportation - Highways - Classification of Roads, Cross section details of flexible pavements, Railways – Zone and Headquarters, Permanent way and its requirement, Components of Permanent way, Bridges: Components of Bridge, Types, Dams: Purpose, Classification, Gravity dams - Advantages and Disadvantages, Elements of protected Water Supply system, Objective, Quantity of water, Design period, Per-capita demand, Factor affecting per capita demand, Sources of Water Supply, Standards of Drinking water, Drinking Water Treatment: Objectives, Treatment plant process, Sewage: Method of collection, Sewage treatment and disposal

UNIT III	POWER PLANTS	9

Coal based thermal Power Plant: layout, components description,working, advantages, disadvantages, Hydro Electric power plant: layout, components description, working, advantages and disadvantages, Nuclear power plant: Nuclear fission and fusion reactions, Nuclear reactor, components description, Layout, working, merits and demerits of boiling water reactor , Layout, working, merits and demerits of pressurized water reactor, Gas turbine power plants:componentsdescription,working and types gas turbines, methods to improve performance, Layout and working of open cycle plant with intercooling, reheating, regeneration, Solar Thermal power plant: layout of Flat plate collector based plant, central receiver type plant, advantages, disadvantages, Wind energy conversion system – wind turbine types, Working, advantages and disadvantages, Ocean Thermal Energy Conversion system: layout of open cycle , Layout of closed cycle, advantages, disadvantages

UNIT IV	INTERNAL COMBUSTION ENGINES	9

Engine: Classification,operations of 2 stroke & 4 stroke, Comparison of SI & CI engines, Fuel supply system and Battery ignition system. Magneto ignition system of SI engine, Working of a simple carburetor, GDI, MPFI, CRDI, Lubrication system of an engine, Functions and Working of mist and forced feed lubrication system, Cooling system of an engine – Working of air cooled (fins), Water cooled engines (forced circulation), Alternate fuels for IC Engines. Liquid fuels: methanol, ethanol, vegetable oil, Biodiesel, Gaseous fuel: Hydrogen, CNG, LPG, properties, advantages, disadvantages, Emissions from engine – Emission standards – Euro, BS, Emission control measures – Catalytic converter, Exhaust gas recirculation, Introduction to electric vehicles, Hybrid and autonomous vehicles

UNIT V	CASTING AND FORMING PROCESS	9

Casting introduction and history, Expandable mold casting process , Production steps in a typical sand-casting process, terms including patterns and core, Other expendable mold casting: shell molding, vacuum molding, expanded polystyrene process, Investment casting, Permanent mold casting: hot chamber and cold chamber

die casting & Permanent mold casting:Semi centrifugal and centrifuge casting, Metal forming introduction and its classification, metals and alloys,Bulk deformation: hot, cold forging processes, hot rolling processes,cold rolling processes, Rolling mill classification, hot and cold extrusion processes, wire and bar drawing processes, Sheet metal working, applications. Cutting operations: shearing, blanking, punching, cutoff, parting, slotting, perforating, notching, trimming, shaving, fine blanking, Bending operations: V-bending, edge bending, flanging, hemming,seaming, curling, spring back effect, Drawing operations, its defects, coining, embossing, ironing, lancing, twisting	
Text Book (s)	
1	Dr.V.Rameshbabu,"Basic Civil and Mechanical Engineering", VRB Publishers pvt ltd, 2017
Reference (s)	
1	SeropeKalpakjian, Steven Schmid," Manufacturing Processes for Engineering Materials", Pearson, 2016
2	Drbal, Larry F. Boston, Patricia G. Westra, Kayla L. Black, Veatch, "Power Plant Engineering", Kluwer Academic Pub., 1995
3	Andy Walker, "Solar Energy", John Wiley & Sons, 2013
4	John B. Heywood, "Internal Combustion Engine Fundamentals", Tata McGraw Hill Education, 2017
5	Kumar. T, LeenusJesu Martin and Murali. G, "Basic Mechanical Engineering", Suma Publications, Chennai, 2007.

LIST OF EXPERIMENTS

Total: 30hours

1.	Study of wood types, carpentry tools, operations and safety precautions.
2.	To make various carpentry joints like T-joint, lap joint, bridle joint, mortise tenon joint and etc.
3.	Study of pipeline joints, its location and functions in household fittings.
4.	Preparation of single tap, multi tap and shower connection by using GI and PVC pipes.
5.	Study about basics of fitting process, tools and method of producing models.
6.	Preparation of square, half round, step, V, T fitting of two metals by using fitting tools.
7.	Study of cutting, bending operations and tools used in sheet metal processes.
8.	To make trays, cone and funnel by using sheet metal operations.
9.	Study of welding types, tools, equipments and welded joints.
10.	Preparation of butt joints, lap joints and T-joints by shielded metal arc welding.
11.	Study about the types, properties and uses of brick, stone and cement.
12.	Study about water supply, distribution System, water treatment plant, sewage system
13.	Study about the basics of casting processes and equipments.

Regulation 2018		Semester - I / Semester - II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18EES101J(R)	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s): The purpose of learning this course is to:

1	Gain the knowledge about D.C and A.C circuits.
2	Impart the fundamentals of electrical machines.
3	Study the fundamentals of semiconductor devices
4	Study the working concepts of measuring instruments.
5	Know about digital logic concepts and operational amplifier.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Apply the concepts of ohm's law and Kirchhoff's law in DC and AC circuits
CO2	Explain the basic concepts of DC motor, DC generator, Transformer and Induction motor.
CO3	Summarize the nature of semiconductor devices.
CO4	Interpret the concept of measuring devices like PMMC, MI, energy meter and wattmeter.
CO5	Infer the concept of electronics devices and conversion techniques

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	-	1	1	-	1	3	1	1
CO2	3	-	1	1	1	-	-	-	1	1	-	1	3	1	1
CO3	3	-	1	1	1	-	-	-	1	1	-	1	3	1	1
CO4	3	-	1	1	1	-	-	-	1	1	-	1	3	1	1
CO5	3	-	1	1	1	-	-	-	1	1	-	1	3	1	1
CO (Avg)	3	2	1	1	1	-	-	-	1	1	-	1	3	1	1

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

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UNIT I	ELECTRICAL CIRCUITS	9

Electrical quantities: Resistors, Inductors, Capacitors - Ohm's Law - Kirchoff's Laws -Series and Parallel circuits - Analysis of DC circuits: Mesh & Nodal analysis, Thevenin's Theorem, Norton's Theorem & Maximum Power Transfer Theorem, Star delta Transformation, RL & RC Transient Analysis. Introduction to AC Circuits: Waveforms and RMS Value – Power and Power factor- Introduction to three phase systems – Types of connections, Relationship between line and phase values.

UNIT II	ELECTRICAL MACHINES	9

Faraday's laws- Construction, Principle of Operation, Basic Equations of DC Generators, DC Motors – Two Point & Three Point Starter – Construction, Working and EMF Equation of Single Phase Transformer – Construction and Working of AC Generator – Three Phase Induction Motor: Construction and Working of Squirrel Cage and Slip Ring Induction Motor – Single Phase Induction Motor (Split Phase, Capacitor Start Induction Motor).

UNIT III	ELECTRONIC DEVICES	9

Intrinsic and Extrinsic Semiconductors – PN junction diode , Zener diode and its Characteristics – Operation of Half Wave, Full Wave and Bridge Type Rectifiers – Bipolar Junction Transistor: Configurations and Characteristics of CB, CE, CC – Construction and Operation of JFET, MOSFET.

UNIT IV	MEASUREMENTS	9

Basic Principles and Classification of Instruments – Construction and Working of PMMC, MI Instruments (Attraction & Repulsion type) – Principle of Operation of Dynamometer Type Wattmeter, Induction Type Energy Meter – Instrument transformer – CRO – Megger.

UNIT V	DIGITAL & INTEGRATED CIRCUITS	9

Number Systems – Boolean Theorems– Logic Gates – Half Adder and Full Adder Circuit – Flip-Flops: RS, JK, T and D – A/D Converter (Successive Approximation Type) – D/A Converter (Binary Weighted Type) – Op-Amp : Functional Block and Types (Inverting , Non-Inverting & Differential Amplifier).

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LIST OF EXPERIMENTS	15

1. Verification of Ohm's & Kirchoff's Laws
2. Types of Wiring (Fluorescent Lamp & Staircase)
3. Verification of Thevenin's Theorem
4. Verification of Norton's Theorem
5. Characteristics of PN Junction Diode
6. Characteristics of Common Base Configuration.
7. Characteristics of Common Emitter Configuration.
8. Measurement of Ripple Factor: Half Wave & Full Wave Rectifier.
9. Study of AC and DC Machines
10. Verification of Logic Gates
11. Study of PMMC and MI Meters

Text Book (s)

1	R. Muthusubramanian, S. Salivahanan,"Basic Electrical and Electronics Engineering," Tata McGraw-Hill, 2012
2	Sawhney, A.K., "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2011.

Reference (s)

1	Dash.S.S, Subramani.C, Vijayakumar.K, "Basic Electrical Engineering", Vijay Nicole, 1st Edition, 2013.
2	Jegatheesan.R, "Analysis of Electric Circuits", Tata McGraw-Hill, 2014.
3	Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI Learning Private Ltd, 2nd Edition, 2010.

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Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH102J	PROFESSIONAL ENGLISH	2	0	2	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Develop team spirit and stress management skill
CLR-2	Demonstrate the interpersonal skills of the learners
CLR-3	Make learners perform well in interviews
CLR-4	Enable them to listen well and express their ideas, opinions effectively in official contexts
CLR-5	Sharpen their reading comprehension skill
CLR-6	Strengthen their official written communication skill.

Course Outcome (s) (COs):

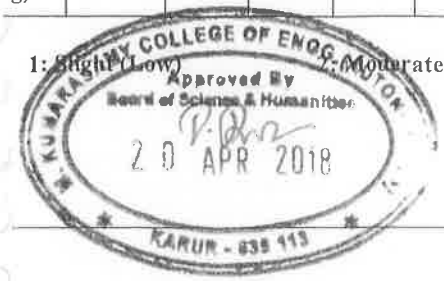
At the end of this course, learners will be able to:

CO1	Work in a team under any situation.
CO2	Practice interpersonal relationships in workplace
CO3	Face interviews confidently and successfully
CO4	Participate and excel in role plays, presentations and formal conversations.
CO5	Read and infer the meanings of technical and aesthetic passages.
CO6	Draft official letters, reports, memos, emails, etc.,

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO3	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	-	-
CO6	1	1	3	3	3	3	1	3	3	3	-	3	-	-	-
CO (Avg)	1	2.66	1.33	3	3	3	1	3	3	3	-	3	-	-	-

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



UNIT I	SOFT SKILLS	7

Introduction to Soft Skills(MCQ on Soft Skills)-Leadership Skills(Handling a Team) -Optimism & Business Etiquettes(Presentations on How to Handle Situations Effectively)-Team Management (Motivational Videos on Positive Thinking)- Time Management(Discussion on Real Time Hardships) -StressManagement(Handling Criticism)-Organizational Communication - Channels of Communication(Case Study).

UNIT II	LISTENING	7

Listening Skills: Active Listening, Passive Listening(Classroom Listening Activities)-Methods for improving Listening Skills, Listening and its process – Barriers to Listening(Innovative Practices and Strategies for Better Listening) – Listening to Pre-Recorded video/audio (Listening to Famous Motivational Speeches)- Listening to Reading in the Class - for Vocabulary - for Complete Understanding – for Better Pronunciation(Read aloud a Story or an Article to Listen and Complete the Task) - Listening for General Content – Listening to fill up Information(Listening –fill in the Form Activity) – Intensive Listening for Specific Purpose-Listening to Monologues(Listening to Announcements) -Extensive Listening(Listening to Business News).

UNIT III	SPEAKING	5

Defining Presentation and its Purpose; Audience & Local; Organizing Contents; Preparing Outline(Mini presentation)- Audio-Visual Aids; Nuances of Delivery; Body Language;(PPT Presentation) - Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice(Voice Modulation Practice)-Interviews &Its Types-Role Play(Mock Interview) -Group Discussion-Oral Presentations -Formal Conversations(Group Discussion Practice) .

UNIT IV	READING	5

Reading & Its Types- Techniques for Good Comprehension, Reading Comprehension(Reading Comprehension Exercises) - Cloze Test ,Reading Newspaper- Editorials & Business Articles (Cloze Test Exercises)- Inferring Meaning- Improving Comprehension Skills(Reading for Meaning) - Skimming and Scanning– Structure of the Text – Structure of Paragraphs(Skimming and Scanning Exercises) - Interpreting Visual Communication(Graphs, Charts, Tables)(Interpreting the Graphical images).

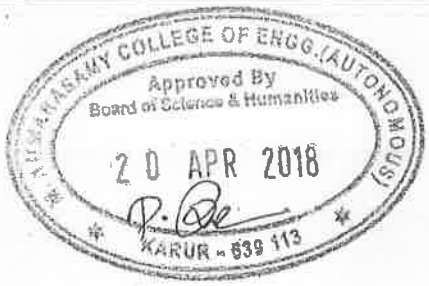
UNIT V	WRITING	5

Writing Official Letters(Invitation Letter (Accepting & Declining),Quotation, Ordering, Complaining, Seeking Clarification)(Business Letter Writing Exercises), Writing Official Letters(Permission – In-Plant Training)- Writing CV (Job Application)(Job Application Letter Exercise)- Essay Writing-Email Writing - Writing Reports & Proposal(Writing a Business Report)- Writing Circulars, Memos, Agenda & Minutes(Exercises on Writing Circulars, Memos, Agenda & Minutes).

LIST OF EXPERIMENTS	16

1. Videos on Stress Management (Stress Management Activities)
2. Videos on Team Spirit (Team Activities)
3. Listening to TED Talks(Listening to Business Interviews)
4. Listening to Business Presentation (Listening to Business Interviews)
5. Telephonic Conversation (Organizing a Meeting)
6. Product Launch (Persuasive Speech)
7. Business Conversations
8. Business Role Play Activities
9. Reading for Pleasure(Intensive Reading)
10. Extensive Reading(Briefing Favourite Self Help Books)

	11. Reading Newspaper articles(Reading Business Reports) 12. Reading Business Legends Success Formula(Read Between the Lines) 13. Writing an Advertisement (Writing Slogans for Products) 14. Error Correction Exercises (Formal Language expressions) 15. Business Vocabulary (Writing Official E-mails) 16. Writing Business Proposals (Writing Permission Letters)
Text Book (s)	
1	Abirami K, "Professional English", First Edition, R.K.Publishers, Coimbatore, 2019.
Reference (s)	
1	LinaMuhkopadhyay, et al., "English for Jobseekers" ,Cambridge University Press, New Delhi,2013
2	Brook Hart Guy , Business Benchmark Advanced Personal Study Book for BEC and BULATS, Cambridge
3	Mascull , Bill, Business Vocabulary in Use, Third Edition, Nov 2017
4	Emerson Paul, Business English Handbook ,Advanced, Macmillan
5	www.Business English Site.com
6	www.businessenglishpod.com



Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC201J	FLUID MECHANICS AND HYDRAULIC MACHINERY	3	0	2	4

Prerequisite Course (s)

Physics

Course Objective (s): The purpose of learning this course is to:

1.	Learn the basic properties of fluids.
2.	Get knowledge about dimensional analysis and model laws.
3.	Know the types and characteristics of open channel flow.
4.	Describe the uniform, gradually and rapidly varied flows in steady state conditions and flow in pipes.
5.	Know the various types of turbines and pumps.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Understand the properties of fluids and fundamental concept of fluid mechanics.
CO2	Understand the principle of model analysis and dimensional analysis by using various methods.
CO3	Apply their knowledge of fluid mechanics in addressing problems in open channels.
CO4	Solve problems in uniform, gradually and rapidly varied flows in steady state conditions and flow in pipes.
CO5	Apply principles of fluid mechanics to the operation, design, and selection of fluid machinery such as pumps and turbines.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	3	2	1	-	1	-	-	2	2	2
CO2	2	2	1	-	-	-	-	1	1	-	-	1	1	1
CO3	3	3	1	-	1	1	1	-	1	-	-	2	2	2
CO4	3	2	-	-	2	2	1	1	1	-	-	2	2	2
CO5	3	2	1	-	3	2	1	-	-	-	-	2	2	2
CO (Avg)	2.80	2.20	1.00	0.00	2.25	1.75	1.00	1.00	1.00	0.00	0.00	1.80	1.80	1.80

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

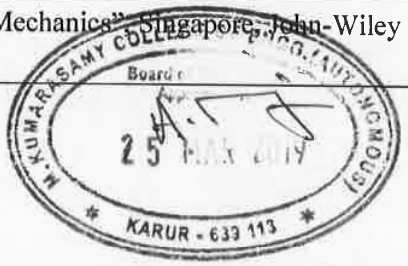
UNIT I	FLUID PROPERTIES AND FLUID STATICS	9
Fluid and fluid properties- Definition-Capillary rise and fall-Surface tension-Vapour pressure, Compressibility, Bulk modulus-Viscosity-Newton's law of viscosity- Pressure measuring instrument-Manometer and Gauges.		
UNIT II	**DIMENSIONAL ANALYSIS AND MODEL STUDIES**	**9**
Fundamental and derived units-Dimensional homogeneity and Similarity-Rayleigh's method-Buckingham π theorem method-Model and its type-Model Laws and scale effects.		
UNIT III	**OPEN CHANNEL FLOW**	**9**
Open Channel Flow- Definition- Types-Properties of open channel - Velocity Distribution in Open Channel flow- Uniform Flow – Manning's and Chezy's formulas –Determination of depth and velocity - Most Economical Sections (Trapezoidal channel) - Drawdown and backwater curves - Hydraulic jump .		
UNIT IV	**FLOW THROUGH PIPES**	**9**
Major and Minor losses- Flow through pipes in series and parallel-Equivalent pipe and pipe network - Measuring instruments - Venturimeter, Orificemeter- Derivation - Euler's & Bernoulli's equation - Applications of Bernoulli's equation.		
UNIT V	**HYDRAULIC TURBINES AND PUMPS**	**9**
Turbines-Classification – working principles and velocity triangle of Pelton wheel, Francis and Kaplan Turbines Pumps- working principle of -Rotodynamic Pump, Positive displacement Pump.		
	LIST OF EXPERIMENTS	**30**

1. Flow Through Venturimeter
2. Flow Through Orificemeter
3. Determination of Major And Minor Losses In Pipes
4. Characteristic of Centrifugal Pumps
5. Characteristics of Reciprocating Pumps
6. Characteristics of Submersible pump
7. Flow Through Notches
8. Characteristics of Pelton Wheel Turbine
9. Characteristics of Kaplan Turbine
10. Characteristics of Francis Turbine

Text Book (s)

1	R.K. Bansal, "Fluid Mechanics and Hydraulic Machines", Lakshmi publications, 2018, Delhi.
2	Modi P.N and Seth, "Hydraulics and Fluid Mechanics including Hydraulic Machines", Rajsons Publications Pvt. Ltd., Delhi.

Reference (s)	
1	Roberson J.A and Crowe C.T., "Engineering Fluid Mechanics", Mumbai, Jaico Books, 2000.
2	Streeter, V.L.Wylie,E.B. and Bedford K.W, "Fluid Mechanics", 9th edition, New Delhi, TataMcGrawHill, 2017.
3	Jain A. K. "Fluid Mechanics". Khanna Publishers, 1998.
4	Fox W.R. and McDonald A.T., "Introduction to Fluid Mechanics", Singapore, John-Wiley and Sons, 2018.



Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC203J	SURVEYING	3	0	2	4

Prerequisite Course (s)

Physics

Course Objective (s): The purpose of learning this course is to:

1	To study the different surveying equipments in the field of civil engineering
2	To enhance the ability to calculate surveying quantities.
3	To enable the suitability of surveying instruments and method to a given problem
4	To learn about the advanced methods of surveying to solve complex civil engineering problems.
5	To understand the principle of modern surveying instruments.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Understand the basic classifications of surveying and to Compute the linear measurement in chain surveying.
CO2	Compute angular measurements in compass surveying and to prepare plan with plane table surveying.
CO3	Determine the Reduced levels of various points on ground and to compute the areas and volumes using levelling principles.
CO4	Determine the distance and heights of the object by using theodolite and to setting out curves by various methods.
CO5	To learn on the principles of Electronic distance measurements, Total station and GPS

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	3	1	-	-	-	-	-	2	2	2
CO2	3	3	2	-	3	2	-	-	-	2	-	2	3	2
CO3	3	3	2	-	3	2	-	-	-	2	-	2	3	2
CO4	3	3	2	-	3	-	-	-	-	2	-	2	2	2
CO5	3	2	-	-	3	1	-	-	-	-	-	3	3	3
CO (Avg)	3.00	2.80	2.00	0.00	3.00	1.50	0.00	0.00	0.00	2.00	0.00	2.2	2.6	2.2

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

UNIT I	INTRODUCTION TO SURVEYING	9

Introduction: Definition, classification of surveys, Principles of surveying, Plan and map, Scale.

Chain surveying: Ranging and Chaining, survey station and survey lines, instruments used for setting out right angles, obstacles in chaining, Errors in chain survey.

UNIT II	COMPASS SURVEYING AND PLANE TABLE SURVEYING	9

Compass Surveying: Introduction, Bearing and angles, system of bearings, conversion of WCB to RB and vice versa, Prismatic compass, Magnetic declination, local attraction, Computation of compass traverse.

Plane Table Surveying: Accessories, working operations, methods of plane tabling-Radiation, Intersection, Traversing, Resection(Two point problem), Errors in plane table surveying.

UNIT III	LEVELLING	9

Levelling: Definitions, Levelling Instruments-Types of level and Level staff, temporary adjustments of a level, Benchmark and its types, methods of levelling - fly levelling - contouring.

Areas and Volumes: Calculation of areas and volumes by mid - ordinate, average ordinate, trapezoidal and Simpson's methods.

UNIT IV	THEODOLITE SURVEYING	9

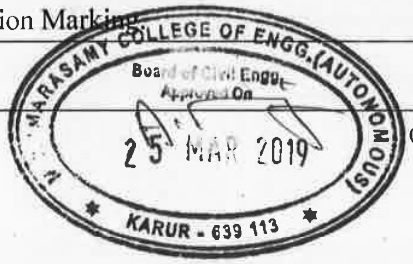
Theodolite Survey: Types of theodolite, Parts of thedolite, Definitions, Measurement of horizontal and vertical angle, Tacheometric surveying - Stadia and tangential methods - setting out of simple curves.

UNIT V	MODERN METHODS OF SURVEYING	9

Electronic Distance Measurement (EDM) – Types - Principles - Total station, Global Positioning System (GPS) - segments of GPS, application of Total station and GPS.

LIST OF EXPERIMENTS	30

1. Aligning, Chaining and Ranging of a line
2. Determination of area of the boundary by traversing using chain (perpendicular offset)
3. Determination of included angles of a given boundary by traversing using compass
4. Locate the position of Plane table by radiation method.
5. Determine the reduced levels of the given points by Height of collimation
6. Determination of profile of the given area by Longitudinal and Cross sectioning in Levelling.
7. Measurement of horizontal angle by repetition method.
8. Measurement of vertical angles by using theodolite.
9. Determination of horizontal distance by Tangential method.
10. Mapping of College Campus using GPS.
11. Determination of Area by using Total station.
12. Foundation Marking



Text Book (s)	
1	Punmia,B.C, Ashok K Jain and Arun K Jain, " Surveying" Vol. I&II, Laxmi Publication, 16th Edition, New Delhi, 2005.
2	Kanetkar,T.P, and Kulkarni,S.V, "Surveying and Levelling" Vol.I&II, United Book Corporation, 23rd Edition, Pune,1997.
Reference (s)	
1	Duggal S.K, "Surveying, Vol. I & II", Tata McGraw-Hill, Publishing Company, 2004.
2	Arora,K.R, "Surveying Vol.I & II", Standard Book House Publishers & Distributors, New Delhi, 2008
3	Venkatramaiah C, "Textbook of Surveying", University Press, 2nd Edition, Hyderabad, 2011.
4	Chandra .A.M "Plane Surveying and Higher Surveying", Chennai, New Age International (P) Limited, Publishers, 2002.

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Board of Civil Engg.
Approved On
25 MAR 2019
KARUR - 639 113

Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC204J	ENVIRONMENTAL ENGINEERING I	3	0	2	4

Prerequisite Course (s)

Environmental Science

Course Objective (s): The purpose of learning this course is to:

1	To impart knowledge on the various issues pertaining to quantity of water.
2	To impart knowledge on hydrological cycle and various sources of water
3	To emphasize the quality of water and various system of conveyance of water
4	To learn about Principles and design of water treatment system
5	To emphasize the need for distribution systems and service reservoir

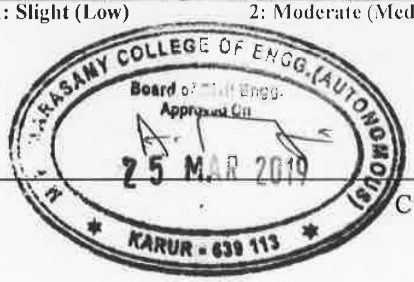
Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Analyze quantity of water and needs of public water supply schemes.
CO2	Identify the sources of water and evaluate the storage capacity of the reservoir.
CO3	Relate water quality criteria and standards to public health.
CO4	Construct appropriate treatment schemes to remove certain pollutants present in water
CO5	Design and evaluate water distribution alternatives on basis of chosen criteria.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	2	2	2	1	1	-	2	2	1
CO2	3	2	3	2	2	2	2	1	1	1	-	1	2	1
CO3	2	2	3	2	2	2	2	1	1	1	-	2	2	1
CO4	3	2	3	2	2	2	2	2	1	1	-	2	3	1
CO5	2	2	2	2	-	2	2	1	1	1	-	1	1	1
CO (Avg)	2.60	2.20	2.60	2.00	2.00	2.00	2.00	1.40	1.00	1.00	0.00	1.60	2.00	1.00

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



UNIT I	INTRODUCTION	9

Necessary and objectives of public water supply schemes – planning and financing – report preparation of schemes-quantity of water – water requirements for continuous and intermittent supply – rate of demand – variations in rate of demand – its effect on design –design periods and capacities of different components –population growth and forecast estimating the quantity of water required.

UNIT II	HYDROLOGICAL CONCEPTS AND SOURCES OF WATER	9

Hydrological concepts-hydrological cycle – precipitation – types of precipitation – rain fall measurements – rain fall indices –estimation of surface runoff – Sources of water –types of sources – wells – lakes – ponds – rivers – infiltration galleries - intakes – types – intake tower – storage reservoirs – determination of reservoir storage capacity by analytical and mass curve methods.

UNIT III	QUALITY OF WATER AND CONVEYANCE OF WATER	9

Characteristics of water - sampling –analysis of water – water borne diseases – water quality standards- conveyance of water – types of conduits – hydraulics of pipe flow – pipe corrosion – theories – effect and prevention – laying and testing of pipe lines - pumps – pumping stations.

UNIT IV	TREATMENT OF WATER	9

Treatment of water – working principles, purpose and design – screening – plain sedimentation – coagulation– filtration – disinfection – water softening – ion exchange- membrane processes.

UNIT V	DISTRIBUTION OF WATER AND IMPACT OF WATER SUPPLY SCHEMES	9

Distribution of water – requirements of good distribution system – method of distribution system – layouts of distribution system – distribution reservoirs – purpose – types– preventive methods to reduce wastage of water – impact of water supply schemes- 3R principles of water management.

LIST OF EXPERIMENTS	30

1. Sampling and preservation methods and significance of characterization of water and Wastewater.
2. Determination of pH and turbidity
3. Determination of hardness of water
4. Determination of dissolved oxygen
5. BOD Test
6. COD Test
7. Determination of ammonia nitrogen in water sample
8. Determination of nitrates in water sample
9. Determination of phosphate in water sample
10. Determination of potassium and sodium
11. Heavy metals determination – chromium, lead and zinc. (Demonstration only)

Text Book (s)	
1	Garg, S.K., "Environmental Engineering Vol. I", 24th Edition, New Delhi, Khanna Publishers, 2018.
2	Mark J. Hammer, Mark J. Hammer Jr, "Water and Waste Water Technology", Prenticehall new arrivals 2012.
Reference (s)	
1	"Manual on water supply and Treatment", CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 1999.
2	Qasim, S.R., Motley, E.M. and Zhu.G. "Water works Engineering – Planning, Design and Operation", Prentice Hall, New Delhi, 2002.
3	Birdie, G.S. and Birdie, J.S., "Water Supply and Sanitary Engineering", Dhanpat Rai and Sons, New Delhi, 2014.
4	Punmia, B.C., Jain, A.K., and Jain.A., "Environmental Engineering, Vol.I," Lakshmi Publications,2015.
5	Poonia, M.P.,Sharma, S.C., "Environmental Engineering",Khanna Publishers, 2018.

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Regulation 2018		Semester IV	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC205J	STRENGTH OF MATERIALS	3	0	2	4

Prerequisite Course (s)

Engineering Mechanics

Course Objective (s): The purpose of learning this course is to:

1	To study the different methods of finding deflection of statically determinate beam and to draw the shear force, bending moment diagrams.
2	To analyse the Indeterminate beams and to draw the shear force, bending moment diagrams.
3	To analyze the column with different end conditions
4	To study about the unsymmetrical bending.
5	To understand the concepts of plane stresses, thick and thin cylinders and understand the behaviour of materials under various loading conditions.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	To impart knowledge on behaviour of structural elements subjected to transverse load
CO2	To recognize the behaviour of statically indeterminate beams.
CO3	To learn about the behavior of columns
CO4	To develop the concepts of unsymmetrical bending of beams and shear centre
CO5	To learn the concepts of stress in thick and thin cylinder and plane stresses
CO6	To able to obtain the material strength and stiffness properties of structural elements

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	2	2	1	1	1	-	-	2	3	3
CO2	2	2	2	-	-	2	1	2	1	-	-	2	2	3
CO3	2	2	2	-	-	-	1	3	1	-	-	2	3	3
CO4	3	3	2	-	-	3	-	2	-	-	-	1	1	2
CO5	3	3	2	-	-	3	-	3	1	-	-	2	1	2
CO6	1	1	1	1	2	2	1	1	1	-	-	2	2	2
CO (Avg)	2.33	2.33	1.83	1.00	2.00	2.40	1.00	2.00	1.00	0.00	0.00	1.83	2.00	2.50

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

UNIT I	STATICALLY DETERMINATE STRUCTURES	9

Introduction, types of beams –Types of loads – concentrated load, uniformly distribute load, uniformly varying load and couples. Shear force and bending moment diagram for statically determinate beams (cantilever, simply supported and over hanging with PL, UDL)- Deflection Curve –Double Integration Method – Macaulay's Method

UNIT II	STATICALLY INDETERMINATE STRUCTURES	9

Propped Cantilever Beams – Fixed Beams – Continuous Beams – Theorem of Three Moments – Calculation of reactions, Bending Moments and Shear Force – Shear Force and Bending Moment Diagrams (for Concentrated Load and UDL).

UNIT III	THEORY OF COLUMNS	9

Members Subjected to Axial Load – eccentric load – Slenderness Ratio – End Conditions – Buckling Load for Columns- Euler's Theory – Assumptions and Limitations – Rankine - Gordon Formula.

UNIT IV	UNSYMMETRICAL BENDING AND SHEAR CENTRE	9

Unsymmetrical Bending – Product of Inertia – Stresses due to Unsymmetrical Bending – Deflection of beams due to Unsymmetrical Bending – Shear Centre – Definition – Shear Centre for Symmetrical and Unsymmetrical Sections.

UNIT V	PRINCIPAL PLANE ANDCYLINDERS	9

PRINCIPAL PLANE: Analysis of plane stress and strain, principal stresses and strains

THICK & THIN CYLINDER: Stresses and deformation of Thin cylindrical and spherical shells – Wire Wound Cylinders - Thick cylinder - Lame's theorem - Stress distribution - Compound cylinders.

LIST OF EXPERIMENTS	30

1. Tension test on mild steel rod
2. Torsion test on mild steel bar
3. Tension and compression test on springs
4. Compression test on bricks and concrete cubes
5. Hardness test on different metals (Brinell and Rockwell)
6. Deflection test on simply supported beams (for different metals)
7. Charpy and Izod Impact Test
8. Double shear test (for different metals)
9. Compression and bending test on wood specimens

Text Book (s)	
1	Rajput.R.K, "Strength of Materials", S. Chand & Co., New Delhi, 2014
2	Sadhu Singh, "Strength of Materials", Khanna publishers, New Delhi, 2013.

3	Vaidyanathan.R, Perumal.P and Lingeswari.S, "Mechanics of Solids and Structures", Volume I", Scitech Publications Pvt Ltd, Chennai, 2006.
Reference (s)	
1	Prasad.I.B, "Strength of Materials", Khanna Publishers, New Delhi, 1998
2	James .M. Gere "Mechanics of Materials", Thomson India, Brooks/Cole, 2006
3	Kazimi, "Solid Mechanics", Tata McGraw Hill, 1998.
4	Bansal R K "Strength of materials", Laxmi Publications, New Delhi, 2010

Regulation 2018		Semester IV	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC207J	SOIL MECHANICS	3	0	2	4

Prerequisite Course (s)

-

Course Objective (s): The purpose of learning this course is to:

CO1	To impart knowledge on soil properties relevant to Civil Engineering and their determination
CO2	Understand the physical significance of effective stress and its relation with pore pressure
CO3	Understand how stresses are transferred through soils and be able to compute both geostatic and induced stresses due to point, line, and area loads.
CO4	To impart knowledge on estimation of the amount of consolidation and settlement
CO5	Computation of shear strength parameters and differentiate various modes of slope failure

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Identify the types of soil and expected behavior on application of load
CO2	Determine the permeability of soil, estimate soil stresses and prepare flow net diagram.
CO3	Estimate the stresses and displacement in soil mass due to various type of surface loading
CO4	Estimate the total settlement and time rate of settlement of the soil.
CO5	Analyze shear properties of cohesive and cohesion less soils and Analyze the slope failure

CO-PO Mapping

COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	3	1	1	-	1	1	-	1	3	1
CO2	3	2	2	-	2	1	1	-	1	1	-	1	3	1
CO3	2	2	2	-	-	1	1	-	1	1	-	1	3	1
CO4	3	2	2	-	2	1	1	-	1	1	-	1	3	1
CO5	2	2	2	-	2	1	1	-	1	1	-	1	3	1
CO (Avg)	2.60	2.00	2.00	0.00	2.25	1.00	1.00	0.00	1.00	1.00	0.00	1.00	3.00	1.00

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

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UNIT I	PHYSICAL PROPERTIES AND CLASSIFICATION OF SOIL	9

Soil formation – Soil problems in Engineering – Physical properties of soil – Phase relations – Index properties of soil –Grain size distribution – Atterberg's limits – Identification and classification of soils (BIS classification).

UNIT II	PERMEABILITY AND SEEPAGE IN SOILS	9

Soil water - concept of total, neutral and effective stresses - capillary phenomena - Permeability and its determination methods - permeability of stratified soils - Seepage flow - one dimensional flow - flow net - Determination of seepage quantity, quick sand condition

UNIT III	STRESS DISTRIBUTION	9

Vertical stress distribution in soil - Influence factors, Isobars, Boussinesq's equation, Westergaard's equation and Newmark's Influence Chart – Stress below equivalent point load. Contact pressure under rigid and flexible area.

UNIT IV	COMPACTION AND CONSOLIDATION	9

COMPACTION

Compaction – Laboratory test – Standard proctor's compaction – Modified proctor's compaction – Factors affecting compaction – Field compaction methods – Compaction control;

CONSOLIDATION

Consolidation – Immediate, primary and secondary consolidation,consolidation test - interpretation of consolidation test results, Terzaghi's theory of consolidation, pressure void ratio relationship, pre-consolidation pressure - Total settlement; co-efficient of consolidation – Curve fitting methods, rate of settlement

UNIT V	SHEAR STRENGTH AND SLOPE STABILITY	9

SHEAR STRENGTH

Shear strength - failure criterion- shear strength tests - direct shear test, UCC, Vane shear test and tri axial test - Different drainage conditions- Shear properties of cohesive and cohesion less soils - Mohr's Stress circle;

SLOPE STABILITY

Slope failure mechanisms - finite slopes and infinite slopes - Swedish circle method - Friction circle method (Theory only).

LIST OF EXPERIMENTS	30

1. Specific gravity of soil solids
2. Grain size distribution – Sieve analysis & Hydrometer analysis
3. Liquid limit, Plastic limit, Shrinkage limit tests
4. Field density Test (Sand replacement method and Core cutter method)

5. Determination of moisture – density relationship using standard Proctor compaction test. 6. Permeability determination (constant head and falling head methods) 7. Direct shear test in cohesion-less soil- Demonstration only 8. Unconfined compression in cohesive soil - Demonstration only 9. One dimensional consolidation test(Determination of co-efficient of consolidation – Demonstration only)	
Text Book (s)	
1	Punmia P.C, "Soil Mechanics and Foundations", Laximi Publications Pvt. Ltd, New Delhi, 2017.
2	Arora K.R. "Soil Mechanics and Foundation Engineering", Standard Publishers and Distributors, New Delhi, 2014.
Reference (s)	
1	Murthy, V.N.S., "Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Ltd., New Delhi. 2011.
2	McCarthy, D.F., "Essentials of Soil Mechanics and Foundations Basic Geotechniques", 6th Edition, Prentice Hall of India, 2002.
3	Karl Terzaghi, Ralph B. Peck, and Gholamreza Mesri ,"Soil Mechanics in Engineering Practice", 3rd Edition, John Wiley & Sons, 1996
4	Gopal Ranjan and Rao A.S.R., "Basic and Applied Soil Mechanics", New Age International Publishers, 2000

M.KUMARASAMY COLLEGE OF ENGG.(AUTONOMOUS)
25 MAR 2019
KARUR - 639 113

Regulation 2018		Semester VII	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
PCC	18CEC401J	ESTIMATION AND QUANTITY SURVEYING	3	0	2	4

Prerequisite Course (s)

Construction Materials and Techniques, Design of Reinforced Concrete Structures

Course Objective (s): The purpose of learning this course is to:

1	Identify various items of work in a building and calculate their quantities using appropriate methods.
2	Understand the concepts behind the preparation of estimate of the various civil engineering works.
3	Impart the knowledge on basic concepts related to estimate preparation.
4	Analyse the rate of a work item according to the specification.
5	Understand the terminologies and concepts behind the valuation of properties, depreciation and time value of money.

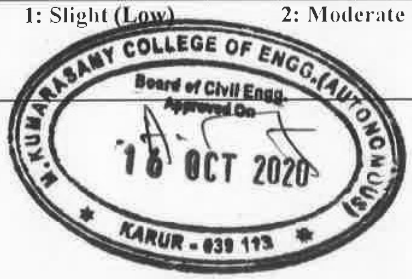
Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Prepare various types of estimation and find out the quantity of works involved.
CO2	Carry out analysis of rates and bill preparation using spreadsheets.
CO3	Prepare specifications for various items of construction works
CO4	Estimate the quantity of works involved in road works, water supply and sanitary works.
CO5	Estimate the value of buildings

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	1	1	1	-	-	-	-	1	3	2
CO2	3	2	1	-	1	1	1	-	-	-	-	1	3	2
CO3	3	2	1	-	1	1	1	-	-	-	-	1	3	2
CO4	3	2	-	-	1	1	1	-	-	-	-	1	3	2
CO5	3	2	1	-	1	1	1	-	-	-	-	1	3	2
CO (Avg)	3.00	2.00	1.00	0.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	3.00	2.00

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



UNIT I	ESTIMATE OF BUILDING	9

Types of estimates – Units of measurements – Methods of estimates – Advantages. Quantity estimate for load bearing and framed structures - brick work and RCC works only, Steel requirement and Bar bending schedule - Calculation of quantities of earth work excavation, brickwork, PCC, RCC, Plastering, white washing, colour washing and painting/varnishing for shops and residential building with flat roof.

UNIT II	ESTIMATE OF OTHER STRUCTURES	9

Estimating of septic tank, soak pit -- Retaining wall– Culvert - estimate of bituminous and cement concrete roads.

UNIT III	ANALYSIS OF RATES AND SPECIFICATIONS	9

Data – Schedule of rates – Analysis of rates – Specifications – sources – General and Detailed specifications-Material Calculations for each work- Material cost.

UNIT IV	VALUATION	9

Necessity – Different methods of valuation of a building – capitalized value – Depreciation – Escalation – Value of building – Calculation of Standard rent - Mortgage - lease.

UNIT V	REPORT PREPARATION	9

Principles for report preparation – report on estimate of residential and industrial building – Roads – Water supply and sanitary installations.

LIST OF EXPERIMENTS	30

The following list of experiments can be carried out by using software tools:

1. Estimation of residential building
2. Estimation of framed structures
3. Estimation of Septic tanks and soak pit
4. Estimation of Industrial Building
5. Estimation of Box Culvert
6. Estimation of Retaining wall
7. Estimation of Irrigation work
8. Estimation of Road
9. Valuation of residential building
10. Valuation of industrial building

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Text Book (s)	
1	Dutta.B.N, "Estimating and Costing in Civil Engineering", UBS Publishers and Distributors Pvt. Ltd., 2003.
2	Chakraborti M, "Estimation, Costing, Specification and Valuation in Civil Engineering (including Computer estimation)", 2001.
Reference (s)	
1	Kohli, D.D and Kohli,R.C, "A text book of Estimating and Costing (Civil)", S.Chand and Company Ltd., 2004.
2	Rangwala S C, "Estimating, Costing and Valuation", Charotar Publishing House", 2001.
3	Estimating and Costing: Including Quantity Surveying, Tendering and Evaluation Kataria and Sons, 2010

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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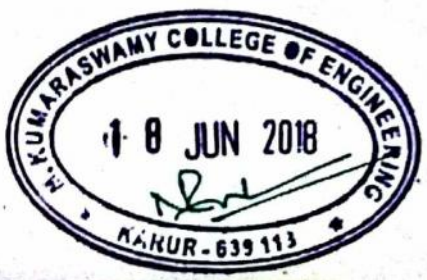
ANNEXURE – A

SCHEME OF EVALUATION			
Programme – Regulation 2018		B.E/ B.Tech	
THEORY COURSES			
Continuous Internal Assessment (CIA) - 50%		End Semester Examinations(ESE)- 50%	
S.No.	Particulars	Weightage Marks	Maximum Marks (100)
A.	**Continuous Internal Assessment (CIA) Distribution**		
1.	Internal Tests		
	Test I (M.S.E.-I)	10	50
	Test II (M.S.E.-II)	10	
	Test III (P.E.)	10	
2.	Objective Test / Unit Test / e Learning	5	
3.	Technical Presentation (Seminars, Mini-Projects, Case-Studies, Self-Study, Certifications, Conf. Paper, Class Interaction, Quiz etc.)	5	
4.	Assignment	10	
B.	**End Semester Examinations**		50

Programme – Regulation 2018		B.E/ B.Tech	
LABORATORY COURSES			
Continuous Internal Assessment (CIA) - 50%		End Semester Examinations (ESE) - 50%	
S.No.	Particulars	Weightage Marks	Maximum Marks (100)
A.	**Continuous Internal Assessment (CIA) Distribution**		
1.	All Experiments marks are distributed towards to Continuous Assessment	50	100
B.	**End Semester Examinations (ESE)**	50	



M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

COE

CONSOLIDATED INTERNAL MARKS

Department : CIVIL ENGINEERING

Semester : 3

Date : 30-12-2022

Batch : 2021

SNo	Register No	Name	18MAB201T TPDE (40)	18CES201T EM(40)	18CEC201J FMHM(50)	18CEC202T CMT(40)	18CEC203J SUR(50)	18CEC204J EE I(50)	18CEP103L MP I(100)	18CEX001J BPV(100)	18MBM201L CSS(60)
1	927621BCE001	ABHINAV K	25	25	42	31	40	41	84	89	53
2	927621BCE002	ADHISH R	24	23	35	29	35	38	76	62	53
3	927621BCE003	ATSHAI B	33	27	45	32	38	43	90	90	52
4	927621BCE004	BALAJI B	18	19	23	18	10	27	50	50	50
5	927621BCE005	DHAKSHA P	25	23	33	26	35	34	60	76	51
6	927621BCE006	DHANUSHYA K	30	32	39	36	42	45	85	88	52
7	927621BCE007	DHARSANA BALAN S	23	23	28	21	28	38	72	61	52
8	927621BCE008	GURU VISHNU GUPTA A	23	23	28	20	27	32	70	50	48
9	927621BCE009	KAARTHICK V P	23	23	28	24	31	36	68	55	52
10	927621BCE010	KALAIARASI R	25	23	45	30	39	41	90	91	56
11	927621BCE011	KALIMUTHU P	23	23	32	26	32	37	70	64	51
12	927621BCE012	KANISHKAR K	24	23	35	29	33	38	75	69	50
13	927621BCE013	KAVINKUMAR C	31	26	43	25	36	38	68	85	48
14	927621BCE014	KAVIYA K	25	23	37	27	37	39	55	88	54
15	927621BCE015	LIBISHREE M	29	25	38	29	41	42	52	87	51
16	927621BCE016	LOGITH S	23	23	35	18	33	34	68	86	50
17	927621BCE017	MITHUN P V	29	29	44	30	42	38	85	93	53
18	927621BCE018	MOHAMED ABUBACKER M	25	24	37	21	31	35	80	84	55
19	927621BCE019	MOHAN PRASAD K	23	23	29	24	29	40	80	65	49
20	927621BCE020	MURUGANANTHAM S	27	23	33	28	38	41	85	76	51
21	927621BCE021	MUTHU S	34	36	46	35	44	47	90	94	54
22	927621BCE022	NANDHAKUMAR A	27	23	38	27	36	39	81	73	50
23	927621BCE023	NAVEENKUMAR C	26	23	32	22	35	38	85	72	53
24	927621BCE024	NAVEENKUMAR R	23	23	35	25	33	38	80	75	49
25	927621BCE025	NIKHITAVARSHA R K	31	26	42	27	40	42	90	87	55
26	927621BCE026	PARTHASARATHY R	23	23	35	23	34	36	85	71	49
27	927621BCE027	RAMANA P	30	23	37	31	39	41	90	68	49
28	927621BCE028	RITHIKA S	32	23	43	29	39	41	82	87	49

No	Register No	Name	18MAB201T TPDE (40)	18CES201T FM(40)	18CEC201J FMHM(50)	18CEC202T CMT(40)	18CEC203J SUR(50)	18CEC204J EE I(50)	18CEP103L MP I(100)	18CEX001J BPV(100)	18MBM201L CSS(60)
29	927621BCE029	ROSHAN AKHTAR B A	36	34	47	36	44	44	90	94	51
30	927621BCE030	SANJAY R	23	23	34	26	31	38	80	70	51
31	927621BCE031	SANJAY T	29	25	47	33	41	44	90	95	56
32	927621BCE033	SOWMIYA P	23	23	36	25	36	39	80	87	47
33	927621BCE034	YASWANTH A	23	23	35	23	32	36	80	72	50
34	927621BCE035	YUVARAJ A	23	23	32	20	35	37	80	77	47
35	927621BCE301	KARTHIKEYAN K	23	23	25	18	32	31	75	50	48

30/11/21

Head of the Department

Head of the Department
Department of Civil Engineering
M. Kumarasamy College of Engineering
(Autonomous) Karur - 639113.

30/11/21

Principal

PRINCIPAL,
M. Kumarasamy College of Engineering,
THALAVAPALAYAM,
KARUR - 639 113

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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Approved by AICTE New Delhi,Accredited by NAAC

COE

Consolidated Internal Marks

Department : B.E.(Civil Engineering)

Semester : 7

Batch : 2019-2023

S.No.	Reg. No.	Name	18MBH202T SE (Max 50)	18CEC401JT EQS (Max 50)	18CEC401JL EQSL (Max 50)	18CEC402T CEM (Max 50)	18CEE019T BOAO (Max 50)	18MEC002T EE (Max 50)	18CEP107L DP (Max 75)
1	19BCE4001	AARTHY S	34	33	44	35	37	37	57
2	19BCE4002	ABIMANYU P	32	35	43	35	36	39	50
3	19BCE4003	ARAVINTH S	33	36	45	35	33	37	48
4	19BCE4004	DHIVYA M	37	37	40	38	41	37	56
5	19BCE4005	GAYATHRI D	29	32	40	32	37	36	47
6	19BCE4006	GOKUL D.V	28	36	42	29	37	32	53
7	19BCE4007	GOKULAKRISHNA R	30	35	42	33	35	34	44
8	19BCE4008	HARINI K K	40	41	41	37	45	42	63
9	19BCE4009	HARITHA M	30	31	37	33	33	34	41
10	19BCE4010	KARTHIKEYAN K	34	32	41	34	33	37	49
11	19BCE4011	KISHORE R	27	36	41	32	33	36	47
12	19BCE4012	KUMARAVEL S	31	34	40	33	34	35	44
13	19BCE4013	MADHUMITHA G	36	40	41	33	38	36	48
14	19BCE4014	MAHILAN M.E	34	35	42	35	34	35	56
15	19BCE4015	NAGARAJAN M	37	36	41	38	40	38	63
16	19BCE4016	NAVEENKUMAR R	35	38	40	37	41	39	56
17	19BCE4017	NILA DHARSHINI S	34	38	40	36	36	37	51
18	19BCE4018	NITHEESH R.S	34	38	46	36	40	38	63
19	19BCE4019	PARAMKUMAR B	26	34	41	30	30	28	44
20	19BCE4020	PRASANNA B	32	36	40	37	33	36	50
21	19BCE4022	RAHUL R	34	36	42	34	37	36	52
22	19BCE4023	RAJADURAI B	36	34	42	36	35	35	58
23	19BCE4024	RAJAKUMARI S	37	42	49	43	43	43	59
24	19BCE4025	RAJESH K	29	37	42	31	35	34	54
25	19BCE4026	SANTHOSH KUMAR S	34	36	42	39	38	35	49
26	19BCE4027	SARAN M	33	35	43	36	37	32	49
27	19BCE4028	SARATH KUMAR S	30	36	43	36	35	37	48
28	19BCE4029	SARAVANA KUMAR K	37	37	42	39	40	42	64
29	19BCE4031	SUDHARSAN M	37	39	42	37	40	41	61
30	19BCE4032	SUDHARSAN P	38	44	48	40	43	37	63

Signature with Date	19/12/22	
Name	Dr. SENTHILKUMAR V	Dr. Ramesh Babu N
	Head of The Department	Principal

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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COE

Consolidated Internal Marks

Department : B.E.(Civil Engineering)

Semester : 7

Batch : 2019-2023

S.No.	Reg. No.	Name	18MBH202T SE (Max.50)	18CEC401JT EQS (Max.50)	18CEC401JL EQSL (Max.50)	18CEC402T CEM (Max.50)	18CEE019T BDAD (Max.50)	18MEO002T EE (Max.50)	18CEP107L DP (Max.70)
31	19BCE4033	SWETHA V	39	42	42	43	40	44	63
32	19BCE4034	VIGNESHWARAN S	36	39	42	36	41	38	52
33	19BCE4035	VIJAYARAGHAVAN P	34	38	42	34	38	40	57
34	19BCE4301	KAVIN P	29	36	42	30	34	33	49
35	19BCE4302	MOHANAPRASATH G	27	34	42	30	33	34	50
36	19BCE4304	RAHULNATH S	27	36	41	31	32	35	50
37	19BCE4305	SIVASHANMUGAM T	34	34	42	32	33	34	48
38	19BCE4306	VISHALRAJ P.V	28	40	44	32	35	34	53

Signature with Date		
Name	Dr. SENTHILKUMAR V	Dr. Ramesh Babu N
	Head of The Department	Principal

Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CBC209J	SOFTWARE DESIGN WITH UML	3	0	2	4

Prerequisite Course (s)

Software Engineering

Course Objective (s):

The purpose of learning this course is to:

1	Know the importance of modeling in the software development life cycle.
2	Understand the object-oriented analysis approach for system requirement and analysis.
3	Identify the elements required for characterization and design of an interactive model.
4	Understand the design methods for building user interface UML system.
5	Learn to interface the UML design with a database application system.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Exemplify the software development process models and standards in software development.
CO2	Elucidate use case design and its association with requirement analysis.
CO3	Explain the design and dependencies of an object oriented model using interaction diagrams.
CO4	Apply various software design methods and components to develop an interactive system.
CO5	Explain the UML design for building an interface for real-time database application.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	2	1	-	-	-	1	1	1	1	2	1
CO2	3	2	2	2	1	1	-	-	2	2	2	1	2	1
CO3	3	3	3	2	1	1	-	-	2	2	2	1	2	1
CO4	3	3	3	2	1	1	-	-	2	2	2	1	2	1
CO5	3	2	1	1	1	-	-	-	1	1	1	1	2	1
CO (Avg)	3	2.4	2	1.8	1	0.6	-	-	1.6	1.6	1.6			

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

UNIT I	INTRODUCTION TO UML METHOD AND LANGUAGE	9
Software development process: The Waterfall Model vs. The Spiral Model -The Software Crisis, description of the real world using the Objects Model - Classes, inheritance and multiple configurations - Quality software characteristics - Description of the Object Oriented Analysis process vs. the Structure Analysis Model - Introduction to the UML Language: Standards, Elements of the language, General description of various models, The process of Object Oriented software development, Description of Design Patterns, Technological Description of Distributed Systems		
UNIT II	**REQUIREMENTS ANALYSIS USING CASE MODELING**	**9**
Analysis of system requirements, Actor definitions, Writing a case goal, Use Case Diagrams, Use Case Relationships - Transfer from Analysis to Design in the Characterization Stage: Interaction Diagrams- Description of goal, Defining UML Method, Operation, Object Interface, Class - Sequence Diagram, Finding objects from Flow of Events, Describing the process of finding objects using a Sequence Diagram, Describing the process of finding objects using a Collaboration Diagram		
UNIT III	**THE LOGICAL VIEW DESIGN STAGE**	**9**
Static Structure Diagrams: The Class Diagram Model, Attributes descriptions, Operations descriptions, Connections descriptions in the Static Model, Association, Generalization, Aggregation, Dependency, Interfacing, Multiplicity - Package Diagram Model: Description of the model, White box, black box, Connections between packagers, Interfaces, Create Package Diagram, Drill Down		
UNIT IV	**DYNAMIC MODEL**	**9**
State Diagram / Activity Diagram: Description of the State Diagram, Events Handling, Description of the Activity Diagram, Exercise in State Machines - Component Diagram Model: Physical Aspect, Logical Aspect, Connections and Dependencies, User face, Initial DB design in a UML environment		
UNIT V	**DEPLOYMENT MODEL**	**9**
Processors, Connections, Components, Tasks, Threads, Signals and Events		
LIST OF EXPERIMENTS		**15**

To develop a mini-project by following the 9 exercises listed below.

1. To develop a problem statement.
2. Identify Use Cases and develop the Use Case model.
3. Identify the conceptual classes and develop a domain model with UML Class diagram.
4. Using the identified scenarios find the interaction between objects and represent them using UML Sequence diagrams.
5. Draw relevant state charts and activity diagrams.
6. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
7. Develop and test the Technical services layer.
8. Develop and test the Domain objects layer.
9. Develop and test the User interface layer.

Suggested domains for Mini-Project:

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system

Text Book (s)	
1	Bernd Bruegge and Allen H. Dutoit, "Object-Oriented Software Engineering: using UML, Patterns, and Java", Pearson, 3rd Edition, 2013
2	Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Pearson Education, 3rd Edition, 2005
Reference (s)	
1	Erich Gamma, Richard Helm, Ralph Johnson, John M. Vlissides, "Design Patterns: Elements of Reusable Object-Oriented Software", Pearson, 2012
2	Roger. S. Pressman and Bruce R. Maxim, "Software Engineering – A Practitioner's Approach", 7th Edition, Tata McGraw Hill, 2015
3	Martin Fowler, Kendall Scott, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Addison Wesley, 3rd Edition, 2003
4	Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young, Ph.D., Jim Conallen Kelli A. Houston, "Object Oriented Analysis and Design with Applications", Addision - Wesely, 3rd Edition, 2007
5	Freeman, Eric & Robson, Elisabeth, "Head First Design Patterns" 1st Edition, O'Reilly, 2004

M.KUMARASAMY COLLEGE OF ENGG. (AUTONOMOUS) ★ KARUR - 639 113 ★
BOARD OF COMPUTER SCIENCE & BUSINESS SYSTEM
18 ... 2021

SYLLABUS: AS PER AUTONOMOUS REGULATION 2018 W.E.F. 2019 - 2020

Regulation 2018(R)		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CBB101J	PROBLEM SOLVING AND C PROGRAMMING	3	0	2	4

Prerequisite course

NIL

Course Objective (s):
The purpose of learning this course is to:

1	Know the fundamental concepts of programming to solve problems.
2	Understand various operations and control mechanisms in C programming.
3	Learn about arrays, functions and preprocessor directives in C.
4	Understand the concept of pointers in C.
5	Learn the basics of structures and various file operations.

Course Outcome (s) (COs):
At the end of this course, learners will be able to:

CO 1	Understand the algorithm, flow chart and C constructs for solving problems in Mathematical and Engineering application.
CO 2	Apply programs using different types of operators, expressions and control structures.
CO 3	Analyze the concept of arrays, modules and recursive functions to solve real world problems.
CO 4	Analyze the concept of pointers using C program.
CO 5	Understand the concepts using structures, unions and explain various file operations.

CO-PO Mapping

COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	2	2	2	2	2	-	2	2	2	3	2	2	1
CO3	3	3	2	2	2	2	2	2	2	2	3	2	2	1
CO4	3	2	2	2	2	2	2	2	2	2	3	2	2	1
CO5	3	2	2	2	2	2	2	2	2	2	3	2	2	1
CO (Avg)	3	2	2	2	2	2	2	2	2	2	3	2	2	1

UNIT 1	GENERAL PROBLEM SOLVING AND INTRODUCTION TO C	9
Introduction- Algorithm and flowchart for problem solving. Decisions and Loops – Imperative Languages – Introduction to C – Syntax and constructs of ANSI C, Variable Names, Data Types and Sizes, Constants, Declarations, proper variable naming and Hungarian Notation – Standard I/O, Formatted Output – printf, variable length argument list, Formatted Input – scanf Statements.		
UNIT 2	OPERATORS, EXPRESSIONS AND CONTROL FLOW	9
Arithmetic Operators, Relational Operators, Logical Operators, Type Conversion; Increment Decrement Operators, Bitwise Operators, Assignment Operators and Expressions, Precedence and order of Evaluation, If-else if, switch, Loops – while, do, for, break and continue, goto-structured and unstructured programming.		
UNIT 3	ARRAYS AND FUNCTIONS	9
Arrays, Multi-dimensional array and Row/Column major formats, Strings, Functions and Program Structures, Basics of functions, parameter passing and return type, External, Auto, Local, Static, Register Variables, Scope rules, Block structure, Initialisation, Recursion, C Pre-processors, Standard Library Functions and return types.		
UNIT 4	POINTERS	9
Pointers and address, Pointers and function Arguments, Pointers and Arrays, Address Arithmetic, Character pointers and functions, Pointers Arrays; Pointer to Pointer, Initialization of pointer Arrays, Command Line arguments, Pointer to functions, Complicated declarations.		
UNIT 5	STRUCTURES AND FILES	9
Basic Structures, Structures and functions, Array of structures, Pointer of structures, self-referral Structures, Table look up, Typedef, Unions, Bit-fields, File Access, Error Handling- including exit, perror and error.h, Line Input and output, Miscellaneous Functions.		
	Total Periods	45
	LIST OF EXPERIMENTS	15
1	Implementation of Algorithm and Flowcharts for GCD	
2	Implementation of small but tricky codes	
3	Implementation of code to using data types, Operators and Expressions.	
4	Execute a code to understand the programming using Loop & nested loop Statements (for, while, do-while).	
5	Implementation of variable parameter.	
6	Implementation of Pointer to functions.	
7	Implementation of User defined header.	
8	Implementation the code to make the file utility.	
9	Implementation of Multi file program and user defined libraries.	
10	Implementation of substring matching / searching programs / parsing related assignments.	
Text Book (s)		
1	B.W. Kernighan and D.M. Ritchi "The C Programming Language", 2nd Edition, Pearson Education, 2016.	
2	B. Gottfried "Programming in C" , Fourth Edition , Schaum Outline Series, 2018.	
Reference (s)		
1	Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGraw Hill, 2017.	
2	Yashavant Kanetkar, "Let Us C", Fifteenth Edition, BPB Publications, 2017.	

Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18CBC204J	COMPUTATIONAL STATISTICS	3	0	2	4

Prerequisite Course(s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand the fundamental concepts of Python & implementation of Data Visualization.
2	Use the fundamental concepts of computational statistical models and multivariate regression in applications.
3	Understand the basic concepts of Discriminant analysis and Principal component analysis
4	Gain knowledge in the concepts of Factor Analysis.
5	Understand the fundamental concepts of Clustering and Segmentation Analysis.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO 1	Utilize the introductory, concepts of Python and Data Visualization techniques in Computational Statistics. (Understand)
CO 2	Illustrate the statistical data using multivariate normal distributions
CO 3	Categorize the fundamentals of Discriminant and Principal component analysis
CO 4	Analyze the concepts of factor analysis.
CO 5	Implement clustering techniques.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	2	1	2
CO2	3	3	2	1	1	-	-	-	-	-	-	-	2	1
CO3	3	3	1	1	1	-	-	-	-	-	-	-	2	1
CO4	3	2	2	1	1	-	-	-	-	-	-	-	2	1
CO5	2	2	2	-	-	-	-	1	-	-	-	2	3	2
CO (Avg)	3	2	2	1	1	-	-	1	-	-	-	2	2	1

UNIT I	PYTHON CONCEPTS AND DATA VISUALIZATION	11
Python Concepts, Data Structures, Classes: Interpreter, Program Execution, Statements, Expressions, Flow Controls, Functions, Numeric Types, Sequences and Class Constructors, Text & Binary Files-Reading and Writing. Visualization in Python: Matpotlib package, Plotting Graphs, Controlling Graph, Adding Text, More Graph Types, Getting and setting values, Patches.		
UNIT II	**MULTIVARIATE NORMAL DISTRIBUTION AND MULTIVARIATE REGRESSION**	**9**
Multivariate Normal Distribution:Multivariate Normal Distribution, Conditional Distribution, Estimation of parameters. Multiple Linear Regression Model: Standard multiple regression models collinearity, outliers, non-normality and autocorrelation, Multivariate Regression: Parameter estimation, Multivariate Analysis of variance and covariance.		
UNIT III	**DISCRIMINANT ANALYSIS AND PRINCIPAL COMPONENT ANALYSIS**	**9**
Discriminant Analysis: Statistical background, linear discriminant function analysis, Estimating linear discriminant functions and their properties. Principal Component Analysis: Principal components, Algorithm for conducting principal component analysis, H-plot.		
UNIT IV	**FACTOR ANALYSIS**	**8**
Factor Analysis: Factor analysis model. Extracting common factors, determining number of factors, Transformation of factor analysis solutions. Factor scores.		
UNIT V	**CLUSTER ANALYSIS**	**8**
Clustering and Segmentation Analysis: Introduction, Types of clustering, Correlations and distances, clustering by partitioning methods, hierarchical clustering, overlapping clustering, K-Means Clustering.		
	Total Periods	**45**

LAB	LIST OF EXPERIMENTS	15
1.	Basic Python Programs	
2.	Program using String Operations	
3.	Program on python Data structures.	
4.	Perform various numpy operations and special functions	
5.	Draw statistical graphics using seaborn	
6.	Implement K-means, logistic and time series algorithm using Scikit-learn	
7.	Multi Variable analysis with regression in python	
8.	Factor analysis with python	
9.	Data Aggregation in python	
10.	Visualization in python using Altair	

PART - III

Text Book (s)	
1	An Introduction to Multivariate Statistical Analysis, T.W. Anderson, Wiley Series in Probability and Statistics (Third Edition), 2003.
2	Applied Multivariate Data Analysis, Vol I & II, J.D. Jobson, Springer, 1991
3	Beginning Python: From Novice to Professional, Magnus Lie Hetland, Edition, 2005.
Reference (s)	
1	The foundation of Factor Analysis, A.S. Mulaik. Chapman and Hall/CRC, 2009
2	Introduction to Linear Regression Analysis, D.C. Montgomery and E.A. Peck.
3	Python for Data Analysis, Wes Me Kinney.
4	Python 3 for Absolute Beginners, Tim Hall and J-P Stacey.

PART - III

(5)

Regulation 2018(R)		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CBC205J	SOFTWARE ENGINEERING	3	0	2	4

Prerequisite course

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Gain knowledge about various phases in software development life cycle.
2	Implement the basic of software requirements, project management and cost estimation.
3	Learn the metrics and models used to estimate the software quality and reliability.
4	Understand the various methodologies in software design using case tools.
5	Analyze various testing strategies used to identify faults and failures in software development.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO 1	Infer various phases in a software development life cycle.
CO 2	Illustrate the software requirement specification and cost estimation for a project management.
CO 3	Apply the metrics and models for estimating the software quality and reliability.
CO 4	Develop software using object oriented case tools for a real time application.
CO 5	Analyze the various testing techniques used in verification and validation of a software.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	-	1	2	1	1	1
CO2	3	3	2	-	1	-	1	-	2	1	2	2	2	1
CO3	3	3	3	-	1	1	1	-	-	-	2	2	2	1
CO4	3	3	3	-	-	-	1	-	-	1	2	2	2	1
CO5	3	3	2	-	-	1	-	-	-	-	2	2	2	1
CO (Avg)	**3**	**3**	**3**	**1**	**1**	**1**	**1**	**-**	**2**	**2**	**2**	**2**	**2**	**1**

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

UNIT 1	Introduction	9
Introduction: Programming in the small vs. programming in the large; software project failures and importance of software quality and timely availability; of software engineering towards successful execution of large software projects; emergence of software engineering as a discipline, Software Engineering Historical Development from Jackson Structured Programming to Agile Development.		
UNIT 2	**Software Project Management and Agile Software Engineering**	**9**
Basic concepts of life cycle models – different models and milestones; software project planning – identification of activities and resources; concepts of feasibility study; techniques for estimation of schedule and effort; software cost estimation models and concepts of software engineering economics; techniques of software project control and reporting; introduction to measurement of software size; introduction to the concepts of risk and its mitigation; configuration management. **Agile Software Engineering:** Concepts of Agile Methods, Extreme Programming; Agile Process Model - Scrum, Feature; Scenarios and Stories.		
UNIT 3	**Software Quality Management and Software Requirements Analysis**	**9**
Software quality; Garvin's quality dimensions, McCall's quality factor, ISO 9126 quality factor; Software Quality Dilemma; Introduction to Capability Maturity Models (CMM and CMMI); Introduction to software reliability, reliability models and estimation. **Software Requirements** Introduction to Software Requirements Specifications (SRS) and requirement elicitation techniques; techniques for requirement modelling – decision tables, event tables, state transition tables, Petri nets; requirements documentation through use cases; introduction to UML, introduction to software metrics and metrics-based control methods; measures of code and design quality.		
UNIT 4	**Object Oriented Analysis, Design and Construction**	**9**
Concepts:the principles of abstraction, modularity, specification, encapsulation and information hiding; concepts of abstract data type; Class Responsibility Collaborator (CRC) model; quality of design; design measurements; concepts of design patterns; Refactoring; object-oriented construction principles; object oriented metrics.		
UNIT 5	**Software Testing**	**9**
Introduction to faults and failures; basic testing concepts; concepts of verification and validation; black box and white box tests; white box test coverage – code coverage, condition coverage, branch coverage; basic concepts of black-box tests – equivalence classes, boundary value tests, usage of state tables; testing use cases; transaction based testing; testing for non-functional requirements – volume, performance and efficiency; concepts of inspection; Unit Testing, Integration Testing, System Testing and Acceptance Testing.		
	Total Periods	**45**
LIST OF EXPERIMENTS		**15**
Development of requirement specification, function oriented design using SA/SD, object-oriented design using UML, test case design, implementation using c++ and testing use of appropriate CASE tools and other tools such as configuration management tools, program analysis tools in the software life cycle.		
Text Book (s)		

1	Ian Sommerville, Software Engineering,Tenth edition,pearson education,2017
2	Roger S.Pressman and Bruce Maxim, Software Engineering – A Practitioner's Approach, Ninth Edition, Mc Graw-Hill Education,2019
Reference (s)	
1	Ivar Jacobson, Object Oriented Software Engineering: A Use Case Driven Approach,First Edition,2007
2	Shari Lawrence Pfleeger and Joanne M. Atlee, Software Engineering: Theory and Practice, Fourth Edition, Pearson Education India, 2011.
3	D. E. Knuth, "The Art of Computer Programming, Vol. 1, Vol. 2 and Vol. 3", Third Edition, Mathematical Science Publishers, 1997.
4	Michael A. Nielsen and Isaac L. Chuang ,"Quantum Computation and Quantum Information",2006

COE

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

(An Autonomous Institution Affiliated to Anna University, Chennai)

MARK ANALYSIS REPORT

Course Name : PROBLEM SOLVING AND C PROGRAMMING

Course Code : 18CBB101J

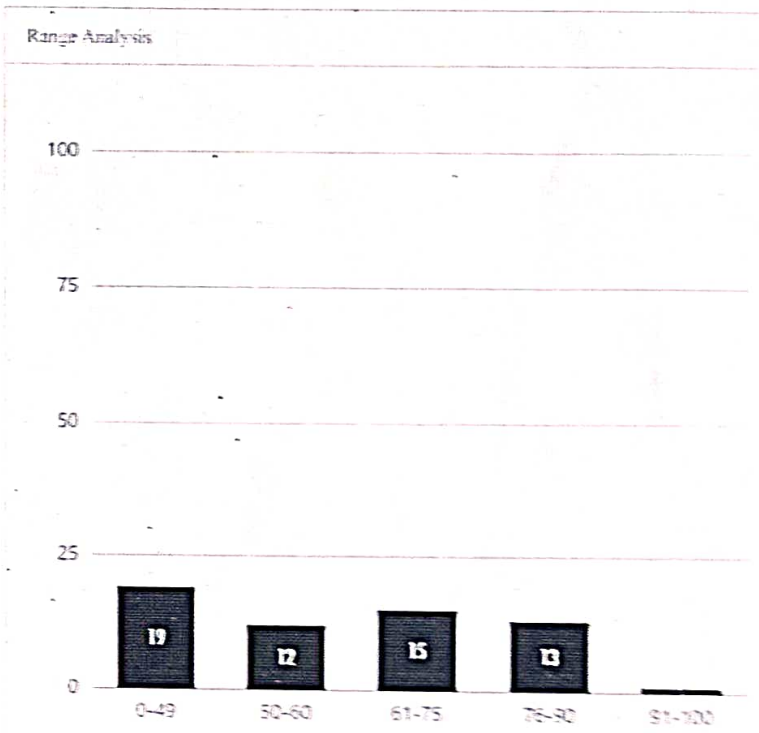
Batch : CSBS

Test Name : Mid Semester Examination 1

Date : 13-3-2023

Name : DURAI MURUGAN A

S.No	Register Number	Name	Marks
[1]	927622BCB001	AATHEESH S	2
[2]	927622BCB002	ADHITHYA V	73
[3]	927622BCB003	AGALYA B	4
[4]	927622BCB004	ARITHRA G	68
[5]	927622BCB005	ARSHITHA S	66
[6]	927622BCB006	ASHWIN K	60
[7]	927622BCB007	BALAJI D	26
[8]	927622BCB008	BHOOMIKA M	51
[9]	927622BCB009	DEEPA S	80
[10]	927622BCB010	DEEPAK V	5
[11]	927622BCB011	DEEPIKA N	50
[12]	927622BCB012	DHANUSHREE P	86
[13]	927622BCB013	DHARANEESH M K	7
[14]	927622BCB014	DHARSHANA S	81
[15]	927622BCB015	DHARSHINI R	67
[16]	927622BCB016	DHARSHINI V	66
[17]	927622BCB017	FARRISUDEEN M H	8
[18]	927622BCB018	GOWRABATHINI VENKATESH	50
[19]	927622BCB019	HARINI M S	30
[20]	927622BCB020	HARINI SHREE G R	82
[21]	927622BCB021	HARINI V	83
[22]	927622BCB022	HARINI V	86
[23]	927622BCB023	HARISH E	89
[24]	927622BCB024	HONEYBHASRI S K	90
[25]	927622BCB025	JEEVITHAN Y	26
[26]	927622BCB026	KAVYA K	75
[27]	927622BCB027	LITHISHYA A	80
[28]	927622BCB028	MADHAN M	62
[29]	927622BCB029	MAHIMA T	70
[30]	927622BCB030	MOHAN PRASHANTH G	19
[31]	927622BCB031	MONIKA G	83
[32]	927622BCB032	NAVEENKUMAR S	25
[33]	927622BCB033	POOJA S	78
[34]	927622BCB034	POORANI R	86
[35]	927622BCB035	PRADEEP K A	57
[36]	927622BCB036	PRADEEP N S	41
[37]	927622BCB037	PRAGALYA T	58
[38]	927622BCB038	PRAVEEN S	19
[39]	927622BCB039	RAFI AHAMED S	0
[40]	927622BCB040	RAMYA N	0
[41]	927622BCB041	RENGA RAGAVAN R	24
[42]	927622BCB042	ROGESHKRISHNA S	32
[43]	927622BCB043	SABARI K	60
[44]	927622BCB044	SABARIKARTHIK K	61
[45]	927622BCB045	SACHIN S S	44
[46]	927622BCB046	SHALINI R	23
[47]	927622BCB047	SHARON SAMSON M J	50
[48]	927622BCB048	SHARULATHA R	68
[49]	927622BCB049	SHOBIKA L	52
[50]	927622BCB050	SIVANI B S	35
[51]	927622BCB051	SOWMIYA R	74



Range Analysis

Range	No.of.Students
0 - 49	19
50 - 60	12
61 - 75	15
76 - 90	13
90 - 100	1

S.No	Register Number	Name	Marks
[52]	927622BCB052	SRIRAM J B	24
[53]	927622BCB053	SUBIKSHA N	61
[54]	927622BCB054	SUBITHA G	51
[55]	927622BCB055	SUDHARSHAN S L	54
[56]	927622BCB056	SUGA PRIYA B	50
[57]	927622BCB057	SWETHA C	67
[58]	927622BCB058	VAISHNAVI P A	92
[59]	927622BCB059	VINOTH B	22
[60]	927622BCB060	VISHWA S	63
[61]	927622BCB061	VISHWANGAR R	87
[62]	927622BCB062	VISMAYA S	75

No.Of.Present :60

No.Of.Absentee:2

No.Of.Pass :41

No.Of.Fail :19

Total Strength:62

Pass %. :68.33

Signature of the Faculty Class Advisor Head of the Department

ANNEXURE - 1

M.KUMARASAMY
COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
Approved by AICTE & Affiliated to Anna University
ISO 9001:2015 & ISO 14001:2015 Certified Institution
Thalavapalayam, Karur - 639 113.

Department of Computer Science and Business Systems

Academic Year: 2022-2023 (Even Sem)

Subject Code & Name : 18CBC209JT - Software Design with UML

II CSBS - IV Semester Mid Sem - 1 Mark Statement

Sl.No	Register No	Student Name	Marks
1	927621BCB001	AJAYKARTHIK T	56
2	927621BCB002	AKALYA S	55
3	927621BCB003	AMIRTHA V	54
4	927621BCB004	ANUSHKUMAR S	63
5	927621BCB005	ARUL RIXY CATHERINE T	50
6	927621BCB006	ARAVINTH ATHIKESAV SE	62
7	927621BCB007	BABU PRASAD R	55
8	927621BCB008	BHARATH A	52
9	927621BCB009	BHAVAL DHARSHINI S	62
10	927621BCB010	DHANUSH T	62
11	927621BCB011	DHARUN K S	22
12	927621BCB012	DHIVYA S	61
13	927621BCB013	GOPIKA SHRI M	52
14	927621BCB014	GOWDAMESHWAR M	34
15	927621BCB015	GOWTHAM R	AB
16	927621BCB016	HARISH R	45
17	927621BCB017	IMRAN FARHATH A	58
18	927621BCB018	INDHUSRI V G	51
19	927621BCB019	JAYA ADHITHIYA D	56
20	927621BCB020	JAYA SURYA S	AB
21	927621BCB021	JEYANTH N	58
22	927621BCB022	KAVIYA S	43
23	927621BCB023	KIRUTHIKA J	51
24	927621BCB024	LIPNA CELES J	51
25	927621BCB025	LITTHIKA S	54
26	927621BCB026	LOGAVARMAN M	47
27	927621BCB027	MADHANKUMAR N	45
28	927621BCB028	MIDHUNKUMAR S	23
29	927621BCB029	MUKESH G	34
30	927621BCB030	MUKILAN I	55
31	927621BCB031	MUKILARASAN J M	25
32	927621BCB032	NANDHAKUMAR V	54
33	927621BCB033	NARASIMMA RAJA T	47
34	927621BCB034	NITHESHKUMAR R	54
35	927621BCB035	NITHYAKALYANI S	62
36	927621BCB036	RAGUL M S	56
37	927621BCB037	RAKESH L	66
38	927621BCB038	RENUGADEVI P	38
39	927621BCB040	SAKTHI B	51
40	927621BCB041	SANGEETH RAJ P S	52
41	927621BCB042	SANJAYRAJ C	31

42	927621BCB043	SEEMA S	68
43	927621BCB044	SEVENTHEESH T	55
44	927621BCB045	SHASHHWATH S	72
45	927621BCB046	SHISHU SHARMA S	44
46	927621BCB047	SIVANESHWARAN S	41
47	927621BCB048	SOUNDARYA R	65
48	927621BCB049	SRIMATHI S	56
49	927621BCB050	SRIRAM K S	50
50	927621BCB051	SUGANTH D	50
51	927621BCB052	SUJITHA K	72
52	927621BCB053	SWETHA N S	62
53	927621BCB054	THANUSH S	50
54	927621BCB055	TRIKSHA K C	70
55	927621BCB056	UNNAMALAI C	72
56	927621BCB057	VEL ARAVINDHAN S	52
57	927621BCB058	VINOTH S	68
58	927621BCB059	VIRITHIKA S	67
59	927621BCB060	VISHALI G	67
60	927621BCB061	VISHNU N	39
61	927621BCB062	VISHNUVARTHAN R	52
62	927621BCB063	YATHESH V	45
		No.of Students Absent	2
		No.of Students Appeared	60
		No.of Students Pass	44
		No.of Students Fail	16
		Pass Percentage	73.33

0-9	0	50-59	27
10-19	0	60-69	13
20-29	3	70-79	4
30-39	5	80-89	0
40-44	3	90-100	0
45-49	5	Class Average	52.77

Faculty Incharge 3/3/2023

Class Advisor

HOD 03/03/2023.

Dr. R RAJA GURU M.Tech.,Ph.D.,
Associate Professor & Head
Department of Computer Science and Business Systems
M.Kumarasamy College of Engineering
Thalavapalayam, Karur - 69 113.

Regulation 2018		-	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18CSE028J	PYTHON PROGRAMMING	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Learn the basic constructs of Python programming language.
2	Make use of Functions, String and Collections.
3	Understand various OOPs concepts and File handling techniques.
4	Develop GUI applications using Tkinter and Database Connectivity.
5	Learn the basics of Numpy and Pandas.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Illustrate the basic constructs of Python programming language.
CO2	Solve problems using Function, String and Collections.
CO3	Demonstrate various OOPs concepts and File handling techniques.
CO4	Develop GUI applications using Tkinter and Database Connectivity.
CO5	Make use of Numpy and Pandas Libraries to solve real world problems.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	1	2	-	-	1	-	1	-	1	3	3
CO2	3	3	3	2	2	-	-	1	-	1	-	1	3	3
CO3	2	2	2	1	2	-	-	1	-	1	-	1	3	3
CO4	3	3	3	2	2	-	-	1	2	1	-	1	3	3
CO5	3	3	3	2	2	-	-	1	2	1	-	1	3	3
CO (Avg)	2.60	2.60	2.60	1.6	2	-	-	1	2	1	-	1	3	3

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

UNIT I	PYTHON INTRODUCTION	9

Introduction to Python Programming - Python Interpreter and Interactive mode - Values and Types: int, float, Boolean, string, and list - variables - expressions - statements - Boolean values and operators - Precedence of operators - Comments - Conditionals: Conditional (if), alternative (if-else), chained conditional (if-elif-else) - Iteration: while, for, Nested loops - Loop controlled statements: break, continue, pass.

UNIT II	FUNCTIONS , STRING AND COLLECTIONS	9

Functions: return values, parameters, arguments, local and global scope - Function composition - Recursion - Lambda function - Strings: string functions and methods - List: operations and methods - Tuple: operations and methods - Dictionary: operations and methods - Set: operations and methods - Errors and Exceptions - Exception Handling.

UNIT III	OOPs CONCEPTS AND FILE HANDLING	9

Object Oriented Programming: Class - Object – Methods - Constructors - Inheritance: Subclasses and Overloading - Overriding Methods - Data Encapsulation - Polymorphism - Files and exception: text files, reading and writing files, format operator - Command line arguments.

UNIT IV	GUI PROGRAMMING AND DATABASE CONNECTIVITY	9

Database Connectivity: MySql connections, Basic operations and Data manipulations - Python JSON - GUI programming: Introduction to Tkinter - Top Level Widget controls: Frames, Menus, Messages, and Entry controls - Python RegEx.

UNIT V	PYTHON FOR DATA SCIENCE	9

Data Science: Introduction to Data Science - Data Science Libraries - Numpy: Data types-Functions - Pandas: Data frames - operations

LIST OF EXPERIMENTS	15

1. Python program using Input and Output function
2. Python program using Control Flow Statements and Functions
3. Python program to implement various operations on String
4. Python program to implement various operations on List
5. Python program to implement various operations on Set
6. Python program to implement various operations on Dictionary
7. Python program to implement various operations on Tuples
8. Python Program using Database Connectivity
9. GUI Programming using Tkinter
10. Program using Numpy and Pandas

Text Book (s)

1. Allen B. Downey, ''Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/thinkpython/)

2	Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference (s)

1	Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd.,, 2015.
2	Mark Lutz ,"Learning Python", O Reily, 4thEdition, 2009, ISBN: 978-0-596-15806-4
3	Mark Lutz ,"Programming Python ", O Reily, 4thEdition, 2010, ISBN 9780596158118
4	Tim Hall and J-P Stacey ,"Python 3 for Absolute Beginners" , 2009, ISBN:9781430216322
5	Magnus Lie Hetland , "Beginning Python: From Novice to Professional", 2nd Edition, 2009, ISBN:9781590599822

M.KUMARASAMY COLLEGE OF ENGG.(AUTONOMOUS)
Approved By
Board of Computer Science On
27 OCT 2020
KARUR - 639 113

Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC202J	OBJECT ORIENTED PROGRAMMING	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand the fundamentals of object oriented programming in Java.
2	Learn the concepts of Array, String handling.
3	Study the basics of Generics and Collections.
4	Establish a firm foundation on core Java concepts like Exceptions and Concurrent programming.
5	Develop Graphical User Interface using Event Driven Programming.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Make use of Object Oriented programming concepts to solve real time problems.
CO2	Construct the programs with Inheritance, Packages and String handling mechanisms.
CO3	Utilize the different Collections and Input/Output streams.
CO4	Make use of Exception handling mechanisms and Multithreding to solve real time problems.
CO5	Develop simple applications using Event handling.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	3	-	-	-	3	1	-	-	3	3
CO2	3	2	-	-	3	-	-	-	3	1	-	-	3	3
CO3	3	2	-	-	3	-	-	-	3	1	-	-	3	3
CO4	3	2	-	-	3	-	-	-	3	1	-	-	3	3
CO5	3	3	-	-	3	-	-	-	3	1	-	-	3	3
CO (Avg)	3	2.2	-	-	3	-	-	-	3	1	-	-	3	3

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

UNIT I	INTRODUCTION	9
OOP Concepts - Introduction to Java - JVM - Data types - Variables - Operators - Control statements - Classes and Methods - Instances and Initialization - Arrays - Constructors and Destructors - Garbage Collection.		
UNIT II	**INHERITANCE AND PACKAGES**	**8**
Inheritance - Access Specifiers - Interfaces - Default interface method - Polymorphism - Packages - this Pointer - String Handling.		
UNIT III	**GENERICS AND COLLECTIONS**	**10**
Enumerations - Type Wrappers - Autoboxing - Annotations - Generic classes - Generic methods - Generic interfaces - Collections - Lists - Sets - Maps - I/O streams.		
UNIT IV	**EXCEPTION HANDLING AND MULTITHREADING**	**9**
Exception handling - Exception hierarchy - Throwing and Catching exceptions - Throws - Finally - Built in Exceptions - User defined Exceptions - Chained exceptions - Multithreaded programming - Interrupting threads - Thread states - Thread priorities - Thread synchronization - Inter Thread Communication.		
UNIT V	**EVENT HANDLING**	**9**
The applet class - Basics of event handling - Delegation event model - Event classes - Event listener interfaces - Adapter classes - AWT.		
	LIST OF EXPERIMENTS	**15**

1. Simple Java program with classes and Instances
2. Programs using inheritance and dynamic polymorphism
3. Programs using Interface
4. Programs using String handling
5. Programs using Type Wrappers
6. Programs using Generics
7. Programs using Collection Classes
8. Programs using Exception Handling
9. Programs using Multithreading
10. Programs using AWT

Text Book (s)

1	Herbert Schildt, "Java the Complete Reference", Ninth edition, McGraw-Hill Osborne Media, 2014.
2	P.J.Deitel and H.M.Deitel, "JAVA™ HOW TO PROGRAM", seventh edition, Pearson International Edition, 2009.

Reference (s)

1	Timothy Budd, —An Introduction to Object-Oriented Programmingl, Third Edition, Pearson Education, 2008.
2	K. Arnold and J. Gosling, "The JAVA programming language", Third edition, Pearson Education, 2000.
3	Timothy Budd, "Understanding Object-oriented programming with Java", Updated Edition, Pearson Education, 2000.

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Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC205J	Database Management Systems	3	0	2	4

Prerequisite Course (s)

Data Structures and Algorithms (18CSC201J)

Course Objective (s):

The purpose of learning this course is to:

1	Understand the principles of database design
2	Sketch the features of relational database using Structured Query Language
3	Learn the techniques for controlling concurrent transactions
4	Study about query processing and its optimization techniques

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Explain database and various data models
CO2	Illustrate the features of SQL and PLSQL commands
CO3	Apply the concepts of normalization to eradicate anomalies from the database
CO4	Outline the significance of various concurrency control techniques
CO5	Summarize the techniques to optimize a query for reducing the cost of execution

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	3	1	-	-	3	2
CO2	3	3	3	-	3	-	-	-	3	1	-	-	3	3
CO3	3	3	3	-	-	-	-	-	3	1	-	-	3	2
CO4	3	3	2	-	-	-	-	-	3	1	-	-	3	2
CO5	3	2	2	-	3	-	-	-	3	1	-	-	3	2
CO (Avg)	3	2.8	2.6	-	3	-	-	-	3	1	-	-	3	2.2

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

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UNIT I	FUNDAMENTALS OF DATABASE DESIGN	9
Purpose of Database Systems – View of Data - Database System Architecture – Database Users and Administrators – Data Models – Entity Relationship(ER) Model – Constraints – Entity Sets – Attributes – Keys – E-R Diagrams – Design Issues - Extended E-R Features – Introduction of Relational Model – E-R Reduction to Relational Schemas.		
UNIT II	**RELATIONAL DATABASE**	**9**
Structure of Relational Databases – Schema Diagrams – Relational Query Languages - Relational Algebra – Queries in SQL – Set Operations – Aggregate Operations – Joins – Views – Integrity Constraints – Authorization –SQL Application Programming using C and Java		
UNIT III	**LOGICAL DATABASE DESIGN**	**9**
Need for good database design – Functional Dependencies and Keys – Closure of Functional Dependencies Set – Closure of attributes - Dependency Preservation - Decomposition using Functional dependencies – Atomic domains and First Normal Form – Second Normal Form – Third Normal Form – Boyce Codd Normal Form		
UNIT IV	**TRANSACTION AND CONCURRENCY CONTROL**	**9**
Transaction Model – ACID properties – Transaction States – Serializability - Conflict serializability – View Serializability – Concurrency Control – Lock Based Protocols – Deadlocks – Time Stamp Based Protocols – Validation Based Protocols – Recovery System		
UNIT V	**QUERY PROCESSING AND OPTIMIZATION**	**9**
Indexing and Hashing – Query Processing – Measures of Query Cost – Join Operation – Evaluation of Expressions – Transformation of Relational Expressions – Choice of Evaluation Plans – Materialized Views		
	LIST OF EXPERIMENTS	**15**

1. Design a database for enterprise applications with the various Data Models
2. DDL commands:
   a. Creation of tables
   b. Usage of alter, drop commands
3. DML commands:
   a. Data Insertion using different ways
   b. Integrity constraints
   c. Usage of truncate command
4. SQL Queries
   a .Simple SQL Queries
   b. Nested Queries
   c. Aggregation Functions
   d. Grouping and Ordering commands
5. JOIN Queries in SQL
6. Normalization of Relation
7. DCL and TCL commands:
   a. Setting privileges and revoke privileges.
   b. Save point, roll back and roll back to commands
8. Introduction about PL/SQL and conditional Statements

9. Cursor in PL/SQL. 10. Trigger in PL/SQL. 11. Procedure and Function in PL/SQL. 12. Develop an Enterprise application with suitable User Interface and database	
Text Book (s)	
1	Henry F Korth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts", McGraw Hill, Sixth Edition, 2013
2	C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Pearson Education, Eighth Edition, 2006
Reference (s)	
1	Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill, Fourth Edition, 2015
2	R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Pearson Education/Addison Wesley, Sixth Edition, 2014
3	Steven Feuerstein, Bill Pribyl — Oracle PL/SQL Programming, Sixth Edition, O'Reilly Media, February 2014
4	Oracle® Database, PL/SQL Language Reference, 11g Release 2 (11.2), December 2014
5	Thomas Cannolly and Carolyn Begg, "Database Systems, A Practical Approach to Design, Implementation and Management", Pearson Education, Fifth Edition, 2009.
6	James Groff, Paul Weinberg, Andy Oppel — SQL: The Complete Reference, 3rd Edition, McGraw-Hill, 2009

Regulation 2018		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC301J	MACHINE LEARNING	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):
The purpose of learning this course is to:

1	Recognize definition, goals and applications of Machine Learning techniques.
2	Understand the concepts of Descriptive Statistics.
3	Apply various machine learning techniques such as Supervised Concepts, Classification, Regression etc.
4	Apply the fundamentals of Unsupervised Learning algorithm in real world application.
5	Understand the fundamentals of Neural Networks and Data Science.

Course Outcome (s) (COs):
At the end of this course, learners will be able to:

CO1	Explain the fundamentals of Machine Learning.
CO2	Demonstrate various concepts of Descriptive Statistics.
CO3	Apply Machine Learning techniques such as Classification, Regression.
CO4	Apply Machine Learning techniques such as Clustering.
CO5	Outline the basics of Neural Networks, Data Science and Deep Learning.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	2	1	-	1	3	3
CO2	3	2	2	2	2	-	-	-	2	1	-	1	3	2
CO3	3	2	2	2	2	-	-	-	2	1	-	1	3	2
CO4	3	2	2	2	2	-	-	-	2	1	-	1	2	2
CO5	3	2	2	2	2	-	-	-	2	1	-	1	2	2
CO (Avg)	3	2	2	2	2	-	-	-	2	1	-	1	2.60	2.20

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

UNIT I	INTRODUCTION OF MACHINE LEARNING	9

Definition, Goals and Applications of Machine Learning - Types of Learning Techniques: Supervised, Unsupervised, Semi - supervised and Reinforcement Learning - Aspects of Developing a Learning System: Training Data, Concept Representation, Function Approximation - Examples of Machine Learning Problems - Structure of Learning versus Designing - Training versus Testing- Characteristics of Machine Learning Tasks - Predictive and Descriptive Tasks.

UNIT II	DESCRIPTIVE STATISTICS	9

Central tendency: Mean, Median, Mode - Measures of Dispersion: Variance, Standard Deviation- Measures of Shape: Skewnes, kurtosis, Percentile, Five number summary - Data Visualization: Box plot, Histogram, Bar Chart, Pie Chart, Scatter plot - Association Analysis: Covariance, Correlation - Types of Correlation: Pearson Correlation, Spearman Correlation, Kendall Correlation - Two Way Tables, Chi-Squared Test for Two Way Tables.

UNIT III	SUPERVISED	9

Supervised Learning: Regression, Simple Linear Regression, Multiple Linear Regression, Logistic Regression - Classification - Decision Tree, k-Nearest Neighbors, Support Vector Machine (SVM).

UNIT IV	UNSUPERVISED LEARNING	9

Unsupervised Learning: Clustering Introduction - Distance Measure - Clustering Methods: Partitioning Based clustering, Hierarchical Based clustering, Density Based Clustering, DBSCAN, Grid Based Clustering-Cluster Tendency Assessment-Applications of Clustering.

UNIT V	NEURAL NETWORKS AND INTRODUCTION TO DATA SCIENCE	9

Introduction to Neural Networks - Activation Functions - Learning Rate - Stochastic Gradient Descent - Feed forward - Back Propagation - Basics of Deep Learning Networks - Introduction to Data Science - Digital Data - Data Science and its components.

LIST OF EXPERIMENTS	15

1. Introduction to Machine Learning and Python
2. Data preprocessing using Python
3. Simple Linear Regression
4. Multiple Linear Regression
5. Support Vector Regression (SVR)
6. K-Nearest Neighbors (K-NN)
7. Support Vector Classification (SVC)
8. Random Forest Classification
9. K-Means Clustering
10. Implementation Neural Networks

Text Book (s)

1	Yaser S.Abu Mostafa, Malik Magdon Ismail, Hsuan Tien Lin,"Learning from Data",Kindle Edition 2017.

Reference (s)	
1	Practical Data Science with R. Author(s): Nina Zumel, John Mount, Manning Shelter Island.ko
2	Data Mining Concepts and Techniques, 3rd Edition. Author(s): J.Han, M Kamber, J Pei.
3	Introduction to Data Mining. Author(s): Pang-Ning Tan, Steinberg, Vipin Kumar.
4	Introduction to Statistical Learning using R. Author(s): Trevor Hastie, Tibshirani.
5	Applied Predictive Modeling. Author(s): by Max Kuhn, Kjell Johnson.

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Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC206J	COMPUTER NETWORKS	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

1	Understand the various layering protocol and physical mode of communication.
2	Understand the different types of networks and analyze the performance of a networks.
3	Learn the functions of network layer and the various routing protocols.
4	Familiarize the functions and protocols of the Transport layer.
5	Understand the working of various application layer protocols.

Course Outcome (s) (COs):

CO1	Understand the basic layers and its functions in computer networks.
CO2	Evaluate the performance of a network.
CO3	Analyze and design routing algorithms.
CO4	Design protocols for various functions in the network.
CO5	Understand the working of various application layer protocols.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	2	2	1	-	1	3	3
CO2	3	2	2	2	2	-	-	2	2	1	-	1	3	2
CO3	3	2	2	2	2	-	-	2	2	1	-	1	3	2
CO4	3	2	2	2	2	-	-	2	2	1	-	1	2	2
CO5	3	2	2	2	2	-	-	2	2	1	-	1	2	2
CO (Avg)	3	2	2	-	2	-	-	2	2	1	-	1	2.60	2.20

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

UNIT I	INTRODUCTION TO NETWORKS AND PHYSICAL LAYER	9
Introduction: Components – Representation of data – Physical topology – Categories of network – Layering and protocols TCP/IP Protocol Architecture – Transmission media – Circuit Switching - Packet Switching.		
UNIT II	**DATALINK LAYER & MEDIA ACCESS CONTROL**	**9**
Link layer services – Framing – Error detection and control – Flow control – Media Access Control(MAC) – Wired LANs: Ethernet – Wireless LANs - CSMA/CD – Token ring – FDDI– CSMA/CA.		
UNIT III	**ROUTING PROTOCOLS**	**9**
Introduction to routing – IPv4 – IPv6 – Subnetting – Unicast Routing Protocol: Distance Vector Routing, Link State Routing , Path Vector Routing – ARP – DHCP – ICMP.		
UNIT IV	**TRANSPORT LAYER TCP & UDP**	**9**
Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol(UDP) – Transmission Control Protocol(TCP) – Congestion control in transport layer.		
UNIT V	**APPLICATION LAYER**	**9**
Responsibilities of application layer – HTTP – WWW – FTP – Email Protocols: SMTP, POP3, IMAP, MIME – DNS – SNMP.		

LIST OF EXPERIMENTS	15
1. Study about Basic Network and its types	
2. Build a Small Network using Switch	
3. Learn to use Basic Network commands like netstat, ifconfig, trace route, ping, etc.	
4. Applications using TCP sockets	
5. Applications using UDP sockets	
6. Study of TCP/UDP performance using Simulation tool	
7. Installation of Network Simulation Tool	
8. Simulation of DNS using UDP sockets	
9. Performance evaluation of Routing protocols using Simulation tool	
10. Simulation of Distance Vector / Link State Routing algorithm	

Text Book (s)

1	Behrouz A Forouzan 'Data Communication and Networking', Fourth Edition, Mcgraw Hill, 2016
2.	Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, Fifth Edition, Morgan Kaufmann Publishers Inc., 2015

Reference (s)

1	Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
2	William Stallings, Data and Computer Communications, Tenth Edition, Pearson Education, 2013.
3	James F. Kurose, Keith W. Ross, Computer Networking, A Top-Down Approach Featuring the Internet, Sixth Edition, Pearson Education, 2013.

Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC201J	DATA STRUCTURES AND ALGORITHMS	3	0	2	4

Prerequisite Course (s)

18CSS101J – Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

1	Impart the basic concepts of Data Structures and Algorithms.
2	Understand basic concepts about Stacks, Queues, Lists, Trees and Graph.
3	Understand concepts about Searching and Sorting techniques.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Explain the Concepts of List and its applications.
CO2	Illustrate Stack and Queue data structures with its applications.
CO3	Summarize the basic operations in Binary Tree, Binary Search and AVL Tree.
CO4	Solve the Graph problem using various Graph Algorithms.
CO5	Apply various Sorting and Searching Algorithms for solving problems.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	-	-	-	3	1	-	-	3	3
CO2	3	3	2	2	3	-	-	-	3	-	-	-	3	3
CO3	3	3	2	2	3	-	-	-	3	-	-	-	3	3
CO4	3	3	2	2	3	-	-	-	3	-	-	-	3	3
CO5	3	3	2	2	3	-	-	-	3	1	-	-	3	3
CO (Avg)	3	3	2	2	3	-	-	-	3	1	-	-	3	3

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

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UNIT I	LINEAR DATA STRUCTURES - LIST	9
Abstract Data Types (ADTs) - List ADT - Operations (Insertion, Deletion, Merge, Traversal) - Array based implementation - Linked list implementation : singly , circularly , doubly-linked lists - Applications of lists : Polynomial Manipulation.		
UNIT II	**LINEAR DATA STRUCTURES - STACK,QUEUE**	**9**
Stack ADT: Operations on Stack- Array Implementation - Linked List implementation - Applications of Stack: Expression Conversion and evaluation. Queue ADT : Operations on Queue - Array Implementation - Linked List Implementation - Circular Queue- Priority Queue - Applications of Queue.		
UNIT III	**TREE STRUCTURES**	**9**
Tree ADT : Basic Tree Terminologies - Binary Tree - Expression Tree - Tree Traversal - Binary Search Tree: Construction, Searching, Insertion, Deletion - AVL trees: Rotation, Insertion, Deletion - Applications of Trees.		
UNIT IV	**GRAPH ALGORITHMS**	**9**
Basic Terminologies - Representations of Graph - Topological sort - Graph Traversals : Breadth First Search - Depth First Search - Biconnectivity - Shortest Path algorithms : Unweighted Shortest Path - Dijkstra's algorithm - Minimum Spanning Trees : Prim's algorithm - Kruskal's Algorithm.		
UNIT V	**SORTING, SEARCHING AND HASH TECHNIQUES**	**9**
Sorting: Insertion sort - Selection sort - Shell sort - Bubble sort - Heap sort - Quick sort - Merge sort. Searching: Linear search - Binary Search .Hashing: Hash Functions - Separate Chaining - Open Addressing - Rehashing - Extendible Hashing.		
	LIST OF EXPERIMENTS	**15**
1. Implementation of Stack and its operations 2. Implementation of Queue and its operations 3. Implementation of Singly Linked list and its operations 4. Implementation of Doubly Linked list and its operations 5. Implementation of polynomial addition using Linked list 6. Implementation of binary search tree and its operations 7. Implementation of insertion sort, selection sort 8. Implementation of Quick sort 9. Implementation of Linear and binary search 10. Implementation of Shortest path algorithms		

Text Book (s)

1	Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education, Third Edition, 2012.
2	Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 1997.

Reference (s)

1	Reema Thareja, "Data Structures Using C", Oxford University Press, 2011.
2	Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", Third Edition, The MIT Press, 2009.

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Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC304J	BIG DATA AND ANALYTICS (Recommended by Infosys)	2	0	4	4

Prerequisite Course (s)

18CSC202J - Object Oriented Programming

18CSC205J - Database Management Systems

Course Objective (s):

The purpose of learning this course is to:

1	Understand the fundamental concepts of Big Data and Analytics.
2	Recognize the key concepts of Hadoop framework, MapReduce, Pig and Hive.
3	Explore tools and practices for working with Big Data.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Explain the concepts of Big Data and Analytics.
CO2	Explain the working procedure of Hadoop ecosystem.
CO3	Make use of MapReduce Framework and Pig Scripting to process real time data.
CO4	Explain different forms of databases used in Big Data.
CO5	Apply the concepts of Big Data to solve real world problems.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	-	-	-	-	-	1	2	2	-	1	3	2
CO2	3	2	-	-	-	-	-	1	2	2	-	1	3	2
CO3	3	2	2	2	2	1	-	1	2	2	1	2	3	3
CO4	3	2	-	-	-	-	-	1	2	2	-	2	3	3
CO5	3	2	2	2	2	-	-	1	2	2	1	2	3	3
CO (Avg)	3	2	2	2	2	1	-	1	2	2	1	1.60	3	2.60

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

UNIT I	INTRODUCTION TO BIG DATA ANALYTICS	6
Introduction to Big Data - Big Data characteristics - Objectives and Applications - Drivers for Big Data - Challenges for processing Big Data - Importance of Analytics in Big Data - Classification of Analytics - Top Analytics Tools.		
UNIT II	**HADOOP ECOSYSTEM**	**6**
Hadoop Ecosystem - Hadoop Execution Environment - Hadoop Distributed File System (HDFS) - HDFS Architecture and Configuration - Processing data in Hadoop - Data Storage in HDFS - HDFS Access - Commands - APIs - Applications.		
UNIT III	**MAPREDUCE FRAMEWORK AND PIG**	**6**
MapReduce Framework - Architecture - Working of MapReduce - Mapper - Reducer - Partitioner - Counter - MapReduce Programming Model - Introduction to Apache Pig: Basic Latin commands - Keywords - Data Types - Operators - UDF statements - Load/Store Functions.		
UNIT IV	**DATABASES OF HADOOP**	**6**
Introduction to Apache Hive - Hive Architecture - Managing Tables - Data types and Schemas - Partitions and Buckets - NoSql Databases: Introduction to Cassandra, Features and Data Types, CRUD, Collections - Introduction to MongoDB - Data Types, CRUD, MongoDB shell.		
UNIT V	**ADVANCED BIG DATA TECHNOLOGIES AND APPLICATIONS**	**6**
Introduction to Spark and kafka - Spark Ecosystem - Spark - Streaming - Resilient Distributed Datasets and Transformations - Spark using python (PySpark) - Analysis of Big Data: Twitter data - E-Commerce data - Blogs data.		
	LIST OF EXPERIMENTS	**30**

1. Installation of Hadoop
2. HDFS setup and Hadoop shell commands
3. MapReduce – running word count program
4. Stop word elimination problem
5. MapReduce program to mine weather dataset
6. Pig installation and scripting operations
7. Hive installation and database operations
8. CRUD operations in MongoDB
9. CRUD operations in Cassandra
10. Data Analytics using Apache Spark

Text Book (s)

1	Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publication, First edition, 2016

Reference (s)	
1	Tom White, Hadoop The Definitive Guide, First Edition. O'Reilly, 2015
2	Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012
3	Glenn J. Myatt, Making Sense of Data, John Wiley &Sons, Pete Warden, Big Data Glossary, O'Reilly, 2011
4	Holden Karau, Andy Konwinski, Patrick Wendell, MateiZaharia, Learning Spark: Lightning-Fast Big Data Analysis, O'Reilly, 2015
5	Dirk Deroos, Paul C. Zikopoulos, Roman B. Melnyk, Bruce Brown, Hadoop for Dummies, Wiley Publications, 2014

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(An Autonomous Institution Affiliated to Anna University, Chennai)

COE

Mark Analysis Report

Course Information : 18CSC202JT-OBJECT ORIENTED PROGRAMMING
Department : B.E (Computer Science and Engineering)
Section : B
Facility Name : Mid Semester Examination II
Faculty Name : Mr.VIKRAM R

Printed On : 11-01-2022
Batch : 2020-2024
Semester : 3
Test Name : Mid Semester Examination II
Exam Date : 25-10-2021-

S.No.	Register No. & Name	Date of Birth	Marks (Max. of 100)
1.	20BCS4055-MADHUBALAN M	03-01-2002	82
2.	20BCS4056-MADHUMITHA U	02-03-2003	79
3.	20BCS4057-MANJU S	19-10-2002	81
4.	20BCS4058-MANOJ B	27-11-2002	32
5.	20BCS4059-MEYKEERTHI S	30-07-2003	94
6.	20BCS4060-MIDHUNAA V S	27-08-2003	57
7.	20BCS4061-MOHAN A	18-02-2003	56
8.	20BCS4062-MOHAN KUMAR S	13-04-2003	92
9.	20BCS4063-MOUNIKA V	07-06-2003	80
10.	20BCS4064-MOUNISH KUMAR P	08-06-2003	52
11.	20BCS4065-NAGUL J G	19-03-2003	64
12.	20BCS4066-NANDHAKUMAR E	29-04-2002	53
13.	20BCS4067-NAVEEN M	20-10-2001	52
14.	20BCS4068-NAVEENA M	07-08-2003	78
15.	20BCS4069-NITHISH KUMAR S	06-11-2002	77
16.	20BCS4070-NITHYA N	06-11-2002	86
17.	20BCS4071-PRADEEPKUMAR R	24-04-2002	88
18.	20BCS4072-PRAVIN M	03-10-2002	53
19.	20BCS4073-RAGUL RAM S G	10-06-2003	71
20.	20BCS4074-RAJASHIVA A	25-04-2002	92
21.	20BCS4075-RAMANIKANTH M	23-05-2002	65
22.	20BCS4076-RAMYA K	18-02-2003	88
23.	20BCS4077-RHYTHUM KRISHNHA S	18-11-2002	88
24.	20BCS4078-RUBIKA V	24-01-2003	72
25.	20BCS4079-SANJAY KUMAR S	23-09-2002	65
26.	20BCS4080-SANJAY M	20-02-2003	62
27.	20BCS4081-SANJAY P	27-05-2003	43
28.	20BCS4082-SANTHOSH N	16-08-2003	66
29.	20BCS4083-SANTHOSH P	09-08-2001	92
30.	20BCS4084-SHARANRAJ K	30-11-2002	62
31.	20BCS4085-SHARMI K	30-10-2002	94
32.	20BCS4086-SHIVANI S	23-09-2002	75
33.	20BCS4087-SHOFIYA A	11-05-2002	83
34.	20BCS4088-SRINEETHI U K	01-04-2003	33
35.	20BCS4089-SRINITHI B	25-05-2003	71
36.	20BCS4090-SUDHARSAN K	22-01-2003	92
37.	20BCS4091-SUDHARSHAN R	15-12-2002	34
38.	20BCS4092-SUPREETHA B	04-07-2002	76
39.	20BCS4093-SUTHARSAN V	21-10-2002	54
40.	20BCS4094-SUWATHIKA K	25-09-2002	54
41.	20BCS4095-SWETHA M	25-01-2003	80
42.	20BCS4096-THIRUKUMARAN K	05-11-2002	43
43.	20BCS4097-THRISHMA B A	28-07-2002	62
44.	20BCS4098-THULASIMANI V V	19-07-2002	88
45.	20BCS4099-UVADHARANEE B	11-10-2002	88
46.	20BCS4100-VAISHNAVI S	05-05-2002	91
47.	20BCS4101-VARSHA V	31-08-2002	61
48.	20BCS4102-VASANTH A	16-07-2003	73
49.	20BCS4103-VELMURUGAN K	25-09-2002	46
50.	20BCS4104-VIDHULAA A V S	14-01-2003	40
51.	20BCS4105-VIMALRAJ M N	10-03-2003	74
52.	20BCS4106-VISHWA G P	15-05-2002	90
53.	20BCS4107-YOGI N	28-10-2002	70
54.	20BCS4304-JAYA PRIYA S	23-04-2003	27
55.	20BCS4306-RAGAVI M	27-02-2002	19
56.	20BCS4307-CHERALATHAN M	25-01-2002	60

Range Analysis

Range	No.of Students	Range	No.of Students
10-19	1	20-29	1
30-39	3	40-44	3
45-49	1	50-54	6
55-59	2	60-69	9
70-79	11	80-89	11
90-100	8		

Average Mark.	: 67.86		
No.of Present	: 56	No.of Absentee	: 0
No.of Pass	: 47	No.of Fail	: 9
Total Strength	: 56	Pass %	: 83.93

Signature of the Faculty

Class Advisor

Head of the Department

Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18EEC203J	MEASUREMENTS AND INSTRUMENTATION	3	0	2	4

Prerequisite Course (s)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Objective (s):

1	Understand the basic needs of instruments and error present in it.
2	Know the instruments necessary for Analog and Digital measurements.
3	Inculcate knowledge on bridges
4	Elaborate discussion about storage & display devices.
5	Initiate basic knowledge on transducers and electronic instruments

Course Outcome (s) (COs):

CO1	Explain the functional elements of an instrument, characteristics of instrument, standards and calibration.
CO2	Illustrate the working principle of Analog and Digital measuring instruments.
CO3	Compute the unknown values of R, L, C using bridges.
CO4	Infer the functions of various storage and display devices.
CO5	Classify the types of transducers and its applications.

CO-PO Mapping

Cos	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	-	-	-	2	2	-	2	3	1	1
CO2	3	2	2	-	-	-	-	-	2	2	-	2	3	1	1
CO3	3	3	3	-	-	-	-	-	2	2	-	2	3	1	1
CO4	3	2	2	-	-	-	-	-	2	2	-	2	3	1	1
CO5	3	3	2	-	-	-	-	-	2	2	-	2	3	1	1
CO (Avg)	3	2.4	2.2	-	-	-	-	-	2	2	-	2	3	1	1

M.KUMARASAMY COLLEGE OF ENGG. (AUTONOMOUS) Dept. of Electrical and Electronics Engineering Approved On 05 MAR 2019 KARUR - 639 113

UNIT I	INTRODUCTION TO MEASUREMENTS AND INSTRUMENTATION	8

Functional elements of an instrument - - Classification of instruments – Static & Dynamic characteristics of instruments - Methods of measurement - Statistical evaluation of measurement data- Errors in measurements -Selection of Instruments – Calibration and Traceability of measuring Instruments.

UNIT II	ANALOG AND DIGITAL MEASURING SYSTEMS	10

Galvanometers - Ballistic, D'Arsonval galvanometer -Measurement of voltage and current –use of ammeter shunts and voltmeter - Power factor meter – Synchroscope – Frequency meter. Energy meter calibration by direct and phantom loading – Maximum demand indicator – Measurement of reactive power –Trivector meter. Digital voltmeters -digital frequency meter-Multimeter.

UNIT III	COMPARATIVE METHODS OF MEASUREMENTS	9

Measurement of low, medium & high resistance: Ammeter, voltmeter method -Wheatstone bridge - Kelvin double bridge - Megger - Earth resistance measurement. A.C bridges: Measurement of inductance, capacitance – Q of coil - Maxwell Bridge, Wein's bridge, Schering bridge, Anderson bridge, Hay's bridge, Owen's bridge.

UNIT IV	STORAGE AND DISPLAY DEVICES	8

Printers and plotters - Strip Chart Recorders - Single point and multi point Recorders, X-Y Recorders - Magnetic Tape Recorders - cathode ray oscilloscopes -digital storage oscilloscope - LED, LCD and dot matrix display. 7 Segment Display - Data Loggers

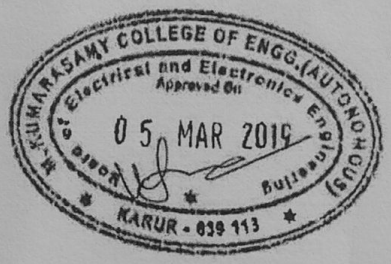
UNIT V	TRANSDUCERS AND APPLICATIONS	10

Resistive Transducer – potentiometric, strain gauge, resistance thermometer, Thermistor. Inductive Transducer- piezoelectric transducers - measurement of displacement-LVDT, RVDT - Applications - pressure, velocity, acceleration, torque, speed, viscosity and moisture.

	List of Experiment(s)
1	Measurement of displacement and pressure using transducers.
2	AC bridges-Measurement of inductance using Maxwell's bridge
3	AC bridges-Measurement of inductance using-Anderson's bridge
4	AC bridges-Measurement of capacitance using-Schering bridge
5	DC bridges-Measurement of resistance using Wheatstone's bridge
6	DC bridges-Measurement of resistance using Kelvin's bridge
7	Instrumentation amplifiers
8	A/D and D/A converters.
9	Measurement of three phase power and power factor
10	Study of transients.

M.KUMARASAMY COLLEGE OF ENGG. (AUTONOMOUS) Approved On 05 MAR 2019 Board of Electrical and Electronics Engineering KARUR - 639 113

Text Book (s)	
1	A.K. Sawhney, 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2014.
2	J. B. Gupta, 'A Course in Electronic and Electrical Measurements', S. K. Kataria & Sons, Delhi, 2013.
Reference (s)	
1	R. K Rajput, Electrical Measurements and Measuring Instruments, S.Chand & Company LTD, 2009
2	D.V.S. Murthy, 'Transducers and Instrumentation', Prentice Hall of India Pvt Ltd, 2015
3	David Bell, 'Electronic Instrumentation & Measurements', Oxford University Press,2013.
4	Martin Reissland, 'Electrical Measurements', New Age International (P) Ltd., Delhi, 2001.
5	Alan. S. Morris, Principles of Measurements and Instrumentation, 2nd Edition, Prentice Hall of India, 2003.



COE

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

Mark Analysis Report

Course Name : MEASUREMENTS AND INSTRUMENTATION

Course Code : 18EEC203J

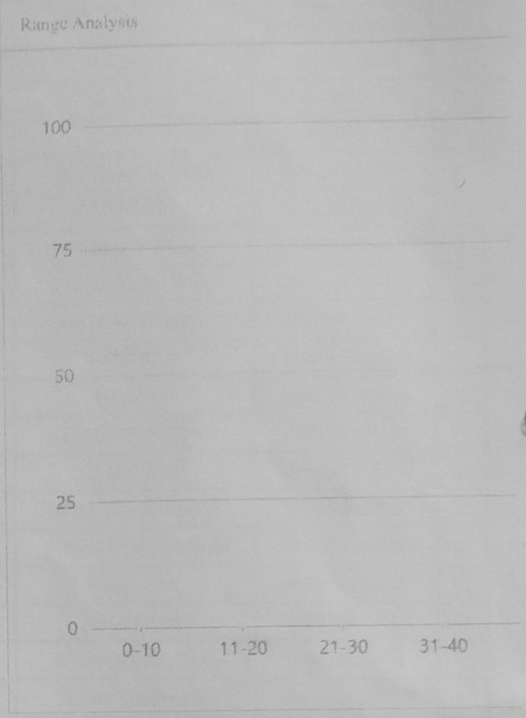
Batch : III SEM EEE 2022-2023 WEDNESDAY

Name : HARIPRABHU MANOHARAN

Report : Final Internal Mark

Date : 10-1-2023

SNo	Register Number	Name	Marks	Attendance Percentage
1	927621BEE001	ABISHEK J S	40.00	98.67
2	927621BEE002	ADITHYA MURUGESH J	43.00	98.67
3	927621BEE003	AJAY K	38.00	98.67
4	927621BEE004	AJEETH S	36.00	97.33
5	927621BEE005	ANANTH C	39.00	98.67
6	927621BEE006	ANCHANA B	42.00	92.00
7	927621BEE007	ARCHANA J	42.00	98.67
8	927621BEE008	ARIHARAN M	37.00	94.67
9	927621BEE009	ARIVARASU D	44.00	98.67
10	927621BEE010	ARUNA S	41.00	98.67
11	927621BEE011	BANUPRIYA K	37.00	98.67
12	927621BEE012	BARATH SRINIVASAN K	41.00	98.67
13	927621BEE013	BARATHKUMAR R	43.00	97.33
14	927621BEE014	BHARATH S	36.00	98.67
15	927621BEE015	BHARATHI S	37.00	94.67
16	927621BEE016	BHARATHY M	38.00	93.33
17	927621BEE017	CARMEL JENIFER I W	40.00	98.67
18	927621BEE018	CHANDRU R	40.00	97.33
19	927621BEE019	CHITTRARASU G	37.00	93.33
20	927621BEE020	DEEPAK S	36.00	92.00
21	927621BEE021	DEEPAN G	37.00	90.67
22	927621BEE022	DEEPAN HENDRY R	34.00	85.33
23	927621BEE023	DEVADHARSHINI S	41.00	96.00
24	927621BEE024	DEVADHARSHINI S	40.00	97.33
25	927621BEE025	DHAKSHANAMOORTHY S	38.00	92.00
26	927621BEE026	DHANUSH V	35.00	98.67
27	927621BEE027	DHARANEESH V M	39.00	92.00
28	927621BEE028	DHARIKA SREE V	40.00	100.00
29	927621BEE029	DHARSHANA K	42.00	100.00
30	927621BEE030	DHARSHINE B	41.00	92.00
31	927621BEE031	DHARSHINI M	41.00	100.00
32	927621BEE032	DINESH S	35.00	100.00
33	927621BEE033	ELAKKIYA P	43.00	98.67
34	927621BEE034	ELANGO M	39.00	98.67



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
20 - 30	0
31 - 50	0

COE

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

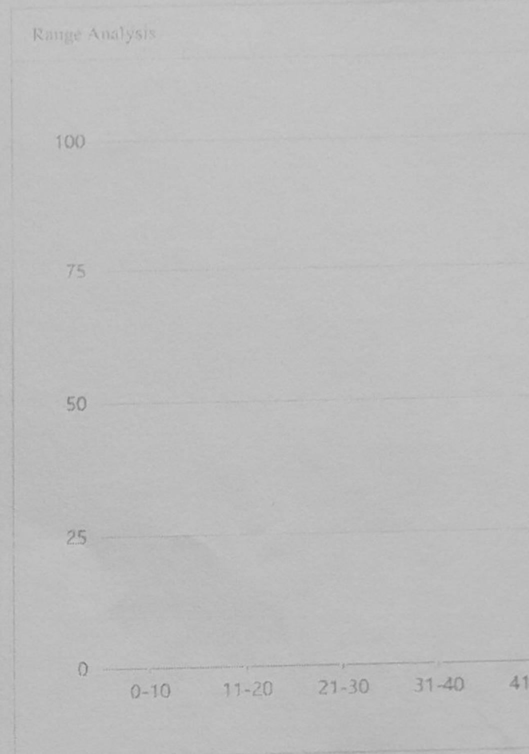
(An Autonomous Institution Affiliated to Anna University,chennai)

Mark Analysis Report

Course Name : MEASUREMENTS AND INSTRUMENTATION
Course Code : 18EEC203J
Batch : III SEM EEE 2022-2023 THURSDAY

Name : HARIPRABHU MANOHARAN
Report : Final Internal Mark
Date : 10-1-2023

SNo	Register Number	Name	Marks	Attendance Percentage
1	927621BEE035	GOBIKA P	43.00	94.67
2	927621BEE036	GOKUL M	37.00	82.67
3	927621BEE037	GOKULAKRISHNA K	39.00	100.00
4	927621BEE038	GOKULAPRIYA C	43.00	98.67
5	927621BEE039	GOPINATH D	37.00	96.00
6	927621BEE040	GOWTHAM V	38.00	98.67
7	927621BEE041	GOWTHAMAN K P	38.00	97.33
8	927621BEE042	HARI PRASATH L	39.00	100.00
9	927621BEE043	HARINI M	44.00	90.67
10	927621BEE044	HARINI P	41.00	96.00
11	927621BEE045	HARIPRASATH E	38.00	94.67
12	927621BEE046	HARISH K	37.00	98.67
13	927621BEE048	HEMA KAVIYAA M	40.00	93.33
14	927621BEE049	HEMA CHANDRAN A	34.00	98.67
15	927621BEE050	JAGAN M	39.00	97.33
16	927621BEE051	JANANI S	39.00	98.67
17	927621BEE052	JANARTHANAN K	35.00	88.00
18	927621BEE053	JAYA VIGNESH N	37.00	96.00
19	927621BEE054	JAYASRI S	41.00	93.33
20	927621BEE056	KALAIMATHI R	46.00	97.33
21	927621BEE057	KAMALRAJ V R	40.00	100.00
22	927621BEE058	KANEESHKUMAR J	43.00	92.00
23	927621BEE059	KANIMOZHI S V	46.00	97.33
24	927621BEE060	KANISKA S	42.00	90.67
25	927621BEE061	KARTHIK R	40.00	97.33
26	927621BEE062	KAVIN M R	40.00	98.67
27	927621BEE063	KAVIN N	38.00	96.00
28	927621BEE301	DHANUSH A	32.00	94.67
29	927621BEE302	JESUDOSS B	32.00	94.67
30	927621BEE303	MAHESHWARAN N	30.00	96.00
31	927621BEE304	MUKESH S	33.00	96.00
32	927621BEE305	NAMBI RAAJAN U C	32.00	94.67
33	927621BEE306	NAVEENA A	43.00	100.00
34	927621BEE307	PRANESH S	32.00	97.33



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
20 - 30	0
31 - 50	0

M. Hari
Signature of the faculty

V. Jeo
Class Advisor

HOD

HEAD OF THE DEPARTMENT
...t.of Electrical & Electronics Engg.
...Kumarasamy College Of Engineering
Karur- 639 113.

COE

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

FINAL INTERNAL MARK REPORT

Course Name : MEASUREMENTS AND INSTRUMENTATION

Course Code : 18EEC203J

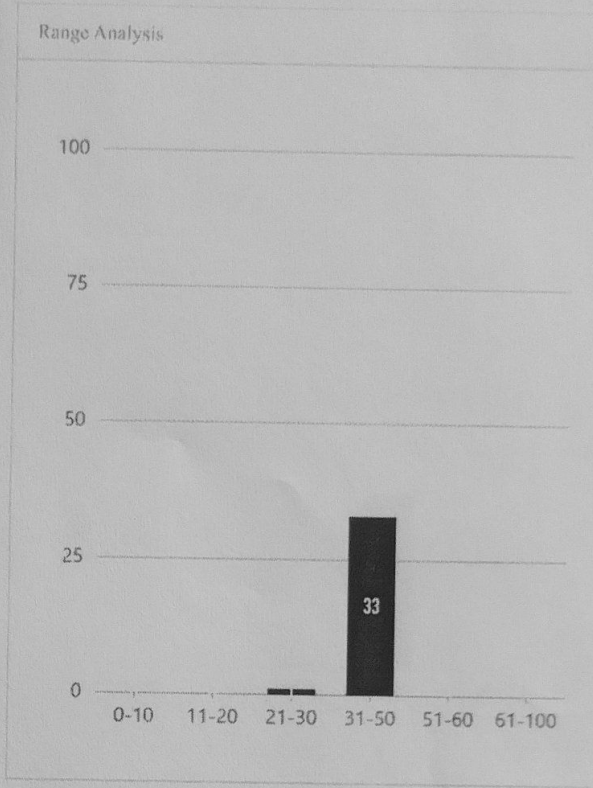
Batch : III SEM EEE 2022-2023 THURSDAY

Name : LAKSHMANAN M

Report : Final Internal Mark

Date : 2-5-2023

SNo	Register Number	Name	Marks	Attendance Percentage
1.	927621BEE098	REETHIKA G	42.00	96.00
2.	927621BEE099	ROSHAN RUBAG R S	40.00	93.33
3.	927621BEE100	SAJITHA G	38.00	97.33
4.	927621BEE101	SAMEERA SARA S	37.00	93.33
5.	927621BEE102	SANTHOSH C	38.00	93.33
6.	927621BEE103	SANTHOSH KUMAR B	33.00	85.33
7.	927621BEE104	SARAN S	42.00	98.67
8.	927621BEE105	SARANYA K	40.00	92.00
9.	927621BEE106	SARATHI M	33.00	89.33
10.	927621BEE107	SARVESHWARAN L V	39.00	92.00
11.	927621BEE108	SELVABHARATHI S	41.00	93.33
12.	927621BEE109	SELVAKARTHICK M	38.00	92.00
13.	927621BEE110	SENIYA DEVI A	41.00	98.67
14.	927621BEE111	SHARAN R	40.00	89.33
15.	927621BEE112	SHIVA KISHNU S	34.00	77.33
16.	927621BEE113	SIBIRAJ M	44.00	100.00
17.	927621BEE114	SREE VAISHNAVI M	44.00	93.33
18.	927621BEE115	SRI VIGNESH C	41.00	93.33
19.	927621BEE116	SRIKANTH V	39.00	89.33
20.	927621BEE117	SRINITHI R	39.00	98.67
21.	927621BEE118	SUDHARSAN S	40.00	77.33
22.	927621BEE119	SUDHESH BALAN V	37.00	96.00
23.	927621BEE120	SULOCHINI S	42.00	98.67
24.	927621BEE121	SURYA R	37.00	82.67
25.	927621BEE122	SUSHMITHAA M	34.00	97.33
26.	927621BEE123	TAMIL SELVA ANTO K	36.00	85.33
27.	927621BEE124	TAMILMANI S	34.00	97.33
28.	927621BEE125	VENGATESH PRABHU P	39.00	89.33
29.	927621BEE126	VIJAY HARISH G S	37.00	85.33
30.	927621BEE308	SANTHOSH C	34.00	86.67
31.	927621BEE309	SANTHOSH D	28.00	76.00
32.	927621BEE310	SRI SABAREESWARAN V	38.00	90.67
33.	927621BEE311	SUDHAKARAN T	34.00	96.00
34.	927621BEE312	VISHWESHWAR P	41.00	100.00



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
21 - 30	1
31 - 50	33
51 - 60	0
61 - 100	0

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

FINAL INTERNAL MARK REPORT

Course Name : MEASUREMENTS AND INSTRUMENTATION

Course Code : 18EEC203J

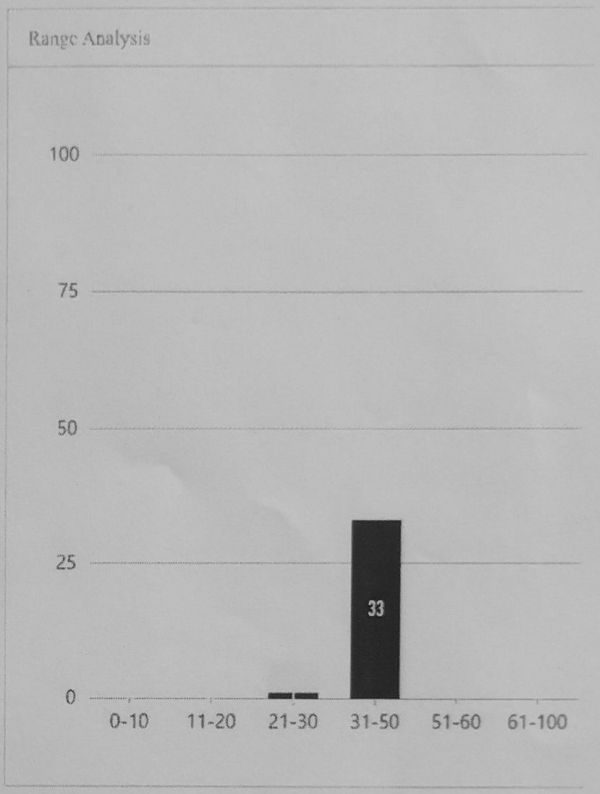
Batch : III SEM EEE 2022-2023 WEDNESDAY

Name : LAKSHMANAN M

Report : Final Internal Mark

Date : 2-5-2023

SNo	Register Number	Name	Marks	Attendance Percentage
1.	927621BEE064	KAVINRAJA G	34.00	77.33
2.	927621BEE065	KAVISHVARAN K	33.00	85.33
3.	927621BEE066	KEERTHIESWAR V	28.00	80.00
4.	927621BEE067	KEERTHIVARMAN AB	39.00	97.33
5.	927621BEE068	KISHOREKUMAR N	35.00	97.33
6.	927621BEE069	KOUSHIK N	40.00	90.67
7.	927621BEE070	LOGESH R	41.00	89.33
8.	927621BEE071	MAHENDRAN K	38.00	82.67
9.	927621BEE072	MANISH B	38.00	97.33
10.	927621BEE073	MANJURAGAVI R	43.00	98.67
11.	927621BEE074	MARI SURJITH S	38.00	85.33
12.	927621BEE075	MEGANATHAN P	38.00	92.00
13.	927621BEE076	MOHAMMED AKRAM A	34.00	96.00
14.	927621BEE077	MOHAN PRASATH M	37.00	90.67
15.	927621BEE078	NANDHAKUMAR M	43.00	98.67
16.	927621BEE079	NANDHINI P	43.00	93.33
17.	927621BEE080	NATHIYA S	44.00	98.67
18.	927621BEE081	NAVEEN S	37.00	93.33
19.	927621BEE082	NAVEEN S	39.00	92.00
20.	927621BEE083	NAVEENKUMAR P	35.00	86.67
21.	927621BEE084	NIVASS S	34.00	86.67
22.	927621BEE085	NIVETHA M	42.00	93.33
23.	927621BEE086	NIVITHA A	44.00	98.67
24.	927621BEE087	POOVARASAN R	37.00	98.67
25.	927621BEE088	PRANAV K	40.00	90.67
26.	927621BEE089	PRASANNA VENKATESH M P	40.00	93.33
27.	927621BEE090	PRATHISHA A	43.00	97.33
28.	927621BEE091	RAGAVI R	41.00	92.00
29.	927621BEE092	RAGUL S	44.00	96.00
30.	927621BEE093	RAGUPATHI K	40.00	96.00
31.	927621BEE094	RAJESH S	42.00	96.00
32.	927621BEE095	RAJESH T	36.00	98.67
33.	927621BEE096	RAMAMANI V	40.00	90.67
34.	927621BEE097	RAMKUMAR D	39.00	93.33



Range Analysis

Range	No.of.Students
0 - 10	0
11 - 20	0
21 - 30	1
31 - 50	33
51 - 60	0
61 - 100	0

Signature of the Faculty

Class Advisor

Head of the Department

HEAD OF THE DEPARTMENT
Dept.of Electrical & Electronics Engg.
M.Kumarasamy College Of Engineering
Karur- 639 113.

Regulation 2018		Semester I/ Semester II	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18EES101J	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Analyze given electric circuits consisting of active and passive components.
2	Identify the parts, functions and working of motors, generators and transformers that function in AC and DC.
3	Utilize the basic electronic devices and circuits.
4	Utilize the working concept of measuring instruments.
5	Build simple logical circuits using Boolean expressions. Identify elements in Integrated circuit.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Discuss basic theory utilized in electrical circuits and its circuits.
CO2	Describing working principle of direct current and alternative current machines such as transformers, motors and generators.
CO3	Operate the basic electronic devices. Identify their uses and construction features.
CO4	Interpret the concept of measuring devices like PMMC, MI ,energy and wattmeter.
CO5	Apply binary logic and Boolean expressions for digital circuit design, Identify elements in a Integrated circuit.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	-	2	2	2	2	-	2	-	-	-
CO2	3	2	1	1	2	-	2	2	2	2	-	2	-	-	-
CO3	3	-	1	1	2	-	2	2	2	2	-	2	-	-	-
CO4	3	-	1	1	1	-	2	2	2	2	-	2	-	-	-
CO5	3	2	2	2	2	-	2	2	2	2	-	2	-	-	-
CO (Avg)	3	2	1.2	1.2	1.8	-	2	2	2	2	-	2	-	-	-

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

UNIT I	ELECTRICAL CIRCUITS	12

Introduction to DC and AC circuits, Active and Passive two terminal elements, Ohms law, Voltage-Current relation, Power, Energy, R,L,C Circuits, Voltage and Current Sources, Kirchoff's current law, Kirchoff's voltage law, Problem Solving Session, Mesh Current Analysis, Nodal Voltage Analysis, Thevenin's Theorem, Norton's Theorem, Maximum Power Transfer Theorem, Star- Delta Transformation, Problem Solving Session, Resistive Circuit Analysis, Superposition, Convolution, RL Circuit Transient Analysis, RC & RLC Transient Analysis , Three Phase Systems, Star and delta Connections, Relation between Line and, Phase, Problem Solving Session.

UNIT II	DC MACHINES & AC MACHINES	12

Sinusoids, Generation of AC, Average, RMS values, Form and peak factors, Analysis of single phase AC circuit, Real, Reactive, Apparent power, Power factor, Magnetic materials, B-H Characteristics Simple magnetic circuits, Faraday's laws, induced emf and inductances. 1 - Phase transformers: Construction, types, ideal, practical transformer, EMF equation, Regulation, Efficiency, Problem Solving Session, Construction, working of DC Generators, Types of DC generators, Characteristics of Generators, Applications of DC generator, Working and types of DC motors, Characteristics , Two point starter and Three point starter, Problem Solving Session, AC generators (Alternators), Construction, working, Characteristics of Alternators, Losses, Single Phase motors: Split phase induction motor & Capacitor start induction motor, Working and types of single phase AC motors, Squirrel Cage and Slip ring induction motor, Types of AC starters (Autotransformer, star-delta and Rotor resistance starter), Problem Solving Session.

UNIT III	ELECTRONIC DEVICES	12

Overview of semiconductors, Intrinsic and Extrinsic semiconductors, Operation of PN Junction diode , Characteristics of PN Diode, Operation of Zener diode, Characteristics of Zener Diode, Overview of diode circuits, Operation of Half-wave rectifier, Half wave : Ripple factor Expression, Advantages, Disadvantages, Operation of Full-wave rectifier, Full wave : Ripple factor Expression, Advantages, Disadvantages, Bridge type rectifier operation, Comparison of rectifier circuits, Overview of filters and its uses, BJT construction, operation, BJT characteristics (CB, CE and CC configurations) and uses, JFET construction, operation, JFET characteristics (Drain and Transfer characteristics), Depletion mode and Enhancement mode MOSFET construction operation, MOSFET characteristics (Transfer and output characteristics), Problem Solving Session.

UNIT IV	MEASUREMENTS	12

Methods of measurements – Overview, Types of Measurements: Primary, Secondary, Tertiary, Basic principles and Classification of Instruments- Indicating, Recording and Integrating, Construction and working of PMMC, PMMC-Torque Equation, Advantages, Disadvantages, Construction and working of MI Instruments, MI (Attraction type)-Operation, MI Attraction type-Advantages , Disadvantages, MI (Repulsion type)- Operation, Torque Equation, MI (Repulsion type)- Errors, Advantages, Disadvantages, Overview of Instrument Transformers, Current Transformer, Potential Transformer, CRO, CRT, Operation of Dynamometer type watt meter, Advantages and Disadvantages, Operation of Induction type watt meter, Advantages and Disadvantages, Megger –Construction, Working, Measurement of Earth resistance

UNIT V	DIGITAL AND INTEGRATED DEVICES	12

Number systems, binary codes, Binary arithmetic, Boolean algebra, laws and theorems, Simplification of Boolean expression, Logic Gates and Operations, Simplification of Boolean expression, Problem Solving Session, SOP and POS Expressions, Standard forms of Boolean expression, Simplify using Boolean Expressions, Minterm and Maxterm, K-Map Simple Reduction Technique, Two, Three and Four Variable K-Map, Problem Solving Session, Half adder circuit, Full adder circuit, Flip-flops : RS , JK, T and D Flip-flops, A/D Converter-Successive Approximation , D/A Converter-Binary Weighted, Overview of Op-Amp, Op-Amp : Functional block & Types (Inverting, Non-inverting & differential amplifier).

LIST OF EXPERIMENTS	30

1. Verification of Kirchoff's Law
2. Verification of all Theorems,
3. Time Domain Analysis (RL, RC).

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4. Types of wiring (Flourescent lamp,Staircase ,godown wiring).
5. Demo of DC Machine & Parts
6. Demo of AC Machine & Parts.
7. Characteristics of semiconductors
8. Measurement of Ripple factor (Half-wave and Full-wave).
9. Characteristics of CB and CE configurations
10. Demo of PMMC and MI Meters.
11. Waveform verification using CRO.
12. Measurement of Energy using Single phase Energy meter.
13. Verification of Boolean expression using logic gates.
14. Reduction using Digital Logic Gates.
15. Design and test of Inverting and Non-Inverting Amplifier using IC741

Text Book (s)

1	R. Muthusubramanian, S. Salivahanan."Basic Electrical and Electronics Engineering, Tata McGraw-Hill, 2012

Reference (s)

1	Dash.S.S, Subramani.C, Vijayakumar.K, Basic Electrical Engineering, 1st ed.,Vijay Nicole, 2013.
2	Jegatheesan.R,Analysis of Electric Circuits, Tata McGraw-Hill; 2014.
3	P. S.Bimbhra ,Electrical Machinery,7th ed,. Khanna Publishers, 2011.
4	Moris M. Mano, Digital Design, 3rd ed.,Pearson, 2011.
5	Sawhney A.K., A Course in Electrical & Electronic measurements and Instrumentation,Dhanpat Rai and Co,2011.

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Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18ECS201J	DIGITAL ELECTRONICS	3	0	2	4

Prerequisite Course (s)

Basic Electrical and Electronics Engineering

Course Objective (s): The purpose of learning this course is to

1.	Simplify Boolean expressions using basic postulates of Boolean algebra.
2.	Synthesize the basic combinational circuits
3.	Synthesize the basic Sequential circuits
4.	Synthesize combinational and sequential logic using programmable logic devices.
5.	Synthesize the synchronous& asynchronous sequential circuits.

Course Outcome (s) (COs): At end of this course, the learners should be able to

CO1	Analyze the Boolean functions and Boolean Expressions
CO2	Analyze the combinational circuits
CO3	Analyze the sequential networks.
CO4	Analyze the characteristics and structure of different memory systems and programmable logic devices.
CO5	Analyze digital circuits by using hardware description languages.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	-	-	3	-	-	3	3	2
CO2	3	3	3	-	2	-	-	-	-	-	-	3	3	2
CO3	3	3	3	2	2	-	-	-	-	-	-	3	3	2
CO4	3	3	3	2	2	-	-	-	3	-	-	3	3	2
CO5	3	2	2	-	2	-	-	-	-	-	-	3	2	2
CO (Avg)	3	2.6	2.6	2	2	-	-	-	3	-	-	3	2.8	2

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

UNIT I	MINIMIZATION TECHNIQUES	9

Minimization Technique: Boolean postulates and laws –De–Morgan's Theorem –Minimization of Boolean expressions using Boolean laws and theorem –Standard Form, Canonical Form, –Sum of Products (SOP) –Product of Sums (POS) – Don't care conditions –Minimization of Boolean expressions up to 4 variables using Karnaugh map and Quine Mc Cluskey method.

UNIT II	COMBINATIONAL CIRCUITS	9

Design procedure: Half adder / subtractor –Full Adder / subtractor –Parallel binary adder/Subtractor –Carry Look Ahead adder –BCD adder-Multiplexer/ Demultiplexer–Decoder –Encoder–Parity generators -Parity checker –Code converters(BCD to Excess3 , BCD to Gray) –Magnitude Comparator.

UNIT III	SEQUENTIAL CIRCUITS	9

Latches, Flip flops –SR, D,JK, T and Master –Slave –Characteristic table and Equation –Application table –Edge and level Triggering –Realization of one flip flop using other flip flops –Serial Adder/Subtractor –Asynchronous Ripple counter –Synchronous counters (Up/Down counters)–Design of Synchronous counters –modulo n counter –Ring counter -Shift registers –Universal shift registers.

UNIT IV	MEMORY DEVICES AND PROGRAMMABLE LOGIC DEVICES	9

Classification of memories –ROM, PROM, EPROM, EEPROM, EAPROM, RAM-Static RAM Cell–Dynamic RAM cell, Programmable Logic Devices –Programmable Logic Array (PLA) –Programmable Array Logic (PAL)–Field Programmable Gate Arrays (FPGA) –Implementation of combinational logic circuits using ROM, PLA, PAL

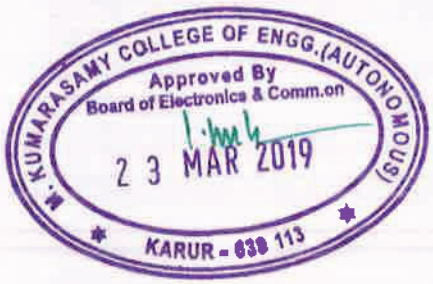
UNIT V	SYNCHRONOUS AND ASYNCHRONOUS SEQUENTIAL CIRCUITS	9

Synchronous Sequential Circuits: General Model –Classification –Analysis of Synchronous Sequential Circuits - Asynchronous Sequential Circuits: Design of fundamental mode circuits –races and hazards –Design of Hazard Free Switching circuits –Preface to VHDL programming Design of Combinational circuits using VHDL.

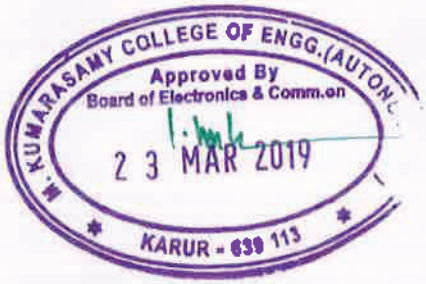
LIST OF EXPERIMENTS	15

1. Verification of Boolean theorems using digital logic gates.
2. Design and implementation of code converters for BCD to Excess-3 conversion and Excess-3 to Conversion
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MS devices.
4. Design and implementation of 2-bit and 8-bit magnitude comparator using MS devices.
5. Design and implementation of multiplexers and demultiplexers.
6. Design and testing of flip-flops using gates.
7. Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops.
8. Implementation of any combinational circuit design using FPGA.

9.Write VHDL coding for Combinational Circuits	
Text Book(s)	
1	M.Morris Mano and Michael D. Ciletti, "Digital Design: 5th Edition, Pearson Education Pvt. Ltd.,2012
2	S.Salivahanan and S.Arivazhagan, "Digital Circuits and Design", 4th Edition, Vikas Publishing House Pvt. Ltd, 2012
Reference (s)	
1	S K Mandal "Digital electronics" MC Graw Hill Education Private Limited, New Delhi , First Reprint 2016.
2	John F.Wakerly, "Digital Design: Principles and Practices", 4th Edition, Pearson/PHI, 2005.
3	John.MY arbrough, "Digital Logic Applications and Design", Thomson Learning, 1996
4	Douglas L Perry "VHDL:Programming by examples" Fourth Edition,Mc Graw-Hill publication,



Reference (s)	
1	Narayana Rao, N "Elements of Engineering Electromagnetics" 6th edition,Pearson Education, New Delhi, 2006.
2	G.S.N. Raju "Electromagnetic Field Theory & Transmission Lines" Pearson Education, 2006.
3	Ramo, Whinnery and Van Duzer "Fields and Waves in Communications Electronics" John Wiley & Sons, 3rd edition 2003.
4	William H.Hayt & John A Buck "Engineering Electromagnetics" TATA McGraw-Hill, seventh Edition 2007 .
5	E.C. Jordan & K.G. Balmain "Electromagnetic Waves and Radiating Systems"Pearson Education/PHI 4nd edition 2006.



Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC202J	ANALOG ELECTRONICS	3	0	2	4

Prerequisite Course (s)

Basic Electrical and Electronics Engineering

Course Objective (s): The purpose of learning this course is to:

1	Understand the Special semiconductor devices and Working methods of biasing of transistors.
2	Know technique for Midband analysis of amplifier circuits using small signal equivalent circuit.
3	Acquire knowledge on the method of calculating cutoff frequencies and to determine bandwidth.
4	Understand the high frequency analysis of amplifier circuits.
5	Study the design of power amplifiers and its characteristics.

Course Outcome (s) (COs): At end of this course, the learners should be able to

CO1	Review the stability factors of various biasing techniques used in BJT and FET.
CO2	Compute the hybrid model for different amplifiers.
CO3	Manipulate the high frequency analysis of single and multi-stage amplifiers.
CO4	Describe the hybrid model-π for different amplifiers.
CO5	Discuss the distortion and performance of different categories large signal amplifiers.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	1	1	-	3	2	-	3	3	2
CO2	3	3	2	-	-	1	1	-	-	2	-	3	3	2
CO3	3	3	2	-	-	-	-	-	-	2	-	3	3	2
CO4	3	3	2	-	-	-	-	-	3	2	-	3	3	2
CO5	3	3	2	-	-	1	1	-	3	2	-	3	3	2
CO (Avg)	3	3	2	-	-	1	1	-	3	2	-	3	3	2

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

UNIT I	TRANSISTOR BIAS STABILTY	9

BJT: Biasing, Q-Point, Variation of Q-Point, Stability factor. **Bias stability Concepts**: Fixed bias & collector to base bias of BJT - Voltage Divider bias of BJT - Source or self-bias of FET amplifier. **Bias Compensation:** Diode compensation - Thermistor & Sensistor compensation.

UNIT II	MIDBAND ANALYSIS OF SMALL SIGNAL AMPLIFIERS	9

Analysis of a Transistor amplifier using h-parameter model - Comparison of Transistor Amplifier Configurations - Simplified Calculation of CE model - Simplified Calculation of CB model - Small signal model of FET Amplifier: CS, CD - Comparison of BJT and FET model - **Methods of increasing input impedance**: Bootstrapping circuit - Darlington Circuit.

UNIT III	FREQUENCY RESPONSE OF AMPLIFIERS	9

Differential amplifier: Introduction - Emitter coupled differential amplifier circuit - Bisection theorem - Differential gain - CMRR - Use of constant current circuit to improve CMRR. **Multistage amplifier**: Different coupling schemes – Need for cascading - General expression for frequency response of multistage amplifiers - Calculation of overall upper and lower cutoff frequencies of multistage amplifiers - Amplifier rise time and sag and their relation to cutoff frequencies.

UNIT IV	HIGH FREQUENCY ANALYSIS OF AMPLIFIERS	9

General shape of frequency response of amplifiers - Effect of emitter bypass capacitor on low frequency response - Hybrid pi CE Transistor model - CE Short circuit Current gain obtained with the hybrid pi model - Current gain with resistive load - Emitter follower at High Frequencies – CS, CD amplifiers at High Frequencies - Gain Bandwidth Product.

UNIT V	LARGE SIGNAL AMPLIFIERS	9

Classification of Large signal amplifiers: Series fed Class A amplifier - Transformer-coupled Class A amplifier - Efficiency of Class A amplifiers - Second harmonic distortion, higher order harmonic distortion - Class B amplifier efficiency - push-pull amplifier - complementary-symmetry amplifier - Class AB Amplifier - Class C power Amplifier - MOSFET power amplifier - Thermal stability and heat sink - Distortions in power amplifier.

LIST OF EXPERIMENTS	15

1. Design and construct Fixed Bias amplifier circuit using BJT
2. Design and construct BJT Common Emitter Amplifier using voltage divider bias(self-bias)
3. Darlington Amplifier using BJT
4. Source follower with Bootstrapped gate resistance
5. Differential amplifier using BJT

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6. Common Source Amplifier 7. Common Drain Amplifier 8. Class A Power Amplifier 9. Class B Complementary Symmetry Power amplifier 10. Class C tuned Amplifier	
Text Book (s)	
1	Millman J and Halkias.C. Integrated Electronics, TMH, 2007.
2	S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, Electronic Devices and Circuits, 3rd Edition, Tata McGraw-Hill Education Pvt. Ltd, 2012
Reference (s)	
1	Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson Education / PHI, 2007.
2	David A. Bell, Electronic Devices & Circuits, 4th Edition, PHI, 2007
3	B.Rashid M, Microelectronics Circuits, Thomson Learning, 2007.
4	B.P. Singh and Rekha Singh, Electronic Devices and Integrated Circuits, Pearson Education, 2006.

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Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC205J	ANALOG INTEGRATED CIRCUITS	3	0	2	4

Prerequisite Course (s)

Basic Electrical and Electronics Engineering

Course Objective (s): The purpose of learning this course is to:

1	Identify the working concept of Feedback amplifiers.
2	Understand the various Tuned amplifier and Multivibrators circuits
3	Study the basic principles, configurations and practical limitations of op-amp.
4	Understand the operation of timer, PLL, basic D/A and A/D converter types.
5	Understand the special functions if IC's.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Summarize the concept of Feedback amplifiers.
CO2	Review the concepts of Wave shaping circuits and tuned amplifier.
CO3	Illustrate the op-amp's basic construction, characteristics, parameter limitations, various configurations and few applications of op-amp.
CO4	Analyze the timer circuits, PLL and Analog to digital and Digital to Analog Convertors.
CO5	Analyze the special functions of IC's.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	3	2	1	-	3	2
CO2	3	2	1	1	-	-	-	-	3	2	1	-	3	2
CO3	3	2	1		-	-	-	-	2	2	1	-	3	2
CO4	3	3	2	2	2	-	-	-	3	2	1	3	3	2
CO5	3	3	2	2	2	1	1	-	3	2	2	3	3	2
CO (Avg)	3	2.4	1.4	1.6	2	1	1	-	2.8	2	1.2	3	3	2

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

UNIT I	FEEDBACK AMPLIFIERS	9
Classification of basic amplifiers- Block diagram and transfer gain with and without feedback-Effects of negative feedback on Input and output Resistance-Classification of Oscillator- Condition for Oscillation-Analysis of LC oscillators: Hartley, Colpitt's-RC oscillators: Phase shift oscillator - Miller and Pierce Crystal oscillators.		
UNIT II	**TUNED AMPLIFIERS AND BLOCKING OSCILLATORS**	**9**
Introduction - Analysis of capacitor coupled Single tuned amplifier- Effect of cascading single tuned on bandwidth - Stagger tuned amplifiers - Neutralization methods. Diode Clippers, Clampers - Blocking Oscillator: Astable Blocking Oscillators with base timing and Emitter timing - Time base circuits: Voltage-Time base circuit.		
UNIT III	**OP-AMP AND ITS APPLICATIONS**	**9**
Basic Operational Amplifier - Characteristics of Op-Amp - Functional Block Diagram - Open and Closed loop configuration- DC characteristics and AC characteristics - Widlar Current Source – Wilson Current Source. Instrumentation amplifier - Log and Antilog amplifiers - Differentiator, Integrator - Comparators -Schmitt Trigger – Precision Rectifier – First order Low pass filter.		
UNIT IV	**TIMER, PLL, ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS**	**9**
Astable and Monostable Multivibrators using IC555 - Monolithic PLL IC565 – Voltage Controlled Oscillator. Sample and Hold circuit, D/A converter: Weighted Resistor type - R-2R Ladder type – Inverted R - 2R Ladder type. A/D Converters: Flash type - Successive Approximation type.		
UNIT V	**WAVEFORM GENERATOR & SPECIAL FUNCTION ICs**	**9**
Square Wave Generator- Triangular Wave Generator ,IC Voltage Regulators: Fixed and Adjustable Voltage Regulators - IC 723 general purpose regulator – Switching Regulator - Power amplifier and Isolation Amplifier - Opto-couplers.		

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LIST OF EXPERIEMNTS	15

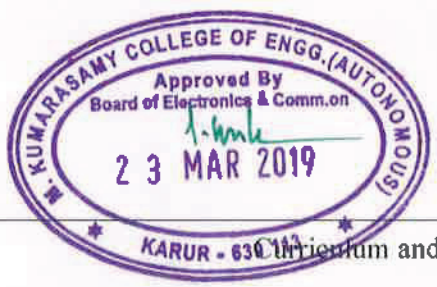
1. Voltage Feedback Amplifiers
2. Current Feedback Amplifiers
3. RC Phase Shift Oscillator
4. Colpitts Oscillator
5. Diode Clippers, Clampers
6. Differentiator using op-amp
7. Integrator using op-amp
8. Low pass filter using op-amp
9. PLL characteristics
10. Instrumentation amplifier using Op-Amp

Text Book (s)

1	D.RoyChoudhry, ShailJain,Linear Integrated Circuits,New Age International Pvt.Ltd. 4th edition,2010, Reprint, 2014.
2	Ramakant A.Gayakwad, OP-AMP and Linear ICs, Prentice Hall / Pearson Education, 4th Edition, 2001.

Reference (s)

1	Sergio Franco, Design with operational amplifiers and analog integrated circuits, 3rd Edition, Tata McGraw-Hill, 2007.
2	Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson Education / PHI, 2007.
3	David A. Bell, Electronic Devices & Circuits, 4th Edition, PHI, 2007
4	B.Rashid M, Microelectronics Circuits, Thomson Learning, 2007.
5	Microelectronic circuits -Adel Sedra and Kenneth C. Smith
6	Millman J and Halkias.C. Integrated Electronics, TMH, 2007.
7	S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, Electronic Devices and Circuits, 3rd Edition, Tata McGraw-Hill Education Pvt. Ltd, 2012



Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC208J	MICROPROCESSOR AND MICROCONTROLLER	3	0	2	4

Prerequisite Course (s)

Digital Electronics

Course Objective (s): The purpose of learning this course is to:

1	Study the Architecture of 8086 microprocessor.
2	Study about communication and bus interfacing
3	Study the Architecture of 8051 microcontroller
4	Study the interfacing in micro controller
5	Acquire the knowledge of embedded system design using MSP430 microcontrollers.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Design and implement programs on 8086 Microprocessor.
CO2	Design Memory Interfacing circuits.
CO3	Design and implement 8051 Microcontroller based systems
CO4	Able to discuss about the interfacing in Microcontroller
CO5	Identify the fundamental need of Low power embedded system

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	-	-	-	-	3	2	-	2	3	3
CO2	3	2	3	2	-	-	-	-	3	2	-	2	2	3
CO3	3	3	2	2	2	-	-	-	3	2	-	2	3	3
CO4	3	2	3	2	2	-	-	-	3	2	-	2	3	2
CO5	3	3	2	2	2	-	-	-	3	2	-	2	3	3
CO (Avg)	3	2	2.6	2	2	-	-	-	3	2	-	2	2.8	2.8

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

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UNIT I	8086 MICROPROCESSOR	9

Introduction to 8086 – Microprocessor architecture – Addressing modes - Instruction set and assembler directives – Assembly language programming – Modular Programming - Linking and Relocation - Stacks - Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II	8086 I/O INTERFACING	9

. Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – D/A and A/D Interface - Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display, LCD display, Keyboard display interface and Alarm Controller

UNIT III	8051 MICROCONTROLLER	9

Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.

UNIT IV	8051 INTERFACING MICROCONTROLLER	9

Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor and Waveform generation.

UNIT V	INTRODUCTION TO MSP430	9

Motivation for MSP430 microcontrollers- Low Power embedded systems, On-chip peripherals (analog and digital), low-power RF capabilities. MSP430 RISC CPU architecture, Compiler-friendly features, &Instruction set.

LIST OF EXPERIMENTS	15

1. Arithmetic and Logical Operation using 8086Microprocessor.
2. Programming with 8086- Code Conversion and Matrix Multiplication.
3. Interfacing with 8086-Parallel Communication Interface
4. Interfacing with 8086-Serial Communication Interface.
5. Interfacing of ADC/ DAC with8086
6. Interfacing with 8086 - Keyboard and Display Controller.
7. Interfacing with 8086 – Traffic lightcontroller

8. Arithmetic and Logical Operation using 8051Microcontroller.

9. Stepper motor Interfacing with 8051Microcontroller

Text Book(s)	
1	Yu-Cheng Liu, Glenn A.Gibson, "Microcomputer Systems: The 8086 / 8088 Family -Architecture, Programming and Design", Second Edition, Prentice Hall of India, 2007.
2	Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay , "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", Second Edition, Pearson education,2011.
3	Chris Nagy, Embedded Systems Design Using the TI MSP430 Series, Newnes publisher, 2003.
Reference (s)	
1	Kenneth Ayala, "The Microcontroller Architecture - Programming and Applications", 3rd Edition, Cengage Learning,2004.
2	N. Senthil Kumar, M. Saravanan, S. Jeevananthan "Microprocessors and Microcontrollers", 2nd Edition, Oxford Higher Education, 2018.
3	Douglas V.Hall and SSSP Rao, " Microprocessors and Interfacing", third edition , Tata Mc Graw Hill ,2012.

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Regulation 2018		Semester V	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC301J	DIGITAL SIGNAL PROCESSING	3	0	2	4

Prerequisite Course (s)

Signals and Systems

Course Objective (s): The purpose of learning this course is to:

1	Understand the concept of DFT and FFT algorithms.
2	Study the design methods of digital filters
3	Know the Quantization noise in digital filters.
4	Study the fundamentals of Multirate Digital Signal Processing
5	Study the Architecture concepts of digital signal processors.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Compute DFT and FFT algorithms
CO2	Design the FIR and IIR filters.
CO3	Understand the quantization noise in filters and avoiding.
CO4	Understand the Multirate Digital Signal Processing.
CO5	Understand the DSP Processors.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	-	-	-	-	-	-	-	3	2
CO2	3	3	3	3	1	-	-	-	-	-	-	-	3	2
CO3	3	3	2	2	2	-	-	-	-	-	-	-	3	2
CO4	3	3	3	3	2	-	-	-	-	1	-	-	3	2
CO5	3	2	1	-	-	-	1	-	-	1	-	1	3	2
CO (Avg)	3	2.8	2.2	2.5	1.7	-	1	-	-	1	-	1	3	2

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

UNIT I	DISCRETE FOURIER TRANSFORM	9

Discrete Fourier transform (DFT): Properties - Linear filtering using DFT - Filtering long data sequences: overlap save and overlap add method - Fast computation of DFT(FFT): Radix-2 Decimation-in-time (DIT), Decimation-in-frequency (DIF).

UNIT II	DESIGN OF DIGITAL FILTER	9

IIR FILTER: Design of IIR filters from analog filters (LPF, HPF) -Design of Digital Butterworth and Chebyshev filter using impulse invariance technique and bilinear transformations.

FIR FILTER:

Linear Phase FIR Filter characteristics - Design of Digital FIR Filter using windowing (LPF, HPF) Technique (Rectangular, Hamming, Hanning, Triangular) and frequency sampling method.

UNIT III	FINITE WORD LENGTH EFFECTS	9

Quantization noise : truncation and rounding error, derivation for quantization noise power , Direct & Cascade Form- Types of Quantization:input quantization error, product quantization error, coefficient quantization error – limit cycle oscillations and dead band - signal scaling.

UNIT IV	MULTIRATE DIGITAL SIGNAL PROCESSING	9

Introduction to Multirate signal processing- Interpolation and Decimation, Decimation by an integer factor - Interpolation by an integer factor - Sampling rate conversion by a rational factor - Multistage implementation of sampling rate conversion - Applications of Multirate signal processing.

UNIT V	DSP PROCESSORS	9

Features of DSP processors – Fixed point Vs floating point DSP processor – Memory architecture of a DSP processor: Von Neumann and Harvard – Architecture of TMS320C5x- instruction set – Addressing Modes – Architecture of TMS320C8x Processor- Application of DSPs

LIST OF EXPERIMENTS	15

1. Computation of DFT of a signal using basic equation and FFT & power spectrum estimation using DFT.
2. Spectrum Analysis using DFT
3. Compute Convolution for longer sequence
4. Design of IIR filters using bilinear transformation .
5. Design of FIR filter using windowing method .
6. Compute and calculate the dead band for a second order system.
7. Design and compute the upsampling and downsampling
8. Arithmetic operations in Processor

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9. Generation of square and saw tooth waveform s using Processor.	
Text Book (s)	
1	John G Proakis and Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson, Fourth Edition, 2007.(Recent Edition)
2	S.Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, TMH/McGraw Hill International, 2000. (Recent Edition)
Reference (s)	
1	S.K.Mitra- "Digital Signal Processing- A Computer based approach"- Tata McGraw-Hill- 2006- New Delhi.
2	Allan V.Openheim, Ronald W.Sehafer & John R.Buck –"Discrete Time Signal Processing", second edition-Pearson/Prentice Hall.
3	A.Nagoor Kani - "Digital Signal Processing", second edition-Tara Mcgraw hill Pearson.
4	B.Venkataramani & M-Bhaskar- Digital Signal Processor Architecture- Programming and Application-TMH 2003 (UNIT V).
5	P.Ramesh Babu – Digital Signal Processing-latest edition-TMH

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Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC304J	Digital Communication	3	0	2	4

Prerequisite Course (s)

Probability Theory and Random Process, Signals and Systems

Course Objective (s): The purpose of learning this course is to:

1	Know the principles of sampling and quantization
2	Study the various combating technique for ISI
3	Learn the various digital modulation schemes for Pass band data transmission
4	Know the fundamentals of channel coding schemes and spread spectrum technique

Course Outcome (s) (Cos): At the end of this course, learners will be able to:

CO1	Understand Pulse modulation technique
CO2	Analyze combating technique for baseband binary transmission
CO3	Summarize the various Digital Modulation Schemes
CO4	Identify the errors using channel coding schemes
CO5	Explain the spread spectrum modulation for effective spectrum utilization

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	1	-	-	3	2
CO2	3	2	2	2	2	-	-	-	-	-	-	-	2	2
CO3	2	3	2	-	2	-	-	-	-	-	-	-	3	2
CO4	3	2	2	2	1	1	1	-	-	1	-	1	2	2
CO5	2	2	2	2	-	1	-	-	-	-	-	1	3	2
CO (Avg)	2.6	2.4	2.2	2	1.7	1	1	-	-	1	-	1	2.6	2

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

UNIT I	PULSE MODULATION	9
Sampling Process – Quantization process – PAM, PWM, PPM - PCM - Noise considerations in PCM Systems – Differential pulse code modulation -Delta modulation - Adaptive Delta Modulation- TDM - Digital multiplexers		
UNIT II	**BASEBAND PULSE TRANSMISSION**	**9**
Matched Filter – Inter symbol Interference - Nyquist's criterion for Distortion less Base band Binary Transmission - Correlative level coding – Adaptive Equalization –Eye patterns		
UNIT III	**PASS BAND DATA TRANSMISSION**	**9**
Introduction – Pass band Transmission model- Generation, Detection, Signal space diagram, bit error probability and Power spectra of BPSK, QPSK, QAM, MSK, FSK schemes – Comparison of Digital modulation systems using a single carrier		
UNIT IV	**ERROR CONTROL CODING**	**9**
Linear block codes - Cyclic codes - Convolutional codes – Maximum likelihood decoding of convolution codes - Viterbi Algorithm -Turbo Codes		
UNIT V	**SPREAD SPECTRUM MODULATION**	**9**
Pseudo- noise sequences –spread spectrum – Direct sequence spread spectrum with coherent binary phase shift keying – Signal space Dimensionality and processing gain –Probability of error – Frequency hop spread spectrum –Maximum length and Gold codes		

LIST OF EXPERIMENTS — **15**

1. Verification of Sampling theorem
2. Study of Pulse analog modulation (PAM, PWM and PPM)
3. Design and implementation of PCM and DPCM
4. Design and Implementation of Delta modulator
5. Design and implementation of ASK, FSK and PSK
6. Simulation of Duo binary Signaling
7. Simulation of BPSK Modulation and Demodulation
8. Simulation of QPSK Modulation and Demodulation
9. BER Analysis of BPSK and QPSK over AWGN
10. Study of linear block code error control coding technique

Text Book (s)

1	Simon Haykin, "Digital Communication Systems" John Wiley, 4th Edition, 2013
2	John G. Proakis, "Digital Communication" McGraw Hill 5e Edition, 2008

Reference (s)

1	Bernard Sklar and Pabitra Kumar Ray, Digital Communications: Fundamentals & Applications, 2/E, Pearson Education, 2009
2	Sam K. Shanmugam "Analog and Digital Communication" John Wiley, 2006
3	Taub and Schilling, "Principles of Digital Communication" Tata Mc Graw Hill, 28th Reprint 2013

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Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ECC305J	MICROWAVE ENGINEERING	3	0	2	4

Prerequisite Course (s)

Transmission Lines and Wave Guides

Course Objective (s): The purpose of learning this course is to:

1	Know the concepts of waveguide components
2	Understand the Microwave tubes
3	Study Microwave semiconductor devices
4	Become familiar with the concepts of Microwave measurements
5	Study the microwave applications

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Describe the various waveguide components
CO2	Discuss the Microwave sources
CO3	Describe the operation of Microwave semiconductor devices.
CO4	Analyze the microwave measurements
CO5	Identify the concepts of microwave and its applications

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	1	-	-	-	-	3	3	3	3
CO2	3	2	2	3	2	1	-	-	-	-	1	3	3	2
CO3	2	2	2	2	2	1	-	-	-	-	2	2	1	2
CO4	3	3	2	3	2	1	-	-	-	-	3	3	3	1
CO5	2	2	1	2	2	1	-	-	-	-	1	2	2	1
CO (Avg)	2.6	2.4	1.8	2.6	2.2	1	-	-	-	-	2	2.6	2.4	1.8

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

UNIT I	MICROWAVE NETWORK THOERY AND MICROWAVE COMPONENTS	9

Microwave frequencies, Microwave Devices, Microwave systems, Microwave units of measure. S parameters, Microwave Hybrid circuits: Waveguide Tees, Magic Tees, Hybrid Rings and Waveguide Corners, Bends, Twists. Directional Couplers: S Matrix of a Directional Coupler. Hybrid Couplers. Microwave Circulators and Microwave Isolators.

UNIT II	MICROWAVE TUBES	9

Klystrons: Reentrant Cavities, Velocity modulation Process, Bunching Process, Output Power and beam loading – Multicavity Klystron Amplifiers - Reflex Klystrons: Velocity modulation, Power Output and efficiency, Electronic Admittance - Helix Traveling Wave Tubes: Slow Wave structures, Amplification Process, Convection Current, Axial Electric Field, Wave Modes, Gain Consideration

UNIT III	MICROWAVE SEMICONDUCTOR DEVICES	9

Gunn Effect Diodes - GaAs Diode – Ridely Watkins Hilsum (RWH) Theory: Differential Negative Resistance, Two Valley Model Theory and High Field Domain - Modes of Operation - Read Diode - IMPATT Diodes - TRAPATT Diodes - BARITT Diodes - Parametric Devices: Physical Structures, Nonlinear Reactance and Manley Rowe Power Relations, Parametric Amplifiers, Applications

UNIT IV	MICROWAVE MEASUREMENTS	9

Spectrum Analyzer, Network Analyzer, Power measurements, Bolometer Sensor, Power Meter, Thermocouple sensor, High power measurement by the calorimetric method - Insertion loss and Attenuation measurements – VSWR Measurements - Return loss measurement by Reflectometer – Impedance Measurement – Frequency Measurement

UNIT V	APPLICATIONS OF MICROWAVES	9

Microwave Radar Systems, The Radar Equation, Duplexer, Pulsed Radar, CW Radar, Tracking Radars, Microwave Communication Systems, Terrestrial Systems, Satellite Communication Systems, Industrial Application of Microwaves, Microwave Heating, Industrial Control and Measurements, Thickness Measurements, Moisture Content Measurements, Medical Applications

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LIST OF EXPERIMENTS	15

1.Characteristics of Reflex Klystron Oscillator.

2. Characteristics of Gunn diode Oscillator.

3. Study of Power Distribution in directional coupler.

4. Study of power distribution in E / H -Plane Tee, Magic Tee.

5. VSWR Measurements – Determination of terminated impedance.

6. Radiation Pattern of Horn antenna.

7. Determination of guided wavelength, frequency measurement.

8. Measurement of load Impedance using slotted line method and calculate using smith chart.

9. Characteristics of Circulator and Isolator.

Text Book (s)	
1	Samuel Y. Liao, "Microwave Devices and Circuits" Third Edition, Pearson India, 2011.
2	Annapurna Das and Sisir K Das, "Microwave Engineering", TMH, New Delhi, 2008
Reference (s)	
1	David M.Pozar, "Microwave Engineering", Fourth Edition, Wiley, 2011.
2	G.P.Srivastava, V.L.Gupta, "Microwave Devices and Circuit Design", Prentice Hall India Private Limited, First Edition, 2006.

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Regulation 2018		Semester __	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18ECE001J	VLSI Design	3	0	2	4

Prerequisite Course (s)

Digital Electronics, Integrated Circuits

Course Objective (s): The purpose of learning this course is to:

1	Understand the CMOS Fabrication Process and CMOS Circuits.
2	Study CMOS Circuits using various Logic Styles.
3	Provide basic knowledge about FPGA and VLSI System Design.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Analyze of MOS Circuit Design Process.
CO2	Design and expose the CMOS circuits using various logic styles.
CO3	Analyze of CMOS circuit Characterization
CO4	Design Strategies for CMOS testing
CO5	Model the digital system using Verilog Hardware Description Language.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	-	-	1	1	-	-	-	2	3	1
CO2	3	3	2	2	2	-	1	1	-	-	-	2	3	1
CO3	3	3	2	2	-	-	1	1	-	-	-	2	3	1
CO4	3	3	2	2	-	-	1	1	-	-	-	2	3	1
CO5	3	3	2	2	3	-	1	1	-	-	-	2	3	2
CO (Avg)	**3**	**3**	**2**	**2**	**2.5**	-	1	1	-	-	-	**2**	**3**	**1.4**

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

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UNIT I	MOS TRANSISTOR THEORY	9

CMOS Technology: n-well, p-well - Twin tub and SOI Process- VLSI Layout Design: Layout design rules- Lambda Design Rules- Stick Diagram: examples. MOS Transistor Theory: Basic MOS transistors: symbols, Enhancement mode transistor operation – Second order effects – Small signal AC characteristics - NMOS inverter - Determination of pull up to pull down ratio - CMOS inverter - DC Characteristics.

UNIT II	CMOS LOGIC STYLES AND PROGRAMMABLE DEVICE	9

CMOS Logic Styles: Pass Transistor and Transmission Gate - Static CMOS design - Pseudo NMOS -dynamic CMOS logic - Clocked CMOS logic – domino CMOS logic.

FPGA: Field Programmable gate arrays- Logic blocks, routing architecture, Design flow technology -mapping for FPGAs, Xilinx XC4000

UNIT III	CMOS CIRCUIT CHARACTERIZATION	9

Switching Characteristics: analytical delay model-Empirical delay model- Gate delays - Power dissipation: Static Dissipation- Dynamic Dissipation- Short circuit Dissipation-Total Power Dissipation- charge sharing- Design margining- Reliability.

UNIT IV	TESTING	9

Need for testing- Manufacturing Test Principles -Design Strategies for Test: Design for Testability – Ad-hoc Testing – Scan based test Techniques- System level test techniques.

UNIT V	VERILOG HDL DESIGN	9

Basic concepts- identifiers- gate primitives, gate delays, operators, timing controls, procedural assignments conditional statements, Data flow and RTL, structural gate level switch level modeling, Design hierarchies, Behavioral and RTL modeling, Test benches, Structural gate level description of decoder, equality detector, comparator, priority encoder, half adder, full adder, Ripple carry adder, D latch and D flip flop.

LIST OF EXPERIMENTS	15

1. Verilog HDL based design entry and simulation of combinational circuits (4-bit min).
2. Verilog HDL based design entry and simulation of sequential circuits.
3. Verilog HDL based design entry and simulation of state machine.
4. Synthesis, P&R and post P&R simulation of 4-Bit Serial Adder.
5. Synthesis, P&R and post P&R simulation of 4-Bit Parallel Adder/Subtractor.
6. Design and Synthesis of 4-Bit Multiplier using Xilinx ISE Simulator.
7. Basic logic gates using T-Spice Tool.

8. Design and simulation of a simple five transistor differential amplifier using T-spice and measure gain, ICMR, and CMRR. 9. Design a Real Time Clock and Demonstrate its Working on The FPGA Board. 10. Design and Testing of 8-Bit ALU on FPGA Board.	
Text Book (s)	
1	Neil H E Weste and Kamran Eshranghian, "CMOS VLSI Design: A system Perspective", Addission Wesley, Third Edition, 1994.
2	John P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Magic International Pvt. Ltd., 2014.
Reference (s)	
1	A.Pucknell, Kamran Eshraghian, "Basic VLSI Design", Third Edition, Prentice Hall of India, 2007.
2	Weste and Harris: CMOS VLSI Design (Third edition) Pearson Education, 2005
3	J. Bhaskar, "A Verilog HDL Primer", B. S. Publications, 2011.
4	M.J.S.Smith: Application specific integrated circuits, Pearson Education, 1997
5	John V.Oldfield, Richard C Dore, "Field Programmable Gate Arrays", Wiley Publications1995.

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Regulation 2018		Semester__	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18ECE002J	EMBEDDED SYSTEM DESIGN	3	0	2	4

Prerequisite Course (s)

Microprocessor and Microcontroller

Course Objective (s): The purpose of learning this course is to:

1	Study ARM Embedded systems and processor fundamentals
2	Learn ARM Organizations, Implementations and Processor cores
3	Understand ARM CPU cores and the AMULET asynchronous ARM processors
4	Enumerate the idea of EMBEDDED communication protocols and RTOS
5	Study system debugging and few applications of embedded systems

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Acquire knowledge about ARM Embedded systems and processor fundamentals
CO2	Perform ARM Organizations, Implementations and Processor cores.
CO3	Learn the concepts of ARM CPU cores and the AMULET asynchronous ARM processors.
CO4	Understand the concepts of EMBEDDED communication protocols and RTOS.
CO5	Understand the concepts of system debugging and few applications of embedded systems

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	-	-	-	1	1	-	-	-	-	3	-
CO2	3	2	1	-	-	-	1	1	-	-	-	-	3	-
CO3	3	2	1	-	-	-	1	1	-	-	-	-	3	-
CO4	3	2	1	1	-	-	1	1	-	-	-	1	3	1
CO5	3	2	1	1	1	-	1	1	-	-	-	1	3	1
CO (Avg)	3	1.8	1	1	1	-	1	1	-	-	-	1	3	1

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

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UNIT I	ARM EMBEDDED SYSTEMS AND PROCESSOR FUNDAMENTALS	9
The RISC Design Philosophy-Embedded System Hardware- Embedded System Software-Pipeline, Exceptions, Interrupts and Vector table-Core Extensions-ARM Instruction Set –Thumb Instruction Set.		
UNIT II	**ARM ORGANIZATIONS, IMPLEMENTATION AND PROCESSOR CORES**	**9**
ARM Organization: Three Stage Pipeline, Five Stage Pipeline - ARM Instruction Execution-**ARM Implementation:** ARM 6 ALU Structure, ARM High Speed Multiplier-Control Structure. **ARM Processor Cores:** ARM7TDMI-ARM8- ARM9TDMI-ARM10TDMI.		
UNIT III	**ARM CPU CORES AND THE AMULET ASYNCHRONOUS ARM PROCESSORS**	**9**
The ARM710T, ARM720T and ARM740T-ARM810-The Strong-Arm SA-110-The ARM920T and ARM940T-ARM946E-S and ARM966E-S-ARM1020E-Self-timed design-AMULET1-AMULET2-AMULET2e-AMULET3-The DRACO telecommunications controller.		
UNIT IV	**EMBEDDED COMMUNICATION PROTOCOLS**	**9**
Serial communication protocols: I^2C-USB-CAN Parallel communication protocols: PCI-X, ARM Bus Serial Peripheral Interface, Inter Integrated Circuits - Ethernet, Universal serial Bus - Controller Area Network, ISA / PCI Bus protocols.		
UNIT V	**SYSTEM DEBUGGING AND APPLICATIONS**	**9**
Debugging Features, Core Sight, Debug Modes, Debugging Events, Breakpoint, Accessing Register and Debugging Components, **Applications:** Telephone answering machine, Engine control unit ,Video accelerator		
	LIST OF EXPERIMENTS	**15**

ARM EXPERIMENTS:

1. Study of ARM LPC2148.
2. Interface - Flashing of LEDS, Keypad and LCD.
3. Interfacing EEPROM using I2C.
4. Interfacing Stepper motor.
5. Serial communication (UART) – Zigbee.
6. Interrupts Programming.
7. interfacing temperature sensor and upload the data in cloud through WiFi
8. interfacing pH sensor with ARM and testing the results in mobile phone through Bluetooth
9. interfacing ultrasonic sensor with ARM and measure the distance of the obstacle
10. AI with IoT based on ARM architecture for testing any sensor data with cloud.

Text Book (s)

1	Andrew N.SLOSS, Dominic SYMES and Chris WRIGHT "ARM System Developer Guide Designing and Optimizing System Software" Elsevier 2004
2	Steve Furber "ARM System-on-Chip Architecture" second edition PEARSON

3	Andrew N. Sloss Dominic Symes Chris Wright, "ARM System Developer"s Guide Designing and Optimizing System Software", Elsevier Inc 2010.
4	"The Definitive Guide to the ARM Cortex-M" Joseph Yiu, Elsevier- Newness, 2014
Reference (s)	
1	Dr.K.V.K.K Prasad "Embedded/Real-Time Systems: Concepts,Design & Programming" Dreamtech Press.
2	Raj Kamal "Embedded Systems Architecture, Programming and Design" Second Edition TATA McGRAW HILL
3	Shibu K.V, "Introduction to Embedded Systems", Mc Graw Hill.
4	Wayne Wolf, "Computers as Components - Principles of Embedded Computing System Design", Morgan Kaufman Publishers, First Indian Reprint, 2001.
5	David E.Simon, "An Embedded Software Primer", Pearson Education Asia, New York 2000.
6	Peter Barry Patrick Crowley "Modern Embedded Computing Designing Connected, Pervasive, Media-Rich Systems", Elsevier, 2012

Regulation 2018		Semester __	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18ECE005J	COMPUTER NETWORKS	3	0	2	4

Prerequisite Course (s)

Digital Electronics

Course Objective (s): The purpose of learning this course is to:

1	Build an understanding of the fundamental concepts of computer networking.
2	Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
3	Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Enumerate the Data Communications System, Layers of the Network models and their flow and error control methods.
CO2	Illustrate the functions of MAC layer and the IEEE standards of LAN and Wireless LAN.
CO3	Identify the different types of network devices and routing protocols and their functions
CO4	Interpret the skills of sub-netting, Transport control and Congestion control mechanisms
CO5	Infer the applications, and how they can be used to assist in network design and implementation.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	2	1	-	-	-	-	-	-	2	2
CO2	3	2	-	-	2	1	-	-	-	-	-	-	2	2
CO3	3	2	-	-	2	1	-	-	1	1	-	1	3	2
CO4	3	2	2	1	2	1	-	-	-	-	-	-	3	2
CO5	3	2	1	-	2	1	-	1	-	-	-	1	3	2
CO (Avg)	2.6	2	1	1	2	1	-	1	1	1	-	1	2.6	2

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

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UNIT I	NETWORK ARCHITECTURE AND DATA LINK LAYER	9

Introduction: Overview of data communication-Topology – Protocols and standards - OSI architecture,TCP/IP Model-Introduction to data link layer-Error detection and correction-Flow Control: Stop and Wait – Error Control: Sliding window protocols (Go back N ARQ, Selective repeat ARQ).

UNIT II	MEDIUM ACCESS SUBLAYER	9

Medium Access layer: Random access - Controlled access - Wired LAN - IEEE 802.3: Standard Ethernet , Fast Ethernet, Gigabit Ethernet IEEE 802.4: Token Ring - IEEE 802.5: Token Bus - Virtual LANs-IEEE802.11-Bluetooth.

UNIT III	INTERNETWORK LAYER AND ROUTING ALGORITHMS	9

Connecting devices: Repeaters, Hubs, Switches and Gateways -Circuit switching- Packet switching - IPv4 - IPv6 – Address Mapping: ARP- Error Reporting: ICMP- Subnetting – Routing: Distance Vector Routing (RIP) – Link State Routing (OSPF) -Multicast routing: DVMRP-MOSPF.

UNIT IV	TRANSPORT LAYER	9

Process–to-Process delivery-User Datagram Protocol (UDP) –Transmission Control Protocol (TCP) – Stream Control Transmission Protocol(SCTP)- Congestion Control – Quality of services (QoS) – Techniques to improve QoS-Integrated services –Differential services.

UNIT V	APPLICATIONLAYER AND NETWORK SECURITY	9

Domain Name Space (DNS) - E-Mail-FTP- HTTP and SMTP- VoIP-TELNET-Security–Symmetric key Cryptography : DES, Triple DES, Asymmetric key Cryptography:RSA, Diffie Hellman, Firewalls.

LIST OF EXPERIMENTS	15

1. Implementation of Ethernet LAN Protocol for Star, Bus and Ring topology using Cisco Packet Tracer
2. Implement three nodes point – to – point network with duplex links between them. Set the queue size, vary the bandwidth and find the number of packets dropped
3. Implementation of Stop and wait protocol & sliding window protocol
4. Simulation of Go Back N protocol and Selective repeat protocols
5. Implementation of Distance vector routing algorithm using Cisco Packet Tracer
6. Implementation of Link state routing algorithm using Cisco Packet Tracer
7. Implementation of Transmission control protocol in sensor network
8. Implementation of Congestion control using leaky bucket algorithm
9. Implementation of Error detection and Error correction techniques
10. Implementation of Data encryption and decryption.

Text Book (s)	
1	Behrouz Foruzan, Data communication and Networking, Tata McGraw-Hill, 2013,5th edition.
2	James .F. Kurouse & W. Rouse, "Computer Networking: A Topdown Approach Featuring", Pearson Education,2006

Reference (s)	
1	Stallings.W, "Data and Computer Communication", Pearson Education, 10th Edition, 2013.
2	J.F.Kurkose& K.W.Rose,"Computer Networking-A top down approach", Pearson Education, 7th Edition, 2017.
3	Ed Tittle," Schaum's outlines - Computer Networking", McGraw Hill Professional, 2002.
4	Srinivasan Keshav, "An Engineering Approach to Computer Networking", Addision Wesley Professional, 2010.
5	Andrew S.Tanenbaum, David Wetherall, "Computer Networks", Pearson Education, 5th Edition, 2013.

Regulation 2018		Semester __	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18ECE009J	INTERNET OF THINGS	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s): The purpose of learning this course is to:

1	Introduce evolution of internet technology and need for IoT.
2	Discuss on IoT reference layer and various protocols and software
3	Train the students to build IoT systems using sensors, single board computers and open source IoT platforms.
4	Make the students to apply IoT data for business solution in various domain in secured manner.
5	Providing IoT Solutions with sensor-based application through embedded system platform

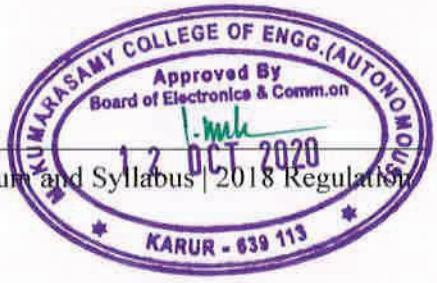
Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Identify the IoT networking components with respect to OSI layer.
CO2	Evaluate IoT solutions, design and develop IoT based sensor systems.
CO3	Analyze the IoT protocols and software.
CO4	Examine the wireless technologies for IoT.
CO5	Demonstrate the ideas of Developing IoT Solutions

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	-	-	-	-	-	1	-	2	3	2
CO2	3	3	2	-	1	1	-	-	-	1	-	2	3	2
CO3	3	3	2	-	-	-	-	-	-	1	-	2	3	2
CO4	3	3	2	1	1	-	-	1	-	1	-	2	3	2
CO5	3	3	2	1	-	1	1	1	-	1	-	2	3	2
CO (Avg)	3	3	2	1	1	1	1	1	-	1	-	2	3	2

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



UNIT I	EVOLUTION OF IoT	9
Review of computer communication concepts (OSI layers, components, packet communication, Networks, TCP-IP, subnetting, IPV4 addressing and challenges). IPV6 addressing. IoT architecture reference layer.		
UNIT II	**INTRODUCTION TO IoT COMPONENTS, PROTOCOLS AND SOFTWARES**	**9**
Characteristics IoT sensor nodes, Edge computer, cloud and peripheral cloud, single board computers, open source hardware, Examples of IoT infrastructure, MQTT, UDP, MQTT brokers, publish subscribe modes, HTTP, COAP, XMPP and gateway protocols.		
UNIT III	**IoT POINT TO POINT COMMUNICATION TECHNOLOGIES**	**9**
IoT Communication Pattern,IoT protocol Architecture, Selection of Wireless technologies (6LoWPAN, Zigbee, WIFI, BT, BLE,SIG,NFC, LORA).		
UNIT IV	**IoT SECURITY**	**9**
Need for encryption, standard encryption protocol, light weight cryptography, Quadruple Trust Model for IoT-A – Threat Analysis and model for IoT-A, Cloud security.		
UNIT V	**DEVELOPING IoT SOLUTIONS**	**9**
Introduction to IoT tools, developing applications through IoT tools, Developing sensor-based application through embedded system platform and Artificial Intelligence (AI). Case studies: IoT for smart cities, health care, agriculture, Industrial IoT, Industry 4.0.		
	LIST OF EXPERIMENTS	**15**

1. Connect Arduino board and glow LED, Read analog and digital sensors such as relay, temperature, Humidity.
2. Load the OS in Raspberry pi.
3. Interface with Bluetooth and transmit sensor data to other node.
4. Interface with Zigbee and transmit sensor data to other node.
5. Mobile app to display cloud data.
6. Measure the light intensity in the room and output data to the web API.
7. Control your home power outlet from anywhere using raspberry pi, zigbee and Arduino.
8. Drinking water monitoring and analytics, consists of IoT device, cloud, and mobile and web app.

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Text Book (s)	
1	Alessandro Bassi, Martin Bauer, Martin Fiedler, Thorsten Kramp, Rob van Kranenburg, Sebastian Lange, Stefan Meissner, "Enabling things to talk – Designing IoT solutions with the IoT Architecture Reference Model", Springer Open, 2016.
2	Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, "From Machine to Machine to Internet of Things", Elsevier Publications, 2014.
Reference (s)	
1	LuYan, Yan Zhang, Laurence T. Yang, Huansheng Ning, The Internet of Things: From RFID to the Next-Generation Pervasive Network, Aurbach publications, March,2008.
2	Vijay Madisetti , Arshdeep Bahga, Adrian McEwen (Author), Hakim Cassimally "Internet of Things A Hands-on-Approach" Arshdeep Bahga & Vijay Madisetti, 2014.

Regulation 2018		Semester __	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18ECE021J	FIBER OPTIC COMMUNICATION	3	0	2	4

Prerequisite Course (s)

Analog communication, Digital communication

Course Objective (s): The purpose of learning this course is to:

1	Study about the various optical fiber modes, configuration of optical fibers
2	Analyze the signal degradation factors coupled with optical fiber
3	Learn the various optical source and photonic crystal in the optical communication system
4	Examine the optical receivers and their uses
5	Discuss about digital transmission and its related parameters on system performance

Course Outcome (s) (COs): At the end of this course, learners will be able to:

CO1	Realize basic elements in optical fibers, different modes and configurations.
CO2	Summarize the signal degradation factors in optical fibers
CO3	List the characteristics of LED and Laser diodes structures
CO4	Discuss the error sources in optical detectors
CO5	Describe the different types of digital transmission systems

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	1	-	1	3	2
CO2	3	2	1	1	1	-	-	-	-	-	-	-	3	2
CO3	3	2	1	-	1	-	-	-	-	-	-	-	3	2
CO4	3	2	1	1	1	-	-	-	-	-	-	-	3	2
CO5	3	2	1	-	-	-	-	-	-	-	-	-	3	2
CO (Avg)	3	2	1	1	1	-	-	-	-	1	-	1	3	2

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

UNIT I	INTRODUCTION TO OPTICAL FIBERS	9

Elements of an Optical fiber Transmission link - Ray theory transmission - Total internal reflection, Acceptance angle, Numerical Aperture, Optical Fiber Modes and Configurations- skew rays-Mode theory of circular wave guide - Overview of Modes, Key Modal Concepts-Linearly Polarized Modes -Single Mode Fibers, Graded Index fiber structure

UNIT II	SIGNAL DEGRADATION IN OPTICAL FIBERS	9

Attenuation -Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses, Signal Distortion in Optical Wave guides-Information Capacity determination-Group Delay-Material Dispersion, Wave guide Dispersion, ISI , Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers-Mode Coupling Design Optimization of SM fibers, RI profile and cut-off wavelength-Mode filed Diameter

UNIT III	OPTICAL SOURCES AND PHOTONIC CRYSTAL	9

LED's- Modulation Of LED, Quantum efficiency and LED power, LASER Diodes: Modulation of LASER diodes - Rate equations -External Quantum efficiency -Temperature effects -Power Launching and Coupling: Source to fiber power launching - Lensing Schemes for Coupling improvement - Fiber Optical Sources and Coupling - Fibre- to-Fibre joints - Fiber splicing. Principle of Photonic crystal, Guidance mechanism: Index guiding PCF, Photonic band gap PCF, All solid photonic Bandgap PCF, Hybrid PCF, Applications Of PCF in sensing.

UNIT IV	FIBER OPTICAL RECEIVERS	9

PIN Photo detector -Schottky -Barrier Photodiodes -Avalanche Photodiodes - Photo detector noise -Detector response time - Avalanche multiplication of Noise-Temperature effects on Photo Detectors-Phototransistors -Fundamental Receiver operation-preamplifiers-Error Sources-Receiver configuration -Probability of error-Quantum limit

UNIT V	DIGITAL TRANSMISSION SYSTEMS	9

Point to point link systems considerations -Link Power budget-Rise time budget-Noise effects on system performance - Operational principles of Wavelength division multiplexing (WDM)–Solitons -Erbium doped fiber Amplifier (EDFA's)-Basic on concepts of SONET/SDH Network-application of OFC-CATV.

LIST OF EXPERIMENTS	15

1. Measurement of Numerical Aperture and Coupling efficiency (Angular and Lateral) in Optical Fiber.
2. Attenuation losses and Bending losses in single mode optical fiber.
3. DC Characteristics of LED Diode.
4. DC Characteristics of LASER Diode.
5. DC Characteristics of PIN Diode.
6. Study of Data Communication using Single Mode Fiber Optic System.

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7. Pulse Width Modulation and Demodulation using fiber optic System.

8. Transmission of different wavelengths using WDM and De-Multiplexing.

9. Transmission and Reception of TDM signals using fiber optic System.

10. Eye pattern measurement.

Text Book (s)	
1	Gerd Keiser,"Optical Fiber Communication",Fifth Edition, Tata Mc Graw Hill, 2007
2	John M. Senior,"Introduction to Optical Fiber Communications", Pearson / Prentice Hall
Reference (s)	
1	Palais,"Fiber optic communications", Fifth Edition, Pearson, 2005
2	Agarwal.G.P, "Fiber Optic Communication systems", Second Edition, John Wiley & Sons, NY, 1997.
3	Harry J.R Dutton, "Understanding Optical Communications", IBM Corporation, International Technical Support Organization.
4	J.Gower, "Optical Communication System ", Prentice Hall of India, 2001.

Regulation 2018		Semester ___	Total Hours			60
Category	Course Code	Course Name	Hours / Week			
			L	T	P	C
E	18ECE036J	Database Management Systems	2	0	2	3

Prerequisite Course (s)
NIL

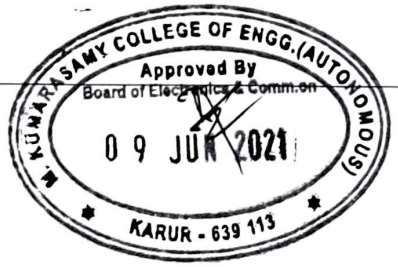
Course Objective (s):	
1	Utilize the appropriate and efficient SQL select operations to organize and retrieve the data from the databases
2	Assess the data by the constraints and relational algebra operations.
3	Decide database storage and accessing techniques
4	Utilize NoSQL data modeling from application specific queries
5	Provide scalability and flexibility along with a powerful querying system.

Course Outcome (s) (COs):	
CO1	Identify the database concepts, structures and query language to maintain the data
CO2	Describe and develop Relational Algebra and Relational Calculus queries
CO3	Apply indexing methods in databases
CO4	Identify the differences between the relational and NoSQL databases.
CO5	Identify mongoDB aggregation framework, and mongoDB with Python

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO 12	PSO1	PSO2
CO1	1	3	3	3	3	-	-	2	2	1	2	3	3	1
CO2	2	3	3	3	3	-	-	2	2	1	2	3	3	1
CO3	1	3	3	3	3	-	-	2	2	1	2	3	1	1
CO4	1	3	3	3	3	-	-	2	2	1	2	3	1	3
CO5	2	3	3	3	3	-	-	2	2	1	2	3	1	3
CO (Avg)	1.3	3	3	3	3	-	-	2	2	1	2	3	2	2

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



UNIT I	Data Management and Modelling	9

Introduction to Database, SQL Databases, Relational Model, Creating Database and dropping database in MySQL, MySQL – Datatypes Numeric Data types, MySQL – Date, Time, String Types, DML – Inserting Data in table, DML – Inserting multiple Data in database, DML – Selecting Data from table, Primary Key, Foreign Key, MySQL Functions – Min, Max, MySQL Functions – Count, Average, Sum, Update, Where, delete clause

UNIT II	Database Languages	9

MySQL – Like, IN, BETWEEN Operator, MySQL –Logical Operators, MySQL –Arithmetic Operators, MySQL – Comparison and bitwise operators, MySql Functions – char length,concat, format, Length, left, right, Lower, upper, reverse, replace, Strcmp, substr, trim, ucase, lcase, Math Functions : ABS, ACOS, ASIN, count, log, pow, MySQL Joins, Inner Join and Cross Joins, Right Join, Left Join, Union and Union All

UNIT III	System Architecture	9

MySQL – Group by, Having, MySQL – Exists, Index -Creating indexes, Dropping indexes, Creating procedures, Execute a procedure, Creating triggers, show triggers, Dropping triggers, NOSQL – Mongo db overview, Data modelling and creating and dropping databases, Create and drop collections, Data types in NOSQL

UNIT IV	NoSQL Databases	9

Query Document, update document, Delete document, projection, Limit records, Sort records and indexing, Mongo db – Aggregation, Mongodb – Replication, In-Memory and On-Disk Key-Value Database, Features of Key-Value Databases, How to Construct a Key, Using Keys to Locate, Hash Functions, Key-Value Database Data Modeling Terms, key data types, Value, Namespace

UNIT V	NoSQL with Mongo	9

Choosing RDBMS or NoSQL or Both, MongoDB Data Types, Planning a Data Model, Building MongoDB Environment, Accessing HTTP Interface, Accessing MongoDB from Shell Client, Scripting MongoDB Shell,
Database and Collection Objects, Managing Databases and Collections from MongoDB Shell, Using Cursor Object and Query Operators, Finding Documents in MongoDB Collection from MongoDB Shell, Counting Documents, Sorting Results Sets, Limiting Result Sets, Finding Distinct Values, Write Concern, Error Handling, Write Requests, Update Operators, Adding, Updating, Saving, Upserting, Deleting documents in Collections

LIST OF EXPERIMENTS	15

1. Creating database, table and dropping table Alter, Rename Truncate Table
2. Select queries
3. Advanced Select using Relation Operators
4. Operators
5. MySQL Functions
6. Joins and Unions
7. Index
8. Triggers and procedures

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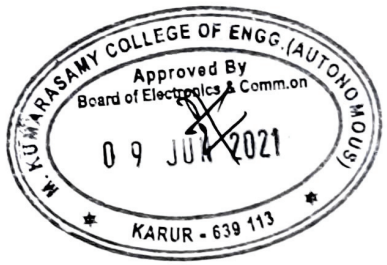
9. Creating documents and inserting documents 10. Mongodb – Quering documents -1 11. Mongodb – Queries documents -2 12. Constructing Key to locate values 13. Configuring access in MongoDB 14. Arrays and objects in Mongodb 15. Finding documents in Mongodb	
Text Book (s)	
1	Andreas Meier, Michael Kaufmann, SQL and NoSQL Databases, Springer, 2019
2	Dan Sullivan, NoSQL for Mere Mortals, Addison-Wesley, 2015
Reference (s)	
1	Brad Dayley, Sams Teach Yourself NoSQL with MongoDB in 24 Hours, SAMS, 2015
2	Udemy Course: NoSQL Databases for Beginners
3	Courera Course: NoSQL Systems



Programme: B.E. Electronics and Communcation Engineering
Year & Sem: III / V
Course Code & Name: 18ECC301JT-DIGITAL SIGNAL PROCESSING

S.NO	Reg No	Name	CO1						CO2						CO3						CO4						CO5					
			MID SEM 1	PRE EXAM	ASSIGN	INT LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 3	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 4	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM
1	20BEC4001	AARTHI P	64	75		94	97	95	84	95		97	97	90	91	80		95	97	85	71	95	96	85	97	90	85	98	85	97	90
2	20BEC4002	ABIRAJA B	12	65		80	69	90	64	25		90	69	80	60	15		85	69	75	52	75	98	90	69	85	75	98	85	69	85
3	20BEC4003	ABISHEK P	16	60		85	64	30	24	0		88	64	10	16	55		88	64	25	52	75	89	93	64	60	60	98	88	64	70
4	20BEC4004	AHAMED MUSTHAFA M	52	50		88	96	100	48	0		88	96	5	64	20		88	96	85	60	20	88	85	96	90	45	98	90	96	70
5	20BEC4005	AKHILAAN K R	44	60		92	84	85	44	80		88	84	25	55	50		90	84	65	48	75	89	95	84	80	70	98	90	84	75
6	20BEC4006	AMIRTHISVARAN R P	24	50		90	68	20	44	75		88	68	10	19	65		95	68	60	14	10	90	85	68	45	70	98	92	68	90
7	20BEC4007	ARCHANA S	64	45		92	86	90	52	25		88	86	40	97	50		95	86	35	69	85	96	95	86	90	55	98	90	86	90
8	20BEC4008	ARTHI S	24	65		90	71	15	48	30		90	71	10	12	70		90	71	30	26	40	92	85	71	70	15	98	90	71	50
9	20BEC4009	ARULMOZHI B	28	60		90	52	80	48	40		85	52	80	50	50		95	52	80	52	85	93	90	52	80	70	98	90	52	80
10	20BEC4011	ARUN KUMAR N	16	50		82	52	45	60	0		88	52	20	67	10		90	52	20	29	60	89	85	52	60	60	98	90	52	50
11	20BEC4012	ASHWIN S	56	50		87	78	75	52	10		85	78	40	55	20		90	78	30	64	35	87	90	78	45	0	98	90	78	90
12	20BEC4013	ASWATH S	68	80		80	79	25	48	80		85	79	40	12	40		85	79	20	7	100	90	90	79	65	60	98	90	79	50
13	20BEC4014	ATHISH K B	36	75		87	73	75	16	0		85	73	35	48	70		85	73	20	45	80	96	90	73	60	65	98	89	73	60
14	20BEC4015	BALAJI J	44	45		85	69	0	12	75		88	69	20	7	20		85	69	20	12	25	98	85	69	50	70	98	90	69	60
15	20BEC4016	BALAJI P	4	15		90	83	45	32	0		85	83	40	52	25		85	83	70	64	70	89	85	83	80	70	98	90	83	80
16	20BEC4017	BALASANJEEV K V	8	65		87	79	75	48	80		85	79	20	31	60		85	79	80	60	90	88	85	79	80	10	98	88	79	70
17	20BEC4018	BALASURYA B	48	55		96	62	55	40	15		97	62	20	34	35		93	62	20	57	75	89	86	62	80	75	98	98	62	80
18	20BEC4019	BHARATH K	32	35		95	78	65	28	75		92	78	5	47	10		92	78	20	33	5	90	89	78	40	10	98	99	78	60
19	20BEC4020	BHARATHI G	64	35		96	96	85	28	80		96	96	60	53	60		99	96	55	45	90	96	90	96	75	80	98	98	96	80
20	20BEC4021	BHAVADHARANI K	84	65		94	74	80	60	60		96	74	70	74	45		95	74	35	71	90	92	87	74	100	70	98	99	74	95
21	20BEC4022	BHUVANESH R	48	35		94	59	80	56	0		94	59	50	28	35		91	59	80	29	65	93	93	59	80	65	98	99	59	75
22	20BEC4023	BOOMA R	36	60		97	86	70	56	70		97	86	35	74	30		94	86	65	74	75	89	94	86	90	60	98	96	86	75
23	20BEC4024	BOOPATHI A	32	65		97	82	45	40	0		94	82	50	60	55		97	82	65	38	80	87	98	82	75	80	98	99	82	75
24	20BEC4025	BOOPATHY L	48	55		95	74	90	56	70		93	74	75	69	45		93	74	85	52	70	93	87	74	80	65	98	98	74	75
25	20BEC4026	CHANDIKA N	52	65		97	96	85	64	75		96	96	50	59	60		97	96	80	29	80	89	91	96	80	75	98	96	96	75
26	20BEC4027	CIBI C	32	45		94	74	50	16	80		95	74	30	5	30		91	74	40	45	70	87	92	74	75	55	98	98	74	70
27	20BEC4028	DEEPANRAJ P	60	15		96	73	90	56	25		94	73	40	81	50		93	73	85	60	80	90	94	73	90	70	98	98	73	85
28	20BEC4029	DEEPIKA B	72	50		96	97	95	64	80		96	97	80	78	40		98	97	50	67	75	96	93	97	90	80	98	98	97	85
29	20BEC4030	DEVADHARSHINI K	96	70		96	74	90	80	45		95	74	70	76	65		97	74	75	71	85	93	92	74	80	75	98	98	74	90
30	20BEC4031	DHANUSHKUMAR S	48	45		87	73	90	52	80		90	73	30	59	60		90	73	85	43	45	89	90	73	55	50	98	91	73	70
31	20BEC4032	DHARANIKUMAR K	20	40		78	63	45	24	65		90	63	10	16	60		90	63	65	40	75	87	93	63	80	80	98	91	83	75
32	20BEC4033	DHARSHINI R	76	70		90	83	100	80	75		90	83	60	76	60		90	83	85	80	95	90	90	83	85	60	98	90	83	80
33	20BEC4034	DHARUN M	88	0		93	81	85	64	0		93	81	10	38	0		90	81	55	31	0	96	85	81	80	0	98	90	81	70
34	20BEC4035	DHAYANETHI V	64	70		93	54	85	48	65		90	54	60	48	80		90	54	85	38	65	98	90	54	85	65	98	90	54	75
35	20BEC4036	DHIVAGAR P	20	75		87	68	40	32	80		93	68	0	29	50		93	68	80	29	75	89	90	68	75	50	98	87	68	70
36	20BEC4037	ELAKKIYA K V	72	30		87	78	90	48	30		93	78	30	59	75		90	78	70	52	90	88	85	78	95	70	98	88	78	80
37	20BEC4038	ELANCHEZIAN K S	52	10		73	64	90	52	15		90	64	45	60	0		90	64	65	55	0	93	90	64	65	65	98	90	64	70
38	20BEC4039	GANGADHARAN R	12	45		85	63	10	20	80		85	63	30	22	50		90	63	20	24	55	89	90	63	45	70	98	91	63	60
39	20BEC4040	GEETHAN B	12	45		82	69	65	20	80		82	69	15	12	25		90	69	15	45	10	87	90	69	80	70	98	89	69	75
40	20BEC4041	GOKUL P	48	55		78	73	85	64	70		90	73	85	83	25		90	73	85	57	90	90	90	73	80	80	99	91	73	75
41	20BEC4042	GOKUL S C	72	85		90	98	20	56	35		95	98	40	53	30		90	98	60	31	45	96	96	98	60	75	98	93	98	70
42	20BEC4043	GOPINATH N	8	35		85	54	45	12	70		78	54	15	14	65		93	54	35	40	65	98	90	54	80	65	98	87	54	75
43	20BEC4044	GOWRI R	96	30		85	78	55	68	65		90	78	10	69	40		90	78	30	64	85	89	96	78	80	80	98	92	78	75
44	20BEC4045	GOWRI SANKAR G S	24	65		85	58	60	32	70		87	58	10	34	30		88	58	85	24	60	88	93	58	75	70	98	89	58	75
45	20BEC4046	GOWSHIK N	60	55		92	81	45	48	65		92	81	40	55	35		90	81	60	60	90	93	96	81	85	75	98	96	81	75
46	20BEC4047	GOWSIKADEVI M	48	45		98	79	80	52	40		96	79	10	57	45		96	79	75	38	80	89	98	79	85	80	98	92	79	85
47	20BEC4048	GOWTHAM G	68	70		97	83	85	56	25		96	83	10	31	80		94	83	65	43	65	87	96	83	70	60	98	94	83	75
48	20BEC4049	GOWTHAM R	76	75		98	70	70	24	50		94	70	40	19	10		94	70	65	40	15	90	91	70	60	60	98	92	70	75

S NO	Reg No	Name	CO1						CO2						CO3						CO4						CO5				
			MID SEM 1	PRE EXAM	ASSIGN	INT LAB	END SEM LAB	END SEM	MID SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM
49	20BEC4050	GOWTHAM S	48	15		96	63	45	36	10		97	63	40	36	20		96	63	70	24	70	96	98	63	75	55	98	96	63	70
50	20BEC4051	GUNANITHI R	40	55		99	69	55	24	70		96	69	45	10	75		94	69	35	29	20	98	98	69	60	60	98	98	69	55
51	20BEC4052	HARI HARAN T	52	80		98	64	20	48	80		97	64	0	5	70		94	64	25	0	75	89	95	64	75	10	98	95	64	65
52	20BEC4053	HARINI S	56	60		98	81	55	48	15		95	81	30	12	50		98	81	30	36	55	88	97	81	75	15	98	98	81	70
53	20BEC4054	HARISH M	16	70		98	53	15	12	75		96	53	15	5	45		96	53	75	31	60	89	98	53	70	55	98	96	53	75
54	20BEC4055	HARISH S	68	25		98	96	10	44	80		93	96	50	10	25		90	96	70	2	75	90	90	96	75	70	98	95	96	60
55	20BEC4056	HARSHINI M	88	70		98	83	95	80	85		96	83	80	74	45		98	83	35	67	85	96	98	83	85	85	98	98	83	75
56	20BEC4057	INDDIRA A	56	80		95	85	95	16	80		99	85	60	90	65		98	85	60	71	80	100	100	85	100	85	100	99	85	95
57	20BEC4058	JAGADEESHAN V	20	50		100	81	40	16	55		99	81	45	59	15		98	81	35	40	50	100	98	81	65	80	100	99	81	65
58	20BEC4059	JANAKAN D	60	70		99	78	65	48	75		98	78	80	55	50		98	78	60	62	65	100	97	78	80	70	100	98	78	75
59	20BEC4060	JANANI G	40	70		96	73	20	0	10		100	73	80	78	10		100	73	20	38	90	90	100	73	75	75	100	100	73	70
60	20BEC4061	JANANI M	44	50		93	79	70	20	25		94	79	80	72	75		90	79	60	62	80	92	90	79	75	90	100	92	79	70
61	20BEC4062	JASWANT V	32	35		100	96	75	20	0		93	96	50	83	0		90	96	10	21	20	91	90	96	65	35	100	93	96	70
62	20BEC4063	JAYAPRIYA S	72	60		100	68	80	32	90		98	68	80	66	30		100	68	50	57	70	100	100	68	90	80	100	100	68	75
63	20BEC4064	JEYASURYA T	48	60		100	72	65	32	35		99	72	80	66	50		98	72	80	36	40	100	98	72	80	70	100	99	72	75
64	20BEC4065	JOSHIKA P	24	80		100	97	95	36	80		100	97	80	88	30		100	97	80	90	100	100	100	97	95	90	100	100	97	80
65	20BEC4066	JOTHIPRIYA R	24	55		100	63	60	40	15		100	63	80	71	25		100	63	25	62	75	100	100	63	90	80	100	100	63	80
66	20BEC4067	KALAIVANI P	20	60		93	73	40	36	75		94	73	50	66	35		94	73	35	43	75	89	94	73	85	40	100	93	73	80
67	20BEC4068	KAMALESH S	60	80		100	96	95	60	25		100	96	80	53	45		100	96	25	76	75	100	100	96	35	70	100	100	96	70
68	20BEC4069	KARTHICK PRASATH M	20	80		100	77	90	48	75		90	77	80	60	15		90	77	65	43	60	100	100	77	75	50	100	88	77	70
69	20BEC4070	KARTHIK R	0	0		97	56	80	8	0		93	56	70	62	0		90	56	20	33	15	90	91	56	65	70	100	93	56	75
70	20BEC4071	KAVIN S	20	55		99	76	80	12	70		100	76	40	57	10		100	76	20	57	70	94	100	76	75	45	100	100	76	75
71	20BEC4072	KAVIPRIYA M	16	15		91	71	20	0	0		94	71	40	55	50		95	71	25	52	45	100	96	71	85	80	100	91	71	80
72	20BEC4073	KAVIYA C	60	50		93	78	85	44	35		95	78	35	71	35		96	78	45	62	90	100	94	78	80	65	100	95	78	75
73	20BEC4074	KAVIYARASEN B C	64	65		100	78	90	56	75		91	78	80	67	40		100	78	25	90	50	100	100	78	85	85	100	95	78	75
74	20BEC4075	KAVYAPRIYA V	52	70		100	87	90	24	35		96	87	40	60	35		95	87	65	60	85	100	98	87	85	35	100	93	87	65
75	20BEC4076	KAWASKAR R	12	25		97	69	80	16	0		97	69	80	45	0		97	69	40	62	15	90	97	69	70	30	100	97	69	75
76	20BEC4077	KEERTHANA S	24	60		100	97	70	32	20		100	97	55	79	30		100	97	30	69	80	100	100	97	90	70	100	100	97	75
77	20BEC4078	KEERTHI S	88	90		100	97	100	36	80		100	97	80	88	15		100	97	65	90	100	100	100	97	85	90	100	100	97	80
78	20BEC4079	KIRUBAKARAN R	60	90		93	64	90	56	80		93	64	50	47	10		93	64	20	90	75	100	98	64	75	45	100	96	64	60
79	20BEC4080	KISHOR L	56	65		100	73	55	48	0		99	73	10	45	5		98	73	30	79	35	100	98	73	40	15	100	92	73	50
80	20BEC4081	KISHOR S	16	45		88	52	50	36	0		90	52	40	57	15		88	52	30	43	35	91	94	52	60	35	100	93	52	70
81	20BEC4082	KOUSHIKAA N	60	85		100	80	15	52	25		100	80	80	45	10		100	80	25	83	50	100	100	80	80	90	100	100	80	80
82	20BEC4083	KOWSIGAN R	8	10		93	56	55	0	5		98	56	40	81	10		100	56	30	29	75	100	97	56	65	35	100	97	56	60
83	20BEC4084	KRISHNARAJ D	40	35		100	78	55	0	25		100	78	20	79	30		100	78	60	29	50	100	100	78	70	30	100	100	78	70
84	20BEC4085	KRITHIK PRIYAN K A	40	50		96	67	90	24	0		97	67	20	66	15		96	67	15	29	30	100	98	67	65	10	100	97	67	65
85	20BEC4086	KUMARESAN D	48	55		95	72	90	52	70		95	72	80	79	55		89	72	20	43	85	100	94	72	70	35	100	91	72	60
86	20BEC4087	LATHIKESH S	60	80		99	97	55	64	70		98	97	55	90	20		96	97	30	76	100	100	95	97	80	90	100	97	97	75
87	20BEC4088	LAVANYA P	0	60		95	94	65	60	80		94	94	80	83	60		93	94	30	64	100	100	93	94	85	90	100	94	94	85
88	20BEC4089	LAVANYA S	28	55		97	82	50	0	45		96	82	50	45	20		96	82	20	62	65	100	98	82	60	80	100	96	82	70
89	20BEC4090	LEKHASHREE M	68	65		99	71	80	32	35		97	71	80	90	85		98	71	40	93	90	100	98	71	85	90	100	98	71	75
90	20BEC4091	LOGANATH S	60	60		98	77	70	60	60		98	77	80	76	30		96	77	25	52	75	100	98	77	60	80	100	97	77	70
91	20BEC4092	LOGARAJ K M S	48	60		98	82	80	60	80		98	82	80	93	15		96	82	75	62	75	100	98	82	75	65	100	98	82	75
92	20BEC4093	LOGESHWARAN B	20	0		98	62	85	4	0		98	62	75	81	35		96	62	30	14	20	100	97	62	50	50	100	96	62	70
93	20BEC4094	LOGESHWARAN S	0	60		98	69	60	0	40		98	69	50	55	35		96	69	10	45	50	100	97	69	60	65	100	96	69	70
94	20BEC4095	LOGESWARAN P	44	40		97	79	90	24	30		97	79	75	59	40		97	79	30	38	70	100	98	79	75	70	100	98	79	70
95	20BEC4096	LOHESHKUMAR S	0	60		98	68	85	32	70		97	68	60	83	5		98	68	65	43	80	100	98	68	40	45	100	91	68	60
96	20BEC4097	MADHAVAN A	0	0		97	82	30	20	10		94	82	0	53	0		97	82	20	50	0	91	94	82	20	10	100	93	82	50
97	20BEC4098	MADHUPRIYA R	24	40		96	92	80	8	30		99	92	75	53	20		98	92	25	45	80	90	96	92	80	80	100	97	92	80
98	20BEC4099	MAGESHWARAN S P	48	60		97	73	80	52	15		97	73	80	86	60		98	73	80	45	40	100	96	73	85	75	100	98	73	80

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			MID SEM 1	PRE EXAM	ASSIGN	INT LAB	END SEM LAB	END SEM	MID SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM
99	20BEC4100	MANIKANDAN M	48	60		92	76	65	8	50		92	76	60	66	0		92	76	25	33	80	92	92	76	75	60	100	92	76	75
100	20BEC4101	MATHUMITHA T	36	65		97	82	65	4	40		97	82	50	48	40		94	82	25	52	35	100	95	82	35	80	100	95	82	75
101	20BEC4102	MEHA R	28	80		95	87	85	20	60		95	87	60	91	30		92	87	30	76	85	92	94	87	80	85	100	94	87	70
102	20BEC4103	MOHAMED MUSTHAKKIM J	20	40		97	78	80	48	60		99	78	80	97	60		96	78	75	43	40	90	98	78	75	65	100	93	78	75
103	20BEC4104	MOHAMMED ASHRAF D	56	60		96	72	45	16	85		95	72	80	71	60		96	72	20	55	90	100	96	72	70	35	100	96	72	70
104	20BEC4105	MOHAN RAM S	56	0		97	77	40	44	60		96	77	80	72	40		98	77	25	60	80	100	97	77	60	70	100	96	77	70
105	20BEC4106	MONISH K	80	30		97	82	15	20	0		100	82	55	41	0		100	82	70	67	40	100	100	82	70	0	100	96	82	40
106	20BEC4107	MONISHA M	48	60		93	68	75	52	45		93	68	40	38	0		94	68	10	67	80	100	92	68	70	65	100	90	68	70
107	20BEC4108	MOWRIEAN K	68	25		93	79	20	32	0		92	79	15	72	0		96	79	50	31	80	91	98	79	90	55	100	95	79	75
108	20BEC4109	MUTHUPRAKASH A	20	30		94	59	50	16	0		94	59	50	67	50		95	59	30	50	0	100	94	59	50	55	100	96	59	70
109	20BEC4110	NACHIMUTHU J	60	70		96	83	90	44	80		92	83	80	81	10		97	83	35	88	70	100	98	83	70	70	100	92	83	70
110	20BEC4111	NAGARAJ E	16	50		98	74	55	8	20		97	74	10	60	50		96	74	80	36	75	100	96	74	75	60	100	94	74	75
111	20BEC4112	NAGESWARI R	32	60		95	93	80	20	35		96	93	80	47	70		98	93	25	64	35	100	92	93	60	70	100	96	93	70
112	20BEC4113	NANDHEESWARAN S	8	50		97	52	65	0	0		97	52	50	52	0		98	52	70	52	25	100	98	52	65	35	100	99	52	65
113	20BEC4114	NANDHINI R	52	85		100	88	80	56	80		100	88	80	74	60		97	88	40	81	70	100	98	88	85	80	100	98	88	80
114	20BEC4115	NANDHINI	60	65		89	82	80	60	55		90	82	45	52	35		94	82	65	71	60	90	89	82	70	65	92	94	82	70
115	20BEC4116	NANDHITHA	12	45		88	75	45	40	30		92	75	35	33	50		92	75	30	74	80	94	94	75	80	75	94	94	75	70
116	20BEC4117	NARMATHA	8	40		93	57	55	52	20		92	57	0	29	35		89	57	20	19	50	98	91	57	50	55	92	92	57	50
117	20BEC4118	NAVEEN KUMAR	44	10		70	66	0	4	30		91	66	0	34	50		92	66	20	26	15	92	92	66	10	0	94	76	66	65
118	20BEC4119	NAVEEN	64	35		88	77	10	56	0		92	77	0	17	20		87	77	15	24	70	94	82	77	55	60	90	88	77	60
119	20BEC4120	NAVEEN	44	65		87	87	60	56	0		90	87	40	53	65		87	87	30	33	40	90	92	87	70	80	94	93	87	70
120	20BEC4121	NAVYA	48	80		88	70	65	28	0		97	70	15	78	50		94	70	65	62	75	94	96	70	75	75	98	97	70	50
121	20BEC4122	NIKIL	44	90		85	93	85	16	15		95	93	50	60	50		93	93	60	38	70	98	93	93	65	60	92	97	93	45
122	20BEC4123	NIRVIN CHANDAR	48	60		85	82	85	76	0		95	82	65	71	40		91	82	55	36	0	92	89	82	75	70	94	91	82	70
123	20BEC4124	NITHYAASHREE	72	50		93	95	85	60	20		94	95	75	74	70		96	95	35	83	85	94	94	95	80	20	98	96	95	60
124	20BEC4125	NITHYAPRABHA	48	100		92	88	100	44	75		97	88	55	67	80		97	88	90	74	85	100	97	88	85	75	92	97	88	95
125	20BEC4126	NIVETHA	76	80		85	78	80	84	30		93	78	50	38	70		94	78	45	45	45	92	94	78	65	40	94	93	78	55
126	20BEC4127	POOVITHA	72	85		93	98	100	4	60		94	98	95	83	75		93	98	95	93	90	94	91	98	80	90	98	93	98	75
127	20BEC4128	PRADEEP KUMAR	52	85		76	84	90	44	10		93	84	10	50	70		91	84	45	31	50	94	92	84	70	70	92	95	84	80
128	20BEC4129	PRADEEP	52	30		78	67	85	40	0		88	67	20	60	75		96	67	75	38	75	90	94	67	90	70	94	94	67	65
129	20BEC4130	PRADEEP	80	70		82	77	95	48	0		89	77	30	43	45		91	77	75	40	75	94	91	77	75	70	90	96	77	85
130	20BEC4131	PRANAV KIRUTHIKK	56	85		89	84	55	44	20		92	84	35	74	75		91	84	30	40	50	98	92	84	75	60	94	94	84	60
131	20BEC4132	PRASANA KUMAR	64	50		85	69	85	44	35		90	69	70	67	15		96	69	70	36	60	92	96	69	75	60	98	96	69	50
132	20BEC4133	PRASANTH	64	45		83	73	40	40	40		91	73	25	12	35		87	73	75	29	60	94	88	73	85	75	94	95	73	80
133	20BEC4134	PRASSHANTH	44	70		86	79	55	44	60		87	79	70	66	50		92	79	55	38	75	90	94	79	80	65	98	92	79	60
134	20BEC4135	PRAVEEN	68	30		85	84	85	60	55		93	84	25	36	50		88	84	75	31	70	94	94	84	60	45	92	93	84	70
135	20BEC4136	PRAVEEN ANANDH	44	85		92	97	95	40	40		92	97	70	62	75		92	97	85	52	75	98	96	97	95	0	94	91	97	75
136	20BEC4137	PRAVEEN	56	40		85	72	85	44	10		90	72	20	57	45		89	72	45	14	0	92	87	72	75	0	94	91	72	65
137	20BEC4138	PRAVEEN	32	85		91	98	90	40	5		92	98	55	60	60		92	98	90	64	35	94	94	98	80	75	98	94	98	80
138	20BEC4139	PRAVEEN RAJA	56	65		72	62	35	48	5		72	62	0	28	20		72	62	25	21	45	90	72	62	80	70	92	72	62	70
139	20BEC4140	PRAVEEN	52	55		72	77	45	4	5		72	77	30	47	55		72	77	60	40	45	94	72	77	80	70	94	72	77	70
140	20BEC4141	PRAVIN NIXON	52	75		89	84	40	48	5		91	84	60	48	65		94	84	55	24	40	98	91	84	65	50	90	94	84	35
141	20BEC4142	RAHUL	24	40		85	72	40	28	10		95	72	5	60	50		97	72	30	50	35	92	96	72	55	60	94	96	72	75
142	20BEC4143	RAJA	44	30		70	61	0	56	10		85	61	10	5	55		91	61	75	43	30	94	89	61	80	65	90	94	61	85
143	20BEC4144	RAKSHANA	76	90		84	86	20	44	10		93	86	25	40	40		94	86	50	45	40	90	94	86	85	50	94	96	86	75
144	20BEC4145	RAMESH	56	80		92	82	80	48	60		93	82	60	74	40		94	82	35	40	40	94	100	82	55	70	98	100	82	60
145	20BEC4146	RANJITHKUMAR	64	25		94	79	40	64	20		94	79	25	43	65		93	79	75	40	30	98	94	79	75	60	92	94	79	70
146	20BEC4147	RESHMA	56	30		97	66	0	60	0		89	66	35	59	50		95	66	50	60	35	92	95	66	50	60	94	96	66	60
147	20BEC4148	REVATHYSHREE	72	55		95	90	60	44	25		94	90	40	53	80		97	90	65	71	85	94	100	90	85	95	90	97	90	75
148	20BEC4149	RITHANYA	72	70		93	81	20	52	5		98	81	10	22	55		97	81	75	38	65	90	97	81	75	80	94	98	81	70

S.NO	Reg No	Name	CO1						CO2						CO3						CO4						CO5					
			MID SEM 1	PRE EXAM	ASSIGN	INT LAB	END SEM LAB	END SEM	MID SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	END SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM
149	20BEC4150	RITHICK	44	80		97	84	95	40	40		94	84	40	48	55		95	84	65	57	50	90	100	84	70	75	98	100	84	85
150	20BEC4151	RITHIK	56	55		90	89	25	48	0		95	89	35	29	50		95	89	25	26	75	94	96	89	85	60	92	94	89	80
151	20BEC4152	RITHIKA	36	75		98	91	95	44	50		94	91	70	41	50		93	91	50	36	75	98	95	91	55	75	94	94	91	85
152	20BEC4153	ROHITH	52	40		94	85	10	32	0		94	85	40	40	55		95	85	45	0	40	92	94	85	75	65	90	94	85	80
153	20BEC4154	ROOBESH	52	15		93	68	35	60	10		93	68	20	48	55		95	68	55	55	70	94	95	68	80	70	94	95	68	60
154	20BEC4155	SABANA	32	65		95	93	90	56	50		91	93	20	55	60		95	93	40	62	70	90	100	93	75	75	98	98	93	75
155	20BEC4156	SABAREESH	24	25		91	74	25	28	30		89	74	0	31	45		100	74	75	36	60	94	95	74	70	60	92	95	74	80
156	20BEC4157	SABARI	76	55		94	75	10	64	25		94	75	20	26	80		94	75	10	36	85	98	93	75	40	95	94	94	75	85
157	20BEC4158	SABARNA	52	65		95	90	30	52	10		98	90	35	62	55		95	90	60	62	45	90	100	90	95	80	90	97	90	85
158	20BEC4159	SACHIN ARAVINTH	60	35		93	88	30	60	25		93	88	35	29	40		90	88	25	60	65	94	95	88	90	70	94	96	88	70
159	20BEC4160	SACHIN	68	50		95	92	20	60	15		97	92	0	34	65		95	92	30	45	60	98	94	92	40	70	90	95	92	55
160	20BEC4162	SAKTHIVEL	84	75		96	93	95	52	50		92	93	70	50	70		100	93	75	52	80	92	100	93	85	75	94	100	93	60
161	20BEC4163	SANDHIYA	84	75		94	91	55	72	50		96	91	55	83	70		95	91	75	83	75	94	95	91	75	60	98	95	91	70
162	20BEC4164	SANTHIYA	20	85		97	82	95	44	75		98	82	75	91	75		95	82	75	76	85	90	94	82	75	75	92	95	82	85
163	20BEC4165	SANTHOSH KUMAR	80	80		95	92	40	20	30		93	92	45	76	80		93	92	35	36	35	94	93	92	90	65	94	94	92	70
164	20BEC4166	SANTHOSH	60	70		99	94	80	60	75		94	94	65	76	60		100	94	65	76	75	98	100	94	70	75	90	100	94	60
165	20BEC4167	SANTHOSHKUMAR	36	85		95	86	25	44	75		96	86	25	66	60		100	86	60	74	80	92	100	86	75	70	94	100	86	65
166	20BEC4168	SARAN	64	45		96	78	75	52	45		93	78	10	47	70		100	78	60	43	35	94	100	78	80	70	98	100	78	65
167	20BEC4169	SASITH	40	75		93	92	35	52	60		89	92	45	88	70		97	92	45	86	80	90	100	92	70	75	90	100	92	75
168	20BEC4170	SATHISH	20	75		91	93	25	8	0		89	93	10	38	40		93	93	55	29	75	94	95	93	75	60	92	95	93	85
169	20BEC4171	SATHISHKUMAR K	28	30		93	88	50	12	0		94	88	40	74	75		95	88	55	19	70	98	92	88	75	60	98	93	88	70
170	20BEC4172	SELVAKUMAR R	16	0		93	60	10	4	0		93	60	10	48	70		92	60	20	0	45	98	92	60	25	55	98	93	60	30
171	20BEC4173	SHANMUGAPRIYA K	64	35		98	93	45	72	75		94	93	25	91	70		97	93	90	74	75	98	97	93	90	75	99	97	93	70
172	20BEC4174	SHARMILI S	32	55		98	96	95	40	40		94	96	35	64	70		95	96	70	43	35	96	95	96	90	70	97	97	96	60
173	20BEC4175	SHREE SUBHA M	44	65		93	96	85	64	45		95	96	25	76	60		97	96	85	64	70	98	97	96	70	65	96	96	96	70
174	20BEC4176	SHRUDI SK	36	55		97	93	45	8	35		93	93	20	26	55		95	93	65	40	65	97	97	93	65	65	96	97	93	60
175	20BEC4178	SINDHUJA B	80	55		94	94	95	64	50		94	94	60	71	70		95	94	85	67	90	97	96	94	80	80	96	96	94	90
176	20BEC4179	SOBIKA B	64	75		97	97	95	60	30		94	97	10	81	75		96	97	45	76	80	97	97	97	60	70	99	97	97	60
177	20BEC4180	SOWMIYA K	52	40		98	92	55	48	80		94	92	40	69	60		94	92	50	57	65	97	97	92	85	70	99	97	92	60
178	20BEC4181	SOWMIYA P	72	80		97	93	80	40	35		94	93	30	81	55		94	93	75	57	45	99	95	93	85	60	96	97	93	60
179	20BEC4182	SRIDHAR T	44	45		95	73	40	12	0		94	73	40	48	20		95	73	45	38	50	98	96	73	70	55	98	95	73	60
180	20BEC4183	SRIDHAR T.R	48	60		91	78	55	0	25		94	78	70	36	0		93	78	20	43	40	98	96	78	50	50	97	97	78	60
181	20BEC4184	SRIMATHI R	64	75		97	82	85	60	40		94	82	75	64	70		94	82	40	69	80	98	97	82	70	60	99	97	82	70
182	20BEC4185	SRIVISHNU P	64	50		97	78	55	24	50		92	78	50	43	55		94	78	25	52	60	98	97	78	60	65	96	97	78	75
183	20BEC4186	SUBASHRI V	40	75		95	89	70	20	40		94	89	60	55	60		97	89	75	67	90	99	97	89	65	75	96	97	89	80
184	20BEC4187	SUBASRI B	56	85		96	94	100	60	40		95	94	90	84	80		97	94	90	81	90	96	97	94	95	75	97	97	94	80
185	20BEC4188	SUDHARSUN Y	52	60		96	82	60	28	40		95	82	25	78	45		93	82	30	38	40	97	96	82	70	50	96	96	82	75
186	20BEC4189	SUJA S	68	85		98	83	90	56	55		94	83	45	71	75		95	83	55	69	70	98	98	83	85	75	99	97	83	70
187	20BEC4190	SUJITHAA R	80	85		97	96	100	56	55		94	96	75	91	90		96	96	90	79	90	97	98	96	90	80	98	98	96	75
188	20BEC4191	SUKEENDHAR G	44	80		96	80	90	8	30		94	80	65	52	75		95	80	30	33	65	99	95	80	70	70	96	96	80	65
189	20BEC4192	SUKUL S	60	50		92	95	60	56	65		95	95	20	66	70		95	95	25	55	90	97	96	95	70	70	99	95	95	75
190	20BEC4193	SURESH KUMAR K.R	60	65		97	92	95	68	45		97	92	15	74	55		95	92	70	55	30	99	97	92	75	0	96	97	92	70
191	20BEC4194	SURYA S	56	75		97	90	80	60	85		95	90	25	81	75		96	90	50	45	40	99	96	90	65	65	99	96	90	60
192	20BEC4195	SUHASHRAJ V	60	60		97	88	40	32	10		96	88	30	67	70		94	88	40	57	55	99	97	88	70	70	98	95	88	70
193	20BEC4196	SUVETHA C	84	65		95	90	25	20	45		95	90	10	71	85		95	90	90	76	85	98	98	90	95	75	96	98	90	90
194	20BEC4197	SWETHA L.G	68	65		98	95	50	56	75		94	95	35	84	60		94	95	20	76	80	97	97	95	35	70	97	97	95	60
195	20BEC4199	TAMILSELVAN M	72	70		95	87	70	84	80		91	87	60	88	80		96	87	55	76	90	98	96	87	80	80	96	96	87	75
196	20BEC4200	TARUN S K	68	50		93	88	85	56	0		94	88	0	57	40		97	88	65	52	70	96	96	88	55	60	99	97	88	55
197	20BEC4201	THANYA K	60	85		94	82	90	60	70		94	82	30	81	70		96	82	55	83	95	98	97	82	65	80	97	97	82	65
198	20BEC4202	THARSAN NISOK R	76	75		95	85	85	52	30		94	85	25	48	70		94	85	60	69	85	98	93	85	80	65	98	97	85	75

S.NO	Reg No	Name	CO1						CO2						CO3						CO4						CO5				
			MID SEM 1	PRE EXAM	ASSIGN	INT LAB	END SEM LAB	END SEM	MID SEM 1	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	MID SEM 2	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM	PRE EXAM	ASSIGN	LAB	END SEM LAB	END SEM
199	20BEC4203	THARUN S	64	75		92	82	95	36	20		93	82	35	59	60		94	82	60	50	70	98	93	82	70	55	96	97	82	80
200	20BEC4204	THINESH KUMAR G	60	85		91	85	90	52	65		93	85	40	64	65		96	85	50	57	80	98	97	85	70	70	97	97	85	70
201	20BEC4205	USHA E	40	55		93	80	45	12	35		93	80	25	36	45		94	80	55	36	65	96	97	80	75	30	98	97	80	70
202	20BEC4206	UTITH NARENTHAAR S J	36	35		93	79	80	12	0		93	79	50	34	30		96	79	20	33	20	98	94	79	60	55	98	96	79	60
203	20BEC4207	VAISHNAVEE M	80	95		95	97	100	72	85		94	97	60	91	75		97	97	65	86	90	99	98	97	85	85	97	98	97	75
204	20BEC4208	VARNIKA S	68	60		94	96	45	32	0		95	96	75	81	70		97	96	50	79	90	98	97	96	85	80	99	97	96	80
205	20BEC4209	VARSANA J	44	65		94	94	90	36	50		94	94	15	74	60		96	94	45	64	70	96	97	94	65	75	99	97	94	65
206	20BEC4210	VARSHA N	56	65		94	92	85	52	35		94	92	25	74	45		97	92	45	64	80	98	97	92	55	70	99	97	92	75
207	20BEC4211	VARSHAYINI S	84	60		93	97	55	40	65		94	97	50	79	75		97	97	55	86	90	99	97	97	75	65	97	97	97	70
208	20BEC4212	VENKATESH I	40	70		91	94	85	36	85		93	94	55	76	70		97	94	65	79	85	96	97	94	75	80	98	97	94	65
209	20BEC4213	VIGNESH R	60	55		91	85	55	32	45		95	85	30	69	50		97	85	55	64	75	98	97	85	65	65	96	97	85	70
210	20BEC4214	VIGNESH S	36	65		93	88	90	12	45		94	88	50	59	60		97	88	60	57	35	96	97	88	60	45	97	97	88	75
211	20BEC4215	VIGNESHWARAN S	40	35		93	84	55	16	0		94	84	25	47	50		96	84	35	55	65	99	97	84	75	50	97	97	84	70
212	20BEC4216	VIGNESHWARAN S	64	60		92	86	85	40	70		95	86	35	79	60		97	86	60	52	75	96	97	86	65	60	96	97	86	65
213	20BEC4217	VIJAYARAGAVAN T	12	45		93	95	60	56	65		93	95	65	59	50		96	95	65	64	65	97	95	95	75	35	99	97	95	65
214	20BEC4218	VIKRAM R.N	28	55		93	81	25	4	0		94	81	10	57	35		96	81	30	24	65	96	97	81	45	50	99	97	81	50
215	20BEC4219	VINEETH S	56	65		93	90	85	44	35		93	90	45	83	60		97	90	35	60	70	97	97	90	70	55	98	97	90	70
216	20BEC4220	VINITHA A	52	40		93	87	35	24	30		94	87	55	48	20		97	87	65	38	55	96	97	87	70	15	98	97	87	55
217	20BEC4221	VINOTHKUMAR J	48	65		94	80	45	24	40		94	80	30	72	60		97	80	55	36	90	96	97	80	65	0	98	97	80	60
218	20BEC4222	VISHWA S	64	50		94	82	45	40	30		93	82	70	69	65		96	82	65	45	70	99	95	82	65	55	98	96	82	65
219	20BEC4223	YUVARANJANI J	48	45		93	88	45	36	55		94	88	20	55	60		97	88	50	52	30	99	97	88	65	60	97	96	88	70
220	20BEC4301	ASWIN KUMAR K	52	30		93	75	15	52	5		93	75	0	14	0		94	75	5	21	95	98	92	75	30	70	94	93	75	40
221	20BEC4302	DEEPAN S A	8	30		98	78	0	12	65		96	78	0	34	65		94	78	55	52	70	89	93	78	50	60	98	92	78	50
222	20BEC4303	HALDO J	68	45		94	73	55	32	45		90	73	60	67	70		97	73	65	45	85	92	100	73	75	25	90	100	73	60
223	20BEC4305	KAVINADHITHYA J S	76	75		95	89	40	60	0		95	89	10	34	65		95	89	30	50	60	99	96	89	50	70	98	96	89	50
224	20BEC4306	KAVIYAVARDHINI S	52	0		98	90	55	64	15		96	90	45	29	20		90	90	60	45	45	88	90	90	55	50	98	90	90	55
225	20BEC4307	MOKITH K	32	30		93	75	55	20	10		94	75	40	31	35		96	75	45	24	60	99	97	75	60	65	97	97	75	70
226	20BEC4308	NAVEEN E	60	60		93	81	50	0	0		92	81	25	38	50		93	81	40	50	65	98	96	81	65	60	99	97	81	70
227	20BEC4310	RAGUNATH K	12	45		98	80	60	20	80		96	80	40	5	45		94	80	75	19	70	89	98	80	65	65	98	98	80	40
228	20BEC4312	SREEBALAN V	4	70		92	81	35	0	70		95	81	0	5	65		95	81	15	0	40	98	94	81	40	65	98	96	81	40
229	20BEC4313	SRISUNDHAR V B	68	70		96	77	0	32	10		93	77	0	0	30		93	77	0	0	75	94	93	77	0	75	94	95	77	0
230	20BEC4314	SRIVARSHAN S	40	30		93	85	55	24	0		93	85	10	22	60		96	85	70	38	40	98	95	85	80	70	96	95	85	75
		TOTAL	230	230		230	230	230	230	230		230	230	230	230	230		230	230	230	230	230	230	230	230	230	230	230	230	230	230
		AVERAGE MARK in %	48.84	57.76		92.95	80.12	64.04	41.05	47.67		93.28	80.12	44.95	56.12	49.56		94.19	80.12	50.31	50.99	64.60	95.06	94.48	80.12	71.44	63.81	97.27	94.68	80.12	69.50
		CO WITH THEIR THERSHOLD	50	55		60	60	60	50	50		60	60	50	55	50		60	60	55	55	60	60	60	60	60	60	60	60	60	60
		No of student attained THERSHOLD	117	142		230	217	129	81	92		230	217	96	134	130		230	217	115	98	154	230	230	217	196	168	230	230	217	204
		% of student attained the THRESHOLD	50.87	61.74		100.00	94.35	56.09	35.22	40.00		100.00	94.35	41.74	58.26	56.52		100.00	94.35	50.00	42.61	66.96	100.00	100.00	94.35	85.22	73.04	100.00	100.00	94.35	88.70
		WEIGHTAGE	0.200	0.100		0.200	0.125	0.375	0.200	0.100		0.200	0.125	0.375	0.200	0.100		0.200	0.125	0.375	0.150	0.150	0.100	0.100	0.125	0.375	0.200	0.200	0.100	0.125	0.375
			10.17	6.17		20.00	11.79	21.03	7.04	4.00		20.00	11.79	15.65	11.65	5.65		20.00	11.79	18.75	6.39	10.04	10.00	10.00	11.79	31.96	14.61	20.00	10.00	11.79	33.26
			69.17						58.49						67.85						80.18						89.66				
			CO1						CO2						CO3						CO4						CO5				

Class average percentage		Threshold value
Above	60	60
between	50 TO 60	55
below	50	50

Programme: B.E. Electronics and Communcation Engineering

Year & Sem: III / V

Course Code & Name: 18ECC301JT-DIGITAL SIGNAL PROCESSING

Sl. No	Reg No	Name of the Student	CONTINUOUS INETRNAL ASSESSMENT														
			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
1	20BEC4001	AARTHI P	95	90	96	98	95		95			85			88	90	
2	20BEC4002	ABIRAJA B	75	75	90	90	90		85			90			90	80	
3	20BEC4003	ABISHEK P	90	85	80	90	85		88			93			85	90	
4	20BEC4004	AHAMED MUSTHAFA M	95	80	90	85	90		88			85			90	90	
5	20BEC4005	AKHILAAN K R	95	85	95	90	85		90			95			90	90	
6	20BEC4006	AMIRTHISVARAN R P	90	85	95	90	85		95			85			93	90	
7	20BEC4007	ARCHANA S	90	90	95	85	90		95			95			90	90	
8	20BEC4008	ARTHI S	90	90	90	90	90		90			85			90	90	
9	20BEC4009	ARULMOZHI B	90	90	90	85	85		95			90			90	90	
10	20BEC4011	ARUN KUMAR N	80	80	85	85	90		90			85			90	90	
11	20BEC4012	ASHWIN S	90	80	90	85	85		90			90			90	90	
12	20BEC4013	ASWATH S	70	85	85	80	90		85			90			90	90	
13	20BEC4014	ATHISH K B	80	95	85	85	85		85			90			90	87	
14	20BEC4015	BALAJI J	90	80	85	90	85		85			85			90	90	
15	20BEC4016	BALAJI P	90	90	90	85	85		85			85			90	90	
16	20BEC4017	BALASANJEEV K V	80	90	90	85	85		85			85			90	85	
17	20BEC4018	BALASURYA B	95	97	97	97	96		93			86			98	98	
18	20BEC4019	BHARATH K	97	95	93	93	91		92			89			98	99	
19	20BEC4020	BHARATHI G	96	96	97	96	96		99			90			97.5	99	
20	20BEC4021	BHAVADHARANI K	90	95	97	93	98		95			87			97	100	
21	20BEC4022	BHUVANESH R	93	92	96	94	93		91			93			99	98	
22	20BEC4023	BOOMA R	97	97	98	97	96		94			94			97	95	
23	20BEC4024	BOOPATHI A	99	95	98	95	92		97			98			99	98	
24	20BEC4025	BOOPATHY L	96	95	95	95	90		93			87			97	98	
25	20BEC4026	CHANDIKA N	95	97	98	97	94		97			91			97.5	94	
26	20BEC4027	CIBI C	96	94	91	93	96		91			92			97	98	
27	20BEC4028	DEEPANRAJ P	95	94	98	92	95		93			94			98	98	
28	20BEC4029	DEEPIKA B	94	97	98	97	95		98			93			98	98	
29	20BEC4030	DEVADHARSHINI K	95	95	97	95	94		97			92			98.5	98	
30	20BEC4031	DHANUSHKUMAR S	80	90	90	90	90		90			90			91	90	
31	20BEC4032	DHARANIKUMAR K	70	80	85	90	90		90			93			91	90	

Sl. No	Reg No	Name of the Student	CONTINUOUS INTERNAL ASSESSMENT														
			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
32	20BEC4033	DHARSHINI R	90	90	90	90	90		90			90			90	90	
33	20BEC4034	DHARUN M	95	90	95	95	90		90			85			90	90	
34	20BEC4035	DHAYANETHI V	95	95	90	90	90		90			90			90	90	
35	20BEC4036	DHIVAGAR P	85	85	90	95	90		93			90			85	88	
36	20BEC4037	ELAKKIYA K V	85	85	90	95	90		90			85			85	90	
37	20BEC4038	ELANCHEZIAN K S	70	65	85	90	90		90			90			90	90	
38	20BEC4039	GANGADHARAN R	90	85	80	85	85		90			90			96	85	
39	20BEC4040	GEETHAN B	80	80	85	70	93		90			90			85	93	
40	20BEC4041	GOKUL P	70	80	85	90	90		90			90			91	90	
41	20BEC4042	GOKUL S C	90	85	95	95	95		90			96			96	90	
42	20BEC4043	GOPINATH N	85	85	85	70	85		93			90			83	90	
43	20BEC4044	GOWRI R	85	85	85	90	90		90			96			93	90	
44	20BEC4045	GOWRI SANKAR G S	85	85	85	88	85		88			93			93	85	
45	20BEC4046	GOWSHIK N	90	90	95	93	90		90			96			96	96	
46	20BEC4047	GOWSIKADEVI M	100	95	100	97	95		96			98			93	90	
47	20BEC4048	GOWTHAM G	95	95	100	97	94		94			96			94	94	
48	20BEC4049	GOWTHAM R	100	98	96	97	90		94			91			94	90	
49	20BEC4050	GOWTHAM S	94	98	95	98	95		96			98			98	94	
50	20BEC4051	GUNANITHI R	100	98	98	96	96		94			98			97	98	
51	20BEC4052	HARI HARAN T	99	97	98	97	97		94			95			99	91	
52	20BEC4053	HARINI S	95	98	100	94	95		98			97			98	98	
53	20BEC4054	HARISH M	97	97	100	95	97		96			98			97	94	
54	20BEC4055	HARISH S	95	99	100	96	90		90			90			93	96	
55	20BEC4056	HARSHINI M	95	98	100	95	96		98			98			98	98	
56	20BEC4057	INDDIRA A	87	97	100	98	99		98			100			99	98	
57	20BEC4058	JAGADEESHAN V	100	100	100	100	97		98			98			99	98	
58	20BEC4059	JANAKAN D	100	100	98	98	98		98			97			98	98	
59	20BEC4060	JANANI G	89	98	100	100	100		100			100			100	100	
60	20BEC4061	JANANI M	94	92	94	94	94		90			90			92	91	
61	20BEC4062	JASWANT V	100	100	100	95	90		90			90			90	95	
62	20BEC4063	JAYAPRIYA S	100	100	100	100	95		100			100			100	100	
63	20BEC4064	JEYASURYA T	100	100	100	99	98		98			98			98	100	
64	20BEC4065	JOSHIKA P	100	100	100	100	100		100			100			100	100	
65	20BEC4066	JOTHIPRIYA R	100	100	100	100	100		100			100			100	100	

Sl. No	Reg No	Name of the Student	CONTINUOUS INETRNAL ASSESSMENT														
			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
66	20BEC4067	KALAIVANI P	91	94	94	94	94		94			94			95	90	
67	20BEC4068	KAMALESH S	100	100	100	100	100		100			100			100	100	
68	20BEC4069	KARTHICK PRASATH M	100	100	100	90	90		90			100			90	85	
69	20BEC4070	KARTHIK R	94	98	99	95	90		90			91			90	96	
70	20BEC4071	KAVIN S	98	100	100	100	100		100			100			100	100	
71	20BEC4072	KAVIPRIYA M	90	90	94	98	90		95			96			90	91	
72	20BEC4073	KAVIYA C	94	96	90	94	95		96			94			95	94	
73	20BEC4074	KAVIYARASEN B C	100	100	100	88	93		100			100			90	100	
74	20BEC4075	KAVYAPRIYA V	100	100	100	98	94		95			98			92	94	
75	20BEC4076	KAWASKAR R	97	98	97	97	97		97			97			97	97	
76	20BEC4077	KEERTHANA S	100	100	100	100	100		100			100			100	100	
77	20BEC4078	KEERTHI S	100	100	100	100	100		100			100			100	100	
78	20BEC4079	KIRUBAKARAN R	88	93	98	88	98		93			98			93	98	
79	20BEC4080	KISHOR L	100	100	100	100	98		98			98			95	89	
80	20BEC4081	KISHOR S	90	90	84	89	91		88			94			88	97	
81	20BEC4082	KOUSHIKAA N	100	100	100	100	100		100			100			100	100	
82	20BEC4083	KOWSIGAN R	98	94	87	98	97		100			97			97	97	
83	20BEC4084	KRISHNARAJ D	100	100	100	100	100		100			100			100	100	
84	20BEC4085	KRITHIK PRIYAN K A	96	96	97	96	97		96			98			96	98	
85	20BEC4086	KUMARESAN D	96	94	95	96	94		89			94			92	90	
86	20BEC4087	LATHIKESH S	99	98	99	98	98		96			95			97	96	
87	20BEC4088	LAVANYA P	95	94	95	94	93		93			93			94	94	
88	20BEC4089	LAVANYA S	98	98	94	98	94		96			98			95	96	
89	20BEC4090	LEKHASHREE M	100	98	100	94	100		98			98			98	98	
90	20BEC4091	LOGANATH S	98	99	96	98	98		96			98			98	96	
91	20BEC4092	LOGARAJ K M S	99	98	97	98	98		96			98			98	98	
92	20BEC4093	LOGESHWARAN B	99	98	96	98	97		96			97			98	93	
93	20BEC4094	LOGESHWARAN S	99	98	96	98	97		96			97			98	93	
94	20BEC4095	LOGESWARAN P	98	97	96	98	96		97			98			97	98	
95	20BEC4096	LOHESHKUMAR S	98	99	96	97	97		98			98			97	84	
96	20BEC4097	MADHAVAN A	98	94	98	96	92		97			94			90	95	
97	20BEC4098	MADHUPRIYA R	97	94	96	99	99		98			96			96	97	
98	20BEC4099	MAGESHWARAN S P	97	96	97	97	96		98			96			99	96	
99	20BEC4100	MANIKANDAN M	94	88	93	92	92		92			92			94	90	

Sl. No	Reg No	Name of the Student	CONTINUOUS INETERNAL ASSESSMENT														
			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
100	20BEC4101	MATHUMITHA T	95	97	99	99	94		94			95			95	94	
101	20BEC4102	MEHA R	95	94	97	95	95		92			94			93	94	
102	20BEC4103	MOHAMED MUSTHAKKIM J	100	95	97	99	98		96			98			95	90	
103	20BEC4104	MOHAMMED ASHRAF D	98	96	94	94	95		96			96			98	94	
104	20BEC4105	MOHAN RAM S	97	98	96	94	97		98			97			97	94	
105	20BEC4106	MONISH K	92	100	100	100	100		100			100			96	96	
106	20BEC4107	MONISHA M	98	90	92	94	92		94			92			90	90	
107	20BEC4108	MOWRIEAN K	90	94	96	90	94		96			98			98	92	
108	20BEC4109	MUTHUPRAKASH A	95	92	94	93	95		95			94			96	96	
109	20BEC4110	NACHIMUTHU J	96	98	94	94	90		97			98			94	90	
110	20BEC4111	NAGARAJ E	99	98	96	98	96		96			96			94	94	
111	20BEC4112	NAGESWARI R	96	93	97	96	95		98			92			96	96	
112	20BEC4113	NANDHEESWARAN S	97	97	97	97	97		98			98			98	100	
113	20BEC4114	NANDHINI R	100	99	100	99	100		97			98			98	98	
114	20BEC4115	NANDHINI	84	91	93	87	92		94			89			92	96	
115	20BEC4116	NANDHITHA	83	89	91	92	92		92			94			91	97	
116	20BEC4117	NARMATHA	94	90	94	92	91		89			91			92	91	
117	20BEC4118	NAVEEN KUMAR	70	70	70	91	91		92			92			74	77	
118	20BEC4119	NAVEEN	91	87	87	92	92		87			82			87	89	
119	20BEC4120	NAVEEN	84	89	89	92	87		87			92			94	92	
120	20BEC4121	NAVYA	84	91	90	96	97		94			96			97	97	
121	20BEC4122	NIKIL	84	86	86	96	94		93			93			97	96	
122	20BEC4123	NIRVIN CHANDAR	84	86	84	96	93		91			89			92	89	
123	20BEC4124	NITHYAASHREE	94	91	93	94	94		96			94			96	96	
124	20BEC4125	NITHYAPRABHA	91	91	94	97	96		97			97			97	97	
125	20BEC4126	NIVETHA	79	89	87	92	94		94			94			91	94	
126	20BEC4127	POOVITHA	91	93	96	94	93		93			91			92	93	
127	20BEC4128	PRADEEP KUMAR	64	84	81	92	94		91			92			96	94	
128	20BEC4129	PRADEEP	76	72	87	88	88		96			94			94	94	
129	20BEC4130	PRADEEP	84	78	84	91	87		91			91			96	96	
130	20BEC4131	PRANAV KIRUTHIKK	86	87	94	96	87		91			92			94	94	
131	20BEC4132	PRASANA KUMAR	80	88	87	87	92		96			96			95	96	
132	20BEC4133	PRASANTH	79	77	92	94	88		87			88			94	96	
133	20BEC4134	PRASSHANTH	86	86	87	87	86		92			94			93	91	

Sl. No	Reg No	Name of the Student	CONTINUOUS INETRNAL ASSESSMENT														
			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
134	20BEC4135	PRAVEEN	88	84	83	94	91		88			94			94	91	
135	20BEC4136	PRAVEEN ANANDH	89	92	96	96	87		92			96			90	91	
136	20BEC4137	PRAVEEN	87	87	82	87	92		89			87			88	94	
137	20BEC4138	PRAVEEN	96	86	91	92	91		92			94			94	94	
138	20BEC4139	PRAVEEN RAJA	72	72	72	72	72		72			72			72	72	
139	20BEC4140	PRAVEEN	72	72	72	72	72		72			72			72	72	
140	20BEC4141	PRAVIN NIXON	89	91	88	94	88		94			91			96	92	
141	20BEC4142	RAHUL	84	84	88	93	97		97			96			96	96	
142	20BEC4143	RAJA	70	70	70	88	81		91			89			91	96	
143	20BEC4144	RAKSHANA	74	93	84	92	94		94			94			96	96	
144	20BEC4145	RAMESH	92	91	92	93	92		94			100			100	100	
145	20BEC4146	RANJITHKUMAR	93	94	96	91	97		93			94			94	94	
146	20BEC4147	RESHMA	96	96	98	86	92		95			95			96	95	
147	20BEC4148	REVATHYSHREE	96	94	95	93	95		97			100			99	95	
148	20BEC4149	RITHANYA	93	93	92	97	98		97			97			98	97	
149	20BEC4150	RITHICK	94	100	97	95	92		95			100			100	100	
150	20BEC4151	RITHIK	86	90	94	96	93		95			96			93	95	
151	20BEC4152	RITHIKA	98	98	97	93	95		93			95			88	100	
152	20BEC4153	ROHITH	90	96	97	95	93		95			94			94	94	
153	20BEC4154	ROOBESH	92	92	94	93	92		95			95			95	95	
154	20BEC4155	SABANA	96	94	95	91	90		95			100			100	95	
155	20BEC4156	SABAREESH	86	93	94	87	90		100			95			95	95	
156	20BEC4157	SABARI	93	95	94	94	94		94			93			94	93	
157	20BEC4158	SABARNA	95	92	99	100	95		95			100			97	96	
158	20BEC4159	SACHIN ARAVINTH	90	94	95	95	90		90			95			94	98	
159	20BEC4160	SACHIN	95	95	95	95	99		95			94			95	94	
160	20BEC4162	SAKTHIVEL	95	96	97	93	91		100			100			100	100	
161	20BEC4163	SANDHIYA	88	96	97	95	96		95			95			95	95	
162	20BEC4164	SANTHIYA	98	97	96	98	97		95			94			95	95	
163	20BEC4165	SANTHOSH KUMAR	95	93	97	93	93		93			93			93	94	
164	20BEC4166	SANTHOSH	100	100	98	95	93		100			100			100	100	
165	20BEC4167	SANTHOSHKUMAR	90	95	99	94	98		100			100			100	100	
166	20BEC4168	SARAN	96	95	97	93	93		100			100			100	100	
167	20BEC4169	SASITH	92	90	98	90	88		97			100			100	100	

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			EXP 1 (100) CO1	EXP 2 (100) CO1	EXP 3 (100) CO1	EXP 4 (100) CO2	EXP 5 (100) CO2	EXP 6 (100) CO2	EXP 7 (100) CO3	EXP 8 (100) CO3	EXP 9 (100) CO3	EXP 10 (100) CO4	EXP 11 (100) CO4	EXP 12 (100) CO4	EXP 13 (100) CO5	EXP 14 (100) CO5	EXP 15 (100) CO5
168	20BEC4170	SATHISH	92	88	94	88	90		93			95			95	95	
169	20BEC4171	SATHISHKUMAR K	93	93	94	94	93		95			92			92	94	
170	20BEC4172	SELVAKUMAR R	96	92	92	94	92		92			92			93	92	
171	20BEC4173	SHANMUGAPRIYA K	96	99	100	94	94		97			97			97	97	
172	20BEC4174	SHARMILI S	99	96	100	95	93		95			95			97	97	
173	20BEC4175	SHREE SUBHA M	93	92	93	94	95		97			97			96	96	
174	20BEC4176	SHRUDI SK	96	97	99	93	93		95			97			97	97	
175	20BEC4178	SINDHUJA B	92	95	96	94	94		95			96			96	96	
176	20BEC4179	SOBIKA B	96	98	98	94	94		96			97			97	97	
177	20BEC4180	SOWMIYA K	99	96	99	94	94		94			97			97	97	
178	20BEC4181	SOWMIYA P	97	97	98	94	94		94			95			97	97	
179	20BEC4182	SRIDHAR T	96	93	97	94	94		95			96			94	95	
180	20BEC4183	SRIDHAR T.R	89	94	89	94	94		93			96			96	97	
181	20BEC4184	SRIMATHI R	96	96	98	94	94		94			97			97	96	
182	20BEC4185	SRIVISHNU P	98	95	99	89	94		94			97			97	96	
183	20BEC4186	SUBASHRI V	96	93	96	94	94		97			97			97	97	
184	20BEC4187	SUBASRI B	99	94	95	95	94		97			97			97	97	
185	20BEC4188	SUDHARSUN Y	95	97	97	95	94		93			96			96	96	
186	20BEC4189	SUJA S	98	96	99	94	94		95			98			97	97	
187	20BEC4190	SUJITHAA R	96	98	98	94	94		96			98			98	98	
188	20BEC4191	SUKEENDHAR G	94	97	97	94	93		95			95			95	97	
189	20BEC4192	SUKUL S	94	90	91	94	96		95			96			94	96	
190	20BEC4193	SURESH KUMAR K.R	97	97	98	96	98		95			97			96	97	
191	20BEC4194	SURYA S	96	99	97	95	94		96			96			97	95	
192	20BEC4195	SUHASHRAJ V	98	93	100	98	94		94			97			95	95	
193	20BEC4196	SUVETHA C	96	93	97	95	94		95			98			98	98	
194	20BEC4197	SWETHA L.G	96	99	98	94	94		94			97			97	97	
195	20BEC4199	TAMILSELVAN M	95	94	95	90	91		96			96			95	97	
196	20BEC4200	TARUN S.K	93	94	93	95	93		97			96			96	97	
197	20BEC4201	THANYA K	96	94	92	94	94		96			97			97	97	
198	20BEC4202	THARSAN NISOK R	95	94	95	94	94		94			93			96	97	
199	20BEC4203	THARUN S	92	89	94	93	93		94			93			97	97	
200	20BEC4204	THINESH KUMAR G	90	91	93	92	93		96			97			97	97	
201	20BEC4205	USHA E	92	91	95	93	92		94			97			97	97	

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202	20BEC4206	UTITH NARENTHAAR S J	95	95	90	91	94		96			94			95	97	
203	20BEC4207	VAISHNAVEE M	95	96	95	94	94		97			98			98	98	
204	20BEC4208	VARNIKA S	93	94	94	95	94		97			97			97	97	
205	20BEC4209	VARSANA J	95	95	92	94	94		96			97			97	97	
206	20BEC4210	VARSHA N	95	93	94	93	94		97			97			97	96	
207	20BEC4211	VARSHAYINI S	95	93	92	94	94		97			97			97	97	
208	20BEC4212	VENKATESH I	90	91	92	93	93		97			97			97	97	
209	20BEC4213	VIGNESH R	92	90	92	94	96		97			97			97	97	
210	20BEC4214	VIGNESH S	92	95	93	93	94		97			97			96	97	
211	20BEC4215	VIGNESHWARAN S	96	92	92	94	94		96			97			97	97	
212	20BEC4216	VIGNESHWARAN S	92	92	93	95	94		97			97			97	97	
213	20BEC4217	VIJAYARAGAVAN T	93	91	94	93	93		96			95			97	97	
214	20BEC4218	VIKRAM R.N	94	92	93	93	95		96			97			96	97	
215	20BEC4219	VINEETH S	93	94	92	92	93		97			97			97	96	
216	20BEC4220	VINITHA A	92	93	94	94	94		97			97			97	97	
217	20BEC4221	VINOTHKUMAR J	92	94	96	93	94		97			97			97	97	
218	20BEC4222	VISHWA S	94	93	95	93	92		96			95			96	96	
219	20BEC4223	YUVARANJANI J	95	91	94	93	95		97			97			96	96	
220	20BEC4301	ASWIN KUMAR K	92	94	92	92	94		94			92			92	93	
221	20BEC4302	DEEPAN S A	95	99	100	95	96		94			93			94	90	
222	20BEC4303	HALDO J	95	90	97	90	90		97			100			100	100	
223	20BEC4305	KAVINADHITHYA J S	94	95	95	95	95		95			96			95	97	
224	20BEC4306	KAVIYAVARDHINI S	100	98	95	96	96		90			90			90	90	
225	20BEC4307	MOKITH K	94	93	91	94	94		96			97			97	97	
226	20BEC4308	NAVEEN E	94	92	92	90	93		93			96			97	97	
227	20BEC4310	RAGUNATH K	100	95	98	98	94		94			98			98	98	
228	20BEC4312	SREEBALAN V	90	92	94	94	96		95			94			96	96	
229	20BEC4313	SRISUNDHAR V B	98	95	96	91	94		93			93			95	95	
230	20BEC4314	SRIVARSHAN S	92	94	94	92	93		96			95			94	95	

COs	CO Target	CO Attainment	Attainment Gap	Action proposed to bridge the gap	Modification target where achieved
CO1	68.00	69.17	1.17		Increase the target to 70%
CO2	68.00	58.49	-9.51	Solve more number of problems on FIR and IIR Filters	Maintain the same target as 68%
CO3	68.00	67.85	-0.15	The target is nearly Attained	Maintain the same target as 68%
CO4	74.00	80.18	6.18		Increase the target to 75%
CO5	74.00	89.66	15.66		Increase the target to 75%

CO Vs PO														
COURSE COUTCOME	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3				3				3	2
CO2	3	3	3	3	3				3				3	3
CO3	3	3	3	3	3				3				3	2
CO4	3	3	3	2	3	1		1	3	1		1	3	2
CO5	3	3	3	3	3	1		1	3	1		1	3	2
Attainment	73.07	73.07	73.07	72.56	73.07	84.92		84.92	73.07	84.92		84.92	73.07	71.75

Course Coordinator

Verification Incharge

(Dr. A. Murugan)

HOD 21/5/23

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Department	INFORMATION TECHNOLOGY					R 2016	Semester	III
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks	
		L	T	P	C			
16IT301	DATA STRUCTURES AND ALGORITHM DESIGN	3	0	2	4	75	100	

Course Objective (s):

- To introduce the basic algorithm design paradigms to enable the design of efficient algorithms.

Course Outcomes:

1. To introduce the basic concepts of algorithm analysis
2. To introduce the design paradigms for algorithm
3. To introduce the basic complexity theory

Unit I	GRAPH	9

Introduction – Topological sort – Shortest path algorithms – Unweighted Shortest Paths – Dijkstra"s Algorithm – Network flow problems – Depth First Search and Breadth First Search. –Applications of Depth First search –– Applications of Graph.

Unit II	BRUTE FORCE AND DIVIDE-AND-CONQUER	9

Brute Force - Closest-Pair and Convex-Hull Problems-Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassens Matrix Multiplication-Closest-Pair and Convex-Hull Problems.

Unit III	DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE	9

Computing a Binomial Coefficient – Warshall's and Floyd'algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm-Dijkstra's Algorithm-Huffman Trees.

Unit IV	ITERATIVE IMPROVEMENT	9

The Simplex Method-The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs- The Stable marriage Problem.

Unit V	COPING WITH THE LIMITATIONS OF ALGORITHM POWER	9

Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems-- Coping with the Limitations - Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem (0/1) – Traveling Salesman Problem-Approximation Algorithms for NP – Hard Problems.

List of Experiments	30

1. Implementation of Dijikstra's algorithm.
2. Implementation of Depth First Search & Breadth First Search
3. Implementation of Travelling Salesman Problem
4. Implementation of knapsack problem
5. Implementation of Strassens Matrix Multiplication
6. Implementation of Warshall's and Floyd's algorithm
7. Implementation of Prims algorithm
8. Implementation of Kruskal's algorithm
9. Implementation of n-queens algorithm
10. Implementation of Hamiltonian Circuit Problem.

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TEXT BOOK(S):	
1.	Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1997.
2.	Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.

REFERENCE(S):	
1.	T. H. Cormen, C. E. Leiserson, R.L.Rivest, and C. Stein, "Introduction to Algorithms",Second Edition, Prentice Hall of India Pvt. Ltd, 2003.
2.	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education, 1999.

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Department	INFORMATION TECHNOLOGY					R 2016	Semester	IV
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks	
		L	T	P	C			
16IT403	OPEN SOURCE PROGRAMMING	3	0	2	4	75	100	

Course Objective (s):

- To understand the basic principles of open source software & open source programming languages and learn to process software development such as programming, bug reporting, patching code, developing tools.

Course Outcomes:

1. To provide exposure in FOSS and to develop open source software for society.
2. To learn about open source databases & open source programming languages

Unit I	INTRODUCTION	9+2

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux. .

Unit II	OPEN SOURCE DATABASE	9+7

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

Unit III	OPEN SOURCE PROGRAMMING LANGUAGES	9+7

PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

Unit IV	PYTHON	9+7

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

Unit V	PERL	9+7

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

REFERENCE(S):

1.	Rasmus Lerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002,III[rd] Edition
2	Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001,II[nd] Edition.
3	Martin C. Brown, "Perl: The Complete Reference", 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4	Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
5	Steve Suchring, "MySQL Bible", John Wiley, 2002.

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Department	INFORMATION TECHNOLOGY					R 2016	Semester	VI
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks	
		L	T	P	C			
16IT602	OBJECT ORIENTED ANALYSIS AND DESIGN	3	0	2	4	75	100	

Course Objective (s):

The course introduces the students to the basic concept of object oriented analysis and design.

Course Outcomes:

- To learn basic OO analysis and design skills through an elaborate case study.
- To use the UML design diagrams
- To apply the appropriate design patterns

Unit I	FUNDAMENTALS	9+6

Introduction OOAD – Two Orthogonal Views of the Software - Why object orientation – Object basics – Object oriented systems development life cycle.

Unit II	OBJECT ORIENTED METHODOLOGIES	9+6

Rumbaugh methodology – Booch methodology – Jacobson methodology – Patterns – Frameworks – Unified approach – Unified modeling language – Use case diagram – Class diagram – Sequence diagram – Activity diagram.

Unit III	OBJECT ORIENTED ANALYSIS	9+6

Identifying use cases – Identifying Tentative classes – Identifying Classes and their Behaviors using SCM - Identifying object relationships – Attributes and methods.

Unit IV	OBJECT ORIENTED DESIGN	9+6

Design axioms – Designing classes – Object storage – Introduction – Object store and persistence overview – Database Management Systems.

Unit V	SOFTWARE QUALITY AND USABILITY	9+6

Introduction to SQA – Quality Assurance Tests – Testing Strategies – Impact of object orientation on Testing – Test cases-Test Plan – System usability and measuring user satisfaction

TEXT BOOK (S)

1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw - Hill, 1999.
2. Martin Fowler, "UML Distilled", 2nd Edition, Prentice Hall of India / Pearson Education, 2002

REFERENCE (S)

1. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw - Hill, 2003.
2. James Rumbaugh, Ivar Jacobson and Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
3. Barclay, "Object-Oriented Design with UML and Java", Elsevier, 2008.

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Department	INFORMATION TECHNOLOGY					R 2016	Semester
Course Code	Course Name	Hours / Week			Credit	Total Hours	Maximum Marks
		L	T	P	C		
16ITE19	SOFT COMPUTING	3	0	2	4	60	100

Course Objective (s):

The main objective of the course is to expose the students to soft computing, various types of soft computing techniques, and applications of soft computing

Course Outcomes:

- Infer soft computing techniques and their applications.
- Outline various neural network architectures.
- Illustrate the perceptrons and counter propagation networks.
- Infer fuzzy systems.
- Dramatize the genetic algorithms and their applications.

Unit I	ARTIFICIAL NEURAL NETWORK	9

Artificial Neural Network: Introduction, Characteristics- Learning Methods – Taxonomy –Evolution of Neural Networks- Basic Models - Important Technologies –Applications. Fuzzy Logic: Introduction - Crisp Sets- Fuzzy Sets - Crisp Relations and Fuzzy Relations: Cartesian Product of Relation - Classical Relation, Fuzzy Relations, Tolerance and Equivalence Relations, Non-Iterative Fuzzy Sets. Genetic Algorithm- Introduction – Biological Background - Traditional Optimization and Search Techniques - Genetic Basic Concepts.

Unit II	NEURAL NETWORKS	9

Mcculloch-Pitts Neuron - Linear Separability - Hebb Network - Supervised Learning Network: Perceptron Networks - Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, BPN, RBF, TDNN- Associative Memory Network: Auto-Associative Memory Network, Hetero-Associative Memory Network, BAM, Hopfield Networks, Iterative Auto Associative Memory Network & Iterative Associative Memory Network –Unsupervised Learning Networks: Kohonen Self Organizing Feature Maps, LVQ – CP Networks, ART network.

Unit III	FUZZY LOGIC	9

Fuzzy Measures: Fuzzy Arithmetic -Extension Principle - Fuzzy Measures - Measures of Fuzziness -Fuzzy Integrals - Fuzzy Rule Base and Approximate Reasoning : Truth Values and Tables, Fuzzy Propositions, Formation of Rules-Decomposition of Rules, Aggregation of Fuzzy Rules, Fuzzy Reasoning-Fuzzy Inference Systems-Overview of Fuzzy Expert System-Fuzzy Decision Making.

Unit IV	GENETIC ALGORITHM	9

Genetic Algorithm and Search Space - General Genetic Algorithm – Operators - Generational Cycle Stopping Condition – Constraints - Classification - Genetic Programming – Multilevel Optimization – Real Life Problem- Advances in GA.

Unit V	HYBRID SOFT COMPUTING TECHNIQUES & APPLICATIONS	9

Neuro-Fuzzy Hybrid Systems - Genetic Neuro Hybrid Systems - Genetic Fuzzy Hybrid and Fuzzy Genetic Hybrid Systems - Simplified Fuzzy ARTMAP - Applications: A Fusion Approach of Multispectral Images with SAR, Optimization of Traveling Salesman Problem using Genetic Algorithm Approach, Soft Computing Based Hybrid Fuzzy Controllers.

TEXT BOOK(S):

1. J.S.R.Jang, C.T. Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI / Pearson Education 2004.
2. S.N.Sivanandam and S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt Ltd, 2011.

REFERENCE(S):

1. S.Rajasekaran and G.A.Vijayalakshmi Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis & Applications", PHI Learning Pvt. Ltd., 2006.
2. George J. Klir, Ute St. Clair, Bo Yuan, "Fuzzy Set Theory: Foundations and Applications" Prentice Hall, 1997.

Regulation 2018		Semester III	Total Hours			60
			Hours / Week			C
Category	Course Code	Course Name	L	T	P	
S	18ECS202J	Analog and Digital Electronics	3	0	2	4

Prerequisite Course (s)

Basic Electrical and Electronics Engineering

Course Objective (s):

1	To understand the methods of biasing the Transistors & to know construction and characteristics of special diodes
2	To simplify Boolean expressions using basic postulates of Boolean algebra.
3	To synthesize the basic combinational circuits
4	To synthesize the basic Sequential circuits
5	To synthesize combinational and sequential logic using programmable logic devices.

Course Outcome (s) (COs):

CO1	Review various biasing techniques used in BJT and its characteristics.
CO2	Illustrate the Boolean functions and Boolean Expressions.
CO3	Design and Analyze the combinational circuits.
CO4	Design and Analyze the sequential circuits.
CO5	Analyze the characteristics and structure of different memory systems and programmable logic Devices

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	1	-	-	3	2	-	2	3	-	2
CO2	3	3	2	2	2	1	-	-	3	2	-	2	3	-	2
CO3	3	3	2	2	2	1	-	-	3	2	-	2	3	-	2
CO4	3	2	2	2	2	1	-	-	3	2	-	2	3	-	2
CO5	3	3	2	2	2	1	-	-	3	2	-	2	3	-	2
CO (Avg)	3	2.8	2	2	2	1	-	-	3	2	-	2	3	-	2

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

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UNIT I	TRANSISTORS AND SPECIAL DIODES	9

Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics - The Metal-oxide-semiconductor FET (MOSFET) – The Low–frequency Common Source and Common Drain Amplifiers – Biasing the FET - Construction & Characteristics of UJT- SCR –TRIAC - DIAC.

UNIT II	BOOLEAN ALGEBRA AND LOGIC GATES	9

Boolean postulates and laws –De-Morgan's Theorem- Principle of Duality- Boolean expression – Minimization of Boolean expressions– Sum of Products (SOP), Product of Sums (POS) and its Conversion– Minimization of Boolean Expression upto 4 variables using Karnaugh map, Tabulation Method-Don't care conditions. Introduction to Logic Gates - Implementation of Basic Gates using Universal gates.

UNIT III	COMBINATIONAL CIRCUITS	9

Design procedure of Combinational circuits: Adders - Subtractors – Parallel adder/ Subtractor- Carry look ahead adder- BCD adder- 2- bit Magnitude Comparator- Multiplexer / Demultiplexer - Encoder / Decoder – Parity Generator/Checker – Code converters: Binary to Gray – Gray to Binary - BCD to Excess 3 – Excess 3 to BCD.

UNIT IV	SEQUENTIAL CIRCUITS	9

Flip flops SR, JK, T, D and Master slave – Characteristic and excitation tables and equations –Level and Edge Triggering –Realization of one flip flop using other flip flops – counters - Ring counters and Sequence detector - Design of Synchronous counters - Registers – shift registers- Universal shift register.

UNIT V	MEMORY AND PROGRAMMABLE LOGIC DEVICES	9

Classification of memories – ROM Organization: PROM, EPROM, EEPROM – RAM Organization: Static RAM, Dynamic RAM - (PLA) - Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) - Implementation of combinational logic circuits using PROM, PLA, PAL.

LIST OF EXPERIMENTS	15

1. Design and construct Fixed Bias amplifier circuit using BJT
2. Design and construct BJT Common Emitter Amplifier using voltage divider bias (self-bias).
3. Design and implementation of Adder / subtractor using basic gates and MSI devices.
4. Design and implementation of 2-bit and 8-bit magnitude comparator using basic gates and MSI devices.
5. Design and implementation of multiplexers and demultiplexers.
6. Design and testing of flip-flops using gates.
7. Implementation of SISO, SIPO, PISO and PIPO shift registers using flip-flops.

Text Book (s)

1	S. Salivahanan, N. Suresh Kumar and A. Vallavaraj, Electronic Devices and Circuits, 4th Edition, Tata McGraw-Hill Education Pvt. Ltd, 2017.
2	Morris Mano, M, - Digital Design, Third Edition, Prentice Hall of India, New Delhi, 2003.

Reference (s)	
1	Millman J and Halkias.C. Integrated Electronics, TMH, 2007.
2	David A. Bell, Electronic Devices & Circuits, 4th Edition, PHI, 2007
3	Roth, Charles H., - Fundamentals of Logic Design, Thomson Publication Company, New Delhi,2003.
4	Leach, Donald P. and Malvino, Albert Paul., - Digital Principles and Applications, Fifth Edition, Tata McGraw-Hill, New Delhi, 2003.
5	Givone, Donald D.,- Digital Principles and Design, Tata McGraw-Hill, New Delhi, 2003.

Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ITC201J	Data Structures and Algorithms	3	0	2	4

Prerequisite Course (s)

Programming for problem solving

Course Objective (s):

The purpose of learning this course is to:

1	Implement Linear and Non-Linear Data Structures using Array and Linked List
2	Outline the parameters to measure the running time of an algorithm
3	Understand the problem type and select respective problem solving methodology

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Implement Linear Data Structures such as List, Stack and Queue
CO2	Apply Non-Linear Data Structures such as Trees and Heaps in problem solving
CO3	Illustrate the working of shortest path algorithms
CO4	Understand the problem solving nature of brute force and divide and conquer techniques
CO5	Solve problems using Dynamic Programming, Backtracking and Branch & Bound techniques

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2									2	2		
CO2	3	2										2	2		
CO3	3	2	2										2		
CO4	3	2	2										2		
CO5	3	2	2					2					2		
CO (Avg)	3	2	1.6					2					2		

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

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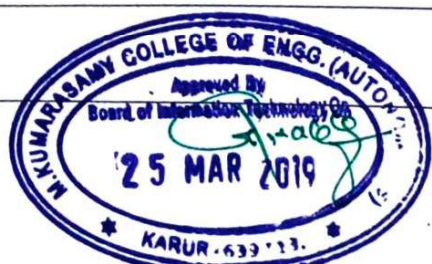
UNIT I	Measuring Algorithm efficiency and Linear Data Structure	9
Notion of an Algorithm - Fundamentals of the Analysis of Algorithm Efficiency - Asymptotic Notations and its properties - ADT - List ADT [Array and Linked List Implementation] - Stack ADT [Implementation] – Applications of Stack [Evaluating arithmetic expressions and Recursion] - Queue ADT [Implementation and Types]		
UNIT II	**Non-Linear Data Structure: Trees**	**9**
Tree basic terminologies – Binary Tree – BST [Implementation] – Tree Traversal – AVL Tree – Red Black Tree – B-Tree – Binary Heap – Hashing		
UNIT III	**Non-Linear Data Structure: Graphs & Greedy Technique**	**9**
Graph basic Terminologies – Topological sort – Depth First Search and Breadth First Search - Unweighted Shortest Paths – Greedy Algorithm: Prim's algorithm - Kruskal's Algorithm - Dijkstra's Algorithm - Huffman Trees		
UNIT IV	**Brute force and Divide and Conquer**	**9**
Brute Force - Exhaustive Search - Traveling Salesman Problem - Knapsack Problem - Assignment problem – Divide and Conquer – Merge, Quick sort - Strassens Matrix Multiplication		
UNIT V	**Dynamic Programming, Backtracking and Branch & Bound**	**9**
Computing a Binomial Coefficient – Warshall's and Floyd's algorithm – Optimal Binary Search Trees - Knapsack Problem - Backtracking – n-Queens problem – Hamiltonian Circuit Problem - Branch and Bound – Assignment problem – Knapsack Problem (0/1)		
	LIST OF EXPERIMENTS	**15**

1. Array Implementation of List ADT
2. Linked List Implementation of List ADT
3. Implementation of Stack ADT
4. Implementation of Queue ADT
5. Binary Search implementation
6. Implement Quick Sort
7. Implementation of Dijikstra's algorithm.
8. Implementation of Prims algorithm
9. Implementation of Kruskal's algorithm
10. Implementation of n-queens algorithm

Text Book (s)

1	M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2011.



2	AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2017.
Reference (s)	
1	Y.Langsam, M.J.Augeustein and A.M.Tenenbaum, "Data Structures Using C", Pearson Education Asia, 2004.
2	Richard Gilberg, Behrouz A. Forouzan, "Data Structures: A Pseudo code Approach with C", Second edition, India Edition 2005.
3	Aho, J.E. Hopcroft and J.D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
4	Ellis Horowitz, SartajSahni, Sanguthevar Rajasekaran, "Fundamentals of Computer Algorithms",Galgotia Publications,2010.
5	Thomas H. Cormen, Charles E.Leiserson, Ronald L.Rivest, Clifford Stein "Introduction to Algorithms", 3rd Edition, The MIT Press 2009.

Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ITC203J	Object Oriented Programming	3	0	2	4

Prerequisite Course (s)

Programming for problem solving

Course Objective (s):

The purpose of learning this course is to:

1	Understand Object Oriented Programming concepts and basic characteristics of Java
2	Understand the principles of packages, inheritance and interfaces
3	Define exceptions and use I/O streams
4	Develop a java application with threads and generics classes
5	Design and build simple Graphical User Interfaces

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Develop Programs using OOP principles
CO2	Develop Programs with the concepts inheritance and interfaces
CO3	Build Applications using exceptions and I/O streams
CO4	Develop Applications with threads and generics classes
CO5	Develop interactive Java programs

COPO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			3								2	2	
CO2	2	2			2								2	2	
CO3	2	2			2							2	2	2	
CO4	2	2										2	2	2	
CO5	3	3										3	2	2	
CO (Avg)	2.4	2.2			2.33							2.33	2	2	

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

UNIT I	INTRODUCTION TO OOP AND JAVA FUNDAMENTALS	10
Object Oriented Programming and Evolution of Java-Program Structures in Java-Datatypes, Variables and Opearators-Control Statements – Classes and Objects – Methods - Arrays.		
UNIT II	**INHERITANCE AND INTERFACES**	**9**
Inheritance – Interfaces – Packages and Java Library – String Handling .		
UNIT III	**EXCEPTION HANDLING AND I/O**	**8**
Exceptions Handling - Input / Output Basics –Streams –Byte streams and Character streams – Reading and Writing Console –Reading and Writing Files		
UNIT IV	**MULTITHREADING AND GENERIC PROGRAMMING**	**9**
Multithread Programming (Differences Between Multithreading and Multitasking, Thread Life Cycle, Creating Threads, Synchronizing Threads, Interthread communication, Daemon threads, Thread groups). Generic Programming –Generic Classes –Generic Methods –Bounded Types – Restrictions and Limitations		
UNIT V	**COLLECTIONS AND EVENT DRIVEN PROGRAMMING**	**9**
Collection (Array List,Tree,Set,Map,Stack,Queue) – Event Handling – Applet – Creating GUI in AWT Windows(Basic Components and Layout Manager).		

Text Book (s)

1	Herbert Schildt, "Java The complete reference", 8th Edition, McGraw Hill Education, 2011
2	Cay S. Horstmann, Gary cornell, "Core Java Volume –I Fundamentals", 9th Edition, Prentice Hall, 2013.

Reference (s)

1	Paul Deitel, Harvey Deitel, "Java SE 8 for programmers", 3rdEdition, Pearson, 2015.
2	Steven Holzner, "Java 2 Black book", Dreamtech press, 2011.
3	Timothy Budd, "Understanding Objectoriented programming with Java", Updated Edition, Pearson Education, 2000.

LIST OF EXPERIMENTS — **15**

1. Develop application to generate Electricity bill. Create a class with the following members: Consumer no., consumer name, previous month reading, current month reading,type of EB connection(i.e domestic or commercial). Compute the bill amount using the following tariff.

If the type of the EB connection is domestic, calculate the amount to be paid as follows:

- First 100 units Rs. 1 per unit
- 101200 units Rs. 2.50 per unit
- 201 500 units Rs. 4 per unit
- >501 units Rs. 6 per unit

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If the type of the EB connection is commercial, calculate the amount to be paid as follows:

- First 100 units Rs. 2 per unit
- 101200 units Rs. 4.50 per unit
- 201 500 units Rs. 6 per unit
- > 501 units Rs. 7 per unit

2. Develop application to implement currency converter (Dollar to INR, EURO to INR, Yen to INR and vice versa), distance converter (meter to KM, miles to KM and vice versa) , time converter (hours to minutes, seconds and vice versa) using packages.

3. Develop application with Employee class with Emp_name, Emp_id, Address, Mail_id, Mobile_no as members. Inherit the classes, Programmer, Assistant Professor, Associate Professor and Professor from employee class. Add Basic Pay (BP) as the member of all the inherited classes with 97% of BP as DA, 10 % of BP as HRA, 12% of BP as PF, 0.1% of BP for

staff club fund. Generate pay slips for the employees with their gross and net salary.

4. Design interface for ADT Stack. Implement this interface using array. Provide

necessary exception handling in both the implementations.

5. Write a program to perform string operations using Array List. Write functions for the following

a) Append add at end
b) Insert – add at particular index
c) Search
d) List all string starts with given letter

6. Write a Program to create an abstract class named Shape that contains two integers and an empty method named print Area(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

7. Write a program to implement user defined exception handling.

8. Write a program that reads a file name from the user, displays information about whether the file exists, whether the file is readable, or writable, the type of file and the length of the file in bytes.

9. Write a program that implements a multithreaded application that has three threads. First thread generates a random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

10. Write a program to find the maximum value from the given type of elements using a generic function.

11. Design calculator using eventdriven programming paradigm with the following options.

a) Decimal manipulations
b) Scientific manipulations

12. Develop a mini project for any application using OOPS concepts.

Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ITC206J	Computer Networks	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Explain the layers of OSI model
2	Solve subnet and VLSM problems
3	Illustrate the application layer protocols

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Select the required topology for a network.
CO2	Analyze the various error detection and correction methods in data communication.
CO3	Design computer networks using sub-netting and routing concepts.
CO4	Apply the congestion control techniques for the data networks to improve the quality of service.
CO5	Identify the application layer protocols required to build applications.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2											3		
CO2	2	1	2										2		
CO3	3	2	3		2			2					3	1	2
CO4	2		2										2	1	
CO5	2		2									2		2	
CO (Avg)	2.4	1.66	2.3		2			2				2	2	1.33	2

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

UNIT I	Fundamentals and Physical Layer	9
Evolution of Computer networks-Categories of networks-Network Topology- Network devices: modems, HUB, Bridge, Switches, Routers, Gateways -Layered Network Architecture - OSI, TCP/IP-Multiplexing - Transmission media		
UNIT II	**Data Link Layer**	**9**
LAN Techonologies (Ethernet, Token Ring) - WAN Technologies (Frame Relay) - Framing - Error control - flow control – Media access control		
UNIT III	**Network Layer**	**9**
IPV4- Addressing, Subnetting, VLSM, CIDR - IPV6 Addressing (Structure and Address Space) - ARP - ICMP - Routing protocols - Distance Vector - Link state		
UNIT IV	**Transport Layer**	**9**
Overview of Transport layer-UDP-TCP-Reliable byte stream-connection management –flow control-congestion control-congestion avoidance		
UNIT V	**Application Layer Protocols And Network Performance Measures**	**9**
Web and HTTP - FTP- DNS – SMTP – POP - SNMP - Bandwidth – latency – Throughput - Jitter – Delay		

LIST OF EXPERIMENTS — **15**

1. Study of CISCO packet tracer
2. Study of Network devices and Network cables
3. Demonstrate how traffic is sent between nodes in a LAN
4. Demonstrate how traffic is sent between nodes in a WAN
5. Make use of Sub-netting and Simulate computer communication network for an organization
6. Implement VLAN for a computer network
7. Configure DHCP server
8. DNS configuration
9. E-mail server configuration
10. FTP configuration

Text Book (s)

1	Behrouz A.Ferouzan,"Data Communications and Networking", Fifth Edition, Tata McGraw-Hill Publication, 2013.
2	Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.

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Reference (s)	
1	William Stallings, "Data and Computer Communications", Tenth edition, Pearson Education, 2013.
2	James F. Kurose, Keith W. Ross, "Computer Networking, A Top–Down Approach Featuring the Internet", Sixth edition, Pearson Education, 2012.
3	Nader. F. Mir, —Computer and Communication Networksl, Pearson Prentice Hall Publishers, 2010.

Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ITC207J	Database Management Systems	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Introduce Database concepts and models
2	Access the Relational Database using SQL queries
3	Understand Transaction processing and concurrency control

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Differentiate Database systems from file systems
CO2	Construct queries to manipulate data in Database
CO3	Illustrate the conditions of Normal forms
CO4	Interpret the issues of Transaction Processing
CO5	Demonstrate an understanding of Storage and Recovery

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2		2										2		
CO2	3	2	3		2				2			2	1	2	
CO3	2	2	3										2	1	
CO4	2		3	2									1		
CO5	3		2					2					3		1
CO (Avg)	2.4	2	2.6	2	2			2	2			2	1.8	1.5	1

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

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25 MAR 2019

UNIT I	DATABASE SYSTEMS AND ER-MODEL	9

The Evolution of Database Systems and DBMS - Overview of a Database Management System – Views of data – Data Models - Database System Architecture – Data Models – Entity Relationship model – ER Model: Objects-Attributes and its type-Entity and Relationship-Design issues of ER model- Constraints.

UNIT II	RELATIONAL MODEL AND SQL	9

Relational model Concepts - Keys – Tabular representation of various ER schema - Overview of query processing - Relational Algebra – Basic operations - SQL overview - Basic SQL Query - Nested queries - Correlated and Aggregate functions - Integrity constraints in SQL - Embedded SQL

UNIT III	NORMALIZATION	9

Problem encountered with bad schema design - functional dependencies - Decomposition - Motivation for normal forms -Normalization (INF, 2NF, 3NF, BCNF) - Multivalued dependencies (4NF) - Join dependencies (5NF)

UNIT IV	TRANSACTION PROCESSING	9

Introduction to Transactions - ACID Properties – Serializability and Recoverability - Conflict Serializability - Concurrency Control Techniques - Two Phase locking mechanism, Timestamp based protocol – Deadlock Detection and Management

UNIT V	RECOVERY AND STORAGE	9

Types of failures - Undo, Redo Techniques - Log based Recovery - Shadow paging Techniques - ARIES Recovery algorithm - Overview of primary and secondary storage media - File organization – RAID - Data Dictionary Storage

LIST OF EXPERIMENTS	15

1. Data Definition Language (DDL) commands
2. Data Manipulation Language (DML) and Data Control Language (DCL)
3. Constraints and Views
4. Joins and Nested Queries
5. High level language extensions Procedures and Functions
6. High level language extensions with Cursors and Triggers
7. Embedded SQL
8. Study of E-R model and Normalization
9. Database Connectivity Using PHP/Python/Java

Text Book (s)

1	Abraham Silberschatz, Henry Korth, and S. Sudarshan, Database System Concepts, Sixth edition, McGraw-Hill.2011.

2	R. Elmasri and S. Navathe, Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2011.
Reference (s)	
1	Gupta G K, "Database Management Systems", Tata McGraw Hill Education Private Limited, New Delhi, 2011.
2	Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Sixth Edition, Pearson / Addision Wesley, 2010.
3	Raghu Ramakrishnan, Johannes Gehrke "Database Management Systems", Third Edition, McGrawHill, 2007.
4	Date C.J, An Introduction to Database, Addison-Wesley Pub Co, 8thEdition, 2006.
5	Thomas M. Connolly and Carolyn E. Begg, "Database Systems - A Practical Approach to Design, Implementation, and Management", fifth edition, Pearson Education, 2010.

Regulation 2018		Semester V	Total Hours			
			Hours / Week			
Category	Course Code	Course Name	L	T	P	C
C	18ITC302J	Software Testing	2	0	2	3

Prerequisite Course (s)

Software Engineering,Agile Development Methodology

Course Objective (s):

The purpose of learning this course is to:

1	Learn the fundamental concepts in software testing .
2	Understand the design of test cases.
3	Understand test management and test automation techniques.
4	Apply test metrics and measurements.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Design test cases suitable for a software development for different domains.
CO2	Identify suitable tests to be carried out.
CO3	Understand the wide variety of testing techniques at various testing levels
CO4	Develop document test plans and test case design.
CO5	Use automatic testing tools.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	2	-	1	1	-	-	2	-	1	1	3	-	-
CO2	3	2	-	-	-	-	-	-	-	1	-	-	3	-	-
CO3	3	2	1	-	-	-	-	-	-	1	-	-	3	-	-
CO4	3	3	2	-	-	-	-	-	1	-	-	1	3	-	-
CO5	3	3	3	3	-	-	-	-	1	1	-	1	3	-	-
CO (Avg)	3	2.2	1.6	3	1	1	-	-	1.33	1.0	1.0	1	3	-	-

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

UNIT I	TESTING FUNDAMENTALS	5
Objectives and Principles - Fundamental Test Process -Test Levels - Establishing a Testing Policy - Structured Approach to Testing -Test Factors - Developing Risk Matrix - Steps in Software Testing Process		
UNIT II	TESTING TECHNIQUES	6
White Box Testing - Basis Path Testing - Control Structure Testing – Mutation Testing - Black Box Testing - Equivalence Partitioning - Boundary Value Analysis - Testing for Web applications – Content Testing - User Interface Testing - Component Level Testing - Navigation Testing - Configuration Testing		
UNIT III	LEVELS OF TESTING - I	6
The need for Levels of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests– Integration Test Planning – Scenario testing – Defect bash elimination System Testing.		
UNIT IV	LEVELS OF TESTING - II	6
Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.		
UNIT V	TEST MANAGEMENT	7
People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group- The Structure of Testing Group- .The Technical Training Program		

List Of Experiments:

1. Understand The Automation Testing Approach
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases.
3. Conduct a test suite for any two web sites
4. Install Selenium server and demonstrate it using a script in Java/PHP
5. Write and test a program to login a specific web page
6. Write and test a program to update 10 student records into table into Excel file
7. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects)
8. Write and test a program to provide total number of objects present / available on the page
9. Write and test a program to get the number of list items in a list / combo box

Text Book (s)

1. Gopalaswamy Ramesh and Srinivasan Desikan,"Software Testing: Principles and Practices",Pearson Education, New Delhi, 2006
2. Ron Patton,"Software Testing", Second Edition, Sams Publishing, Pearson Education, 2007. AULibrary.com.

Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18ITC304J	Web Technology	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Design web pages more effectively
2	Handle the DOM objects
3	Develop server side programs

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Create simple web pages using HTML and CSS
CO2	Structure data for storage and transport
CO3	Access the HTML elements using JavaScript
CO4	Design simple Dynamic web pages using Servlet and JSP
CO5	Access the Database using PHP

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	-	-	-	-	-	-	-	-	2	1	3	2
CO2	3	1	3	2	-	-	-	-	-	-	-	2	1	3	2
CO3	2	1	3	2	-	-	-	-	-	-	-	2	1	3	2
CO4	2	1	3	2	2	1	-	2	1	-	1	2	1	3	2
CO5	3	1	3	2	2	1	-	2	1	-	2	2	1	3	2
CO (Avg)	2.6	1	3	2	2	1		2	1		1.5	2	1	3	2

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

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UNIT I	INTRODUCTION	9
Introduction to www, web 2.0, web browser, web server, three tier web architecture, HTML: bas HTML tags, HTML5 features, CSS		
UNIT II	**XML AND JSON**	**9**
Introduction to XML – XML fundamentals, DTD, Schema - XML namespaces - XPath - XSL JSON: Data types and objects		
UNIT III	**JAVASCRIPT AND AJAX**	**9**
Introduction, Java Script DOM model, Built-in objects, validation, Event Handling, Ajax: AJAX Introduction, AJAX Components, Handling Dynamic HTML with Ajax		
UNIT IV	**SERVER SIDE PROGRAMMING USING JAVA**	**9**
Servlet: Overview - Architecture -Generating Dynamic Content-Life Cycle- Sessions-Cookies, JSP Overview – Standard tag library		
UNIT V	**PHP**	**9**
PHP Introduction, Structure of PHP, PHP Functions, Arrays, function and built-in variables, connecting to Database		

LIST OF EXPERIMENTS — **15**

1. Creation of simple HTML5 pages with divisions, links, tables, canvas and other tags.
2. Webpage – CSS3, Style sheet Inclusion Techniques
3. Client Side Programming
   a. JavaScript for displaying date and comparing two dates.
   b. Form validation including text field, radio buttons, checkboxes, list box and other controls
4. Create a simple Ajax code to retrieve data from a TXT file
5. XML – DTD
6. XML – XSL
7. Simple Dynamic web page creation using Servlet
8. Simple web application using JSP to access the Database
9. PHP web application using JSON

Reference (s)

1	Kogent Learning Solutions Inc., —Web Technologies: HTML, CSS, Javascript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XMLI, Dreamtech Press, New Delhi, 2013
2	Paul Deitel (Author), Harvey Deitel (Author), Abbey Deitel (Author) - Internet and World Wide Web, Fifth Edition, Pearson, 2018
3	Rashim Mogha, Preetham.V.V., — Java Web Services Programmingl, Wiley Dream tech, New Delhi, 2002.

Regulation 2018		Semester VI	Total Hours			45
			Hours / Week			
Category	Course Code	Course Name	L	T	P	C
C	18ITC305J	Bigdata Technologies	2	0	2	3

Prerequisite Course (s)

Data mining and warehousing ,Big data analytics.

Course Objective (s):

The purpose of learning this course is to:

Know the fundamental concepts of Big Data Technologies, explore Tools and practices for working with Big data, stream computing and the research that requires the integration of large amounts of data.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Describe about Big Data and understanding the working process of hadoop environment.
CO2	Explain about streaming Data and learing about the key/value pair in spark
CO3	Explain conceptually how Big Data is stored using various tools.
CO4	Explain how Big Data can be analysed.
CO5	Illustrate the Communication with data using various bigdata applications.

CO-PO Mapping

COs	Pos												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	-	2	-	-	-	-	-	-	3	3	3
CO2	3	2	2	2	-	2	-	-	-	-	-	-	3	2	3
CO3	2	2	2	2	-	2	-	-	-	-	-	-	3	2	2
CO4	3	2	2	2	-	2	-	-	-	-	-	-	2	2	3
CO5	2	2	2	2	-	2	-	-	-	-	-	-	2	2	2
CO (Avg)	2.60	2.00	2.00	2.00	-	2.00	-	-	-	-	-	-	2.60	2.20	2.60

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

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UNIT I	INTRODUCTION TO HADOOP ENVIRONMENT	9
A brief history of hadoop-Introduction to hadoop frame work-Map reduce-YARN-Hadoop Distributed file system-Setting up Hadoop cluster.		
UNIT II	**LEARNING SPARK LIGHTNING**	**9**
Introduction to BigData using Spark-Downloading Spark and Getting started –Working with Key/Value pair-Loading and Saving data – Advanced Spark programming-Running on Clusters.		
UNIT III	**STUDY OF MONGODB**	**9**
Introduction and getting started to Mongodb-Creating,Updating,and Deleting documents – Querying-Indexing-Aggregation-Administration –Replication.		
UNIT IV	**INTRODUCTION TO PIG ,HIVE and H-BASE**	**9**
Introduction to PIG - Pig latin - User Define Functions - Data Processing Operation - Introduction to HIVE - Comparision with traditional database - HiveQL – Tables - Querying data- User Define Functions - Introduction to H-Base-H-Base concepts -H-Base versus RDBMS.		
UNIT V	**DATA TRANSFER USING ZOOKEEPER**	**9**
Introduction to Zookeeper-Installing and Running zookeeper-An Example-Zookeeper services-Building application with Zookeeper.		

LIST OF EXPERIMENTS

1. Setting up hadoop single node cluster.
2. Hadoop word count program.
3. Accuring streaming data using apache spark.
4. Using Mongodb create, update,delete,aggregate data.
5. Data storage using H-base.
6. Data processing using HIVE.
7. Data transfer using Zookeeper.

Text Book (s)

1	Tom White "Hadoop: The Definitive" Copyright © 2009 Tom White.Printed in the United States of America. Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472.
2	Holden Karau, Andy Konwinski, Patrick Wendell, and Matei Zaharia "Learning Spark" Copyright © 2015 Databricks. Printed in the United States of America. Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472
3	Kristina Chodorow and Michael Dirolf "MongoDB: The Definitive Guide"Copyright © 2010 Kristina Chodorow and Michael Dirolf. Printed in the United States of America.Published by O'Reilly Media, Inc., 1005 Gravenstein Highway North, Sebastopol, CA 95472.

Reference (s)

1	https://www.edureka.co/blog/top-big-data-technologies/
2	http://index-of.co.uk/Big-Data-technologies/Big%20Data%20Analytics%20with%20R%20and%20Hadoop.pdf
3	https://analyticsindiamag.com/7-emerging-big-data-technologies-to-watch-out-for/

Regulation 2018			Total Hours			60
Category	Course Code	Course Name	Hours / Week			
			L	T	P	C
E	18ITE001J	Python Programming	3	0	2	4

Prerequisite Course (s)

C Programming

Course Objective (s):

The purpose of learning this course is to:

1	Outline the core syntax and semantics of Python programming language.
2	Identify the need for working with the strings and functions.
3	Illustrate the basic operations and methods of python datastructures-lists, dictionaries, tuples and sets.
4	Understand the Object-oriented Programming concepts in Python.
5	Infer the applications of data science using python.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
CO2	Express proficiency in the handling of strings and functions.
CO3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
CO4	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python.
CO5	Intrept the fundamental of data science using python

CO-PO Mapping

COs	Pos												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	3	-	-	-	-	-	-	-	1	2	-
CO2	2	2	2	1	3	-	-	-	-	-	-	-	1	2	-
CO3	3	3	2	2	3	-	-	-	-	-	-	-	3	3	-
CO4	3	3	2	2	3	-	-	-	-	-	-	-	2	3	-
CO5	3	3	2	1	3	-	-	-	-	-	-	-	2	3	-
CO (Avg)	2.8	2.8	2	1.4	3	-	-	-	-	-	-	-	1.8	2.6	-

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

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UNIT I	FUNDAMENTAL OF PYTHON PROGRAMMING LANGUAGE	9
Introduction to python programming language,Python Data Types, Indentation, Type Conversions,operators, Control Flow Statements, The while Loop, The for Loop, The continue and break Statements, Catching Exceptions Using try and except Statement		
UNIT II	**FUNCTIONS AND STRINGS**	**9**
Functions, Built-In Functions, Function Definition and Calling the Function, The return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Creating and Storing Strings, Basic String Operations, String Slicing and Joining, String Methods, Formatting Strings		
UNIT III	**LIST, DICTIONARIES, TUPLES AND SETS**	**9**
Creating Lists, Basic List Operations, Built-In Functions Used on Lists, List Methods, Creating Dictionary, Accessing and Modifying key:value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, Creating Tuples, Basic Tuple Operations, Built-In Functions Used on Tuples, Sets, Set Methods.		
UNIT IV	**FILES AND OBJECT ORIENTED PROGRAMMING**	**9**
Types of Files, Creating and Reading Text Data, Regular Expression Operations, Object-Oriented Programming, Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism		
UNIT V	**INTRODUCTION TO DATA SCIENCE**	**9**
Data science process, Introduction to python data science libraries (numpy and pandas), Random forest regression in python,Applications of Data Science		

List of Experiments

1.Programs on Data Types
2.Programs on Control Statements
3.Programs on Functions
4.Programs on List
5.Programs on Tuples
6.Programs on Dictionary
7.Programs on Strings
8.Program on Files
9.Programs On Classes and Objects
10.Program on Modules, Packages
11.Mini Project

Text Book (s)

1	Gowrishankar S, Veena A, **"Introduction to Python Programming"**, 1st Edition, CRC Press/Taylor & Francis, 2018. ISBN-13: 978-0815394372
2	Jake VanderPlas, **"Python Data Science Handbook: Essential Tools for Working with Data"**, 1st Edition, O'Reilly Media, 2016. ISBN-13: 978-1491912058

Reference (s)	
1	Aurelien Geron, **Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems",** 1st Edition,O'Reilly Media, 2017. ISBN – 13: 978-1491962299
2	Wesley J Chun, **"Core Python Applications Programming",** 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365
3	Miguel Grinberg, **"Flask Web Development: Developing Web Applications with Python",** 2nd Edition, O'Reilly Media, 2018. ISBN-13: 978-1491991732.

11	18BIT4021	DHARSHINI M	23	3.83	27	4.50	24	4.00	54	5.4	50	5	30	3	26
12	18BIT4022	DINESHKUMAR P	18	3.00	15	2.50	20	3.33	79	7.9	46	5	40	4	26
13	18BIT4031	HARIHARAN K	33	5.50	30	5.00	25	4.17	30	3	37	4	42	4.2	26
14	18BIT4032	HARINI R M	38	6.33	48	8.00	31	5.17	72	7.2	39	4	0	0	31
15	18BIT4033	HARISH R	45	7.50	53	8.83	31	5.17	83	8.3	46	5	30	3	38
16	18BIT4034	ISHWARYA M	28	4.67	47	7.83	23	3.83	66	6.6	48	5	10	1	29

30	18BIT4065	KAMAR K	30	5.00	42	7.00	22	3.67	78	7.8	41	4	30	3	31
31	18BIT4068	RUTHRAPRIYA S	38	6.33	50	8.33	20	3.33	69	6.9	44	4	10	1	31
32	18BIT4070	SAKTHIVEL B	0	0.00	0	0.00	0	0.00	53	5.3	0	0	0	0	5
33	18BIT4071	SALINI M	45	7.50	54	9.00	28	4.67	78	7.8	44	4	40	4	38
34	18BIT4072	SANJAY P	30	5.00	49	8.17	33	5.50	80	8	39	4	30	3	34
35	18BIT4077	SARAN B	31	5.17	37	6.17	31	5.17	47	4.7	41	4	20	2	28
36	18BIT4079	SARAVANAKUMAR M	33	5.50	24	4.00	27	4.50	52	5.2	26	3	40	4	26

51	18BIT4106	YUVARAJ V	31	5.17	52	8.67	30	5.00	81	8.1	39	4	30	3	34
52	18BIT4301	SHAJITH B	38	6.33	47	7.83	36	6.00	65	6.5	37	4	20	2	33
53	18BIT4302	THAMARAI CHELVAN S	36	6.00	50	8.33	28	4.67	80	8	42	4	0	0	32

Staff Incharge

HoD - IT

Head of the Department

Department of Information Technology

Kumarasamy College of Engineering

Thalavapalayam, Karur

MKCE - IT

III Year V Sem B Section

Internal Marks of 18ITE001JL Python Programming Laboratory

Academic Year 2020 - 2021

S. No	Roll Number	Name	Markks (100)	Marks (50)
1	18BIT4001	AAKASH R	85	43
2	18BIT4002	ABINAYA K N	100	50
3	18BIT4004	AKASH G	99	50
4	18BIT4005	ANANDA NAARAYANAN B	50	25
5	18BIT4007	ANBARASU M	100	50
6	18BIT4010	ARUN N	100	50
7	18BIT4011	ARVIND A M	98	49
8	18BIT4014	BHUBESH M	100	50
9	18BIT4016	DEEPA N	84	42
10	18BIT4017	DEEPAK M	60	30
11	18BIT4021	DHARSHINI M	100	50
12	18BIT4022	DINESHKUMAR P	50	25
13	18BIT4031	HARIHARAN K	51	26
14	18BIT4032	HARINI R M	100	50
15	18BIT4033	HARISH R	100	50
16	18BIT4034	ISHWARYA M	100	50
17	18BIT4036	JANANI S	99	50
18	18BIT4037	JEEVADHARSHINI G	100	50
19	18BIT4039	KARUPPUSAMY S	85	43
20	18BIT4041	KAVIN P	99	50
21	18BIT4042	KAVIPRIYA N	99	50
22	18BIT4045	LOGESHWARAN S	100	50
23	18BIT4046	MADHAN SINGH A	71	36
24	18BIT4050	MANIKANDAN M	77	39
25	18BIT4054	NAVEEN K R	68	34
26	18BIT4057	PONRAVIRAJ M	80	40
27	18BIT4059	POOVITHA R	100	50
28	18BIT4062	RABIN RAJ B	90	45
29	18BIT4063	RAGUL E	96	48

30	18BIT4065	RAMAR K	100	50
31	18BIT4068	RUTHRAPRIYA S	96	48
32	18BIT4070	SAKTHIVEL B	0	0
33	18BIT4071	SALINI M	98	49
34	18BIT4072	SANJAY P	100	50
35	18BIT4077	SARAN B	100	50
36	18BIT4079	SARAVANAKUMAR M	50	25
37	18BIT4081	SENTHIL KUMAR S	100	50
38	18BIT4083	SHANTHOSH KUMAR S	88	44
39	18BIT4085	SNEHAPRABHA S B	74	37
40	18BIT4091	SURENKUMAR M	80	40
41	18BIT4095	TAMIL SELVAN E	74	37
42	18BIT4096	THAMEEM ANSARI S	54	27
43	18BIT4097	THARANIDHARAN T	74	37
44	18BIT4098	UDAYA KUMAR S	90	45
45	18BIT4099	UGADHI A	99	50
46	18BIT4100	VETRIVEL K S	100	50
47	18BIT4101	VIDHYASREE M	99	50
48	18BIT4102	VIJAY R S	79	40
49	18BIT4103	VIJAY S	57	29
50	18BIT4105	VIVEKA C	100	50
51	18BIT4106	YUVARAJ V	100	50
52	18BIT4301	SHAJITH B	88	44
53	18BIT4302	THAMARAI CHELVAN S	91	46

Staff Incharge

HoD - IT

Head of the Department
Department of Information Technology
Kumarasamy College of Engineering
Thalavapalayam, Karur

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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COE

Course Consolidated Internal Marks

Department : B.TECH.(Information Technology) **Batch** : 2018-2022

Semester : 5 **Section** : B

Course Code & Name : 18ITE001JT - PYTHON PROGRAMMING

S.No.	Reg. No.	Name	Internal Marks(Max. 50 Marks)	Internal Marks(In Words)
1	18BIT4001	AAKASH R	30	THREE ZERO
2	18BIT4002	ABINAYA K N	27	TWO SEVEN
3	18BIT4004	AKASH G	34	THREE FOUR
4	18BIT4005	ANANDA NAARAYANAN B	26	TWO SIX
5	18BIT4007	ANBARASU M	33	THREE THREE
6	18BIT4010	ARUN N	25	TWO FIVE
7	18BIT4011	ARVIND A M	32	THREE TWO
8	18BIT4014	BHUBESH M	35	THREE FIVE
9	18BIT4016	DEEPA N	30	THREE ZERO
10	18BIT4017	DEEPAK M	26	TWO SIX
11	18BIT4021	DHARSHINI M	26	TWO SIX
12	18BIT4022	DINESHKUMAR P	26	TWO SIX
13	18BIT4031	HARIHARAN K	26	TWO SIX
14	18BIT4032	HARINI R M	31	THREE ONE
15	18BIT4033	HARISH R	38	THREE EIGHT
16	18BIT4034	ISHWARYA M	29	TWO NINE
17	18BIT4036	JANANI S	40	FOUR ZERO
18	18BIT4037	JEEVADHARSHINI G	32	THREE TWO
19	18BIT4039	KARUPPUSAMY S	31	THREE ONE
20	18BIT4041	KAVIN P	28	TWO EIGHT
21	18BIT4042	KAVIPRIYA N	28	TWO EIGHT
22	18BIT4045	LOGESHWARAN S	28	TWO EIGHT
23	18BIT4046	MADHAN SINGH A	30	THREE ZERO
24	18BIT4050	MANIKANDAN M	30	THREE ZERO
25	18BIT4054	NAVEEN K R	26	TWO SIX
26	18BIT4057	PONRAVIRAJ M	30	THREE ZERO
27	18BIT4059	POOVITHA R	30	THREE ZERO
28	18BIT4062	RABIN RAJ B	27	TWO SEVEN
29	18BIT4063	RAGUL E	36	THREE SIX
30	18BIT4065	RAMAR K	31	THREE ONE

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Department : B.TECH.(Information Technology)
Semester : 5
Course Code & Name : 18ITE001JT - PYTHON PROGRAMMING

Batch : 2018-2022
Section : B

S.No.	Reg. No.	Name	Internal Marks(Max. 50 Marks)	Internal Marks(In Words)
31	18BIT4068	RUTHRAPRIYA S	31	THREE ONE
32	18BIT4070	SAKTHIVEL B	5	FIVE
33	18BIT4071	SALINI M	38	THREE EIGHT
34	18BIT4072	SANJAY P	34	THREE FOUR
35	18BIT4077	SARAN B	28	TWO EIGHT
36	18BIT4079	SARAVANAKUMAR M	26	TWO SIX
37	18BIT4081	SENTHIL KUMAR S	32	THREE TWO
38	18BIT4083	SHANTHOSH KUMAR S	27	TWO SEVEN
39	18BIT4085	SNEHAPRABHA S B	32	THREE TWO
40	18BIT4091	SURENKUMAR M	34	THREE FOUR
41	18BIT4095	TAMIL SELVAN E	29	TWO NINE
42	18BIT4096	THAMEEM ANSARI S	34	THREE FOUR
43	18BIT4097	THARANIDHARAN T	26	TWO SIX
44	18BIT4098	UDAYA KUMAR S	29	TWO NINE
45	18BIT4099	UGADHI A	36	THREE SIX
46	18BIT4100	VETRIVEL K S	34	THREE FOUR
47	18BIT4101	VIDHYASREE M	32	THREE TWO
48	18BIT4102	VIJAY R S	32	THREE TWO
49	18BIT4103	VIJAY S	31	THREE ONE
50	18BIT4105	VIVEKA C	30	THREE ZERO
51	18BIT4106	YUVARAJ V	34	THREE FOUR
52	18BIT4301	Shajith B	33	THREE THREE
53	18BIT4302	THAMARAI CHELVAN S	32	THREE TWO

Name	Mrs. Kanimozhi S Assistant Professor B.TECH.(Information Technology)	Dr. Punithavathi R Professor	
ignature with Date			
	Teaching Faculty	**Head of The Department**	**Principal**

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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Course Consolidated Internal Marks

Department : B.TECH.(Information Technology)
Semester : 5
Course Code & Name : 18ITE001JL - PYTHON PROGRAMMING LABORATORY

Batch : 2018-2022
Section : B

S.No.	Reg. No.	Name	Internal Marks(Max. 50 Marks)	Internal Marks(In Words)
1	18BIT4001	AAKASH R	43	FOUR THREE
2	18BIT4002	ABINAYA K N	50	FIVE ZERO
3	18BIT4004	AKASH G	50	FIVE ZERO
4	18BIT4005	ANANDA NAARAYANAN B	25	TWO FIVE
5	18BIT4007	ANBARASU M	50	FIVE ZERO
6	18BIT4010	ARUN N	50	FIVE ZERO
7	18BIT4011	ARVIND A M	49	FOUR NINE
8	18BIT4014	BHUBESH M	50	FIVE ZERO
9	18BIT4016	DEEPA N	42	FOUR TWO
10	18BIT4017	DEEPAK M	30	THREE ZERO
11	18BIT4021	DHARSHINI M	50	FIVE ZERO
12	18BIT4022	DINESHKUMAR P	25	TWO FIVE
13	18BIT4031	HARIHARAN K	26	TWO SIX
14	18BIT4032	HARINI R M	50	FIVE ZERO
15	18BIT4033	HARISH R	50	FIVE ZERO
16	18BIT4034	ISHWARYA M	50	FIVE ZERO
17	18BIT4036	JANANI S	50	FIVE ZERO
18	18BIT4037	JEEVADHARSHINI G	50	FIVE ZERO
19	18BIT4039	KARUPPUSAMY S	43	FOUR THREE
20	18BIT4041	KAVIN P	50	FIVE ZERO
21	18BIT4042	KAVIPRIYA N	50	FIVE ZERO
22	18BIT4045	LOGESHWARAN S	50	FIVE ZERO
23	18BIT4046	MADHAN SINGH A	36	THREE SIX
24	18BIT4050	MANIKANDAN M	39	THREE NINE
25	18BIT4054	NAVEEN K R	34	THREE FOUR
26	18BIT4057	PONRAVIRAJ M	40	FOUR ZERO
27	18BIT4059	POOVITHA R	50	FIVE ZERO
28	18BIT4062	RABIN RAJ B	45	FOUR FIVE
29	18BIT4063	RAGUL E	48	FOUR EIGHT
30	18BIT4065	RAMAR K	50	FIVE ZERO

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Department : B.TECH.(Information Technology)
Semester : 5
Course Code & Name : 18ITE001JL - PYTHON PROGRAMMING LABORATORY

Batch : 2018-2022
Section : B

S.No.	Reg. No.	Name	Internal Marks(Max. 50 Marks)	Internal Marks(In Words)
31	18BIT4068	RUTHRAPRIYA S	48	FOUR EIGHT
32	18BIT4070	SAKTHIVEL B	0	ZERO
33	18BIT4071	SALINI M	49	FOUR NINE
34	18BIT4072	SANJAY P	50	FIVE ZERO
35	18BIT4077	SARAN B	50	FIVE ZERO
36	18BIT4079	SARAVANAKUMAR M	25	TWO FIVE
37	18BIT4081	SENTHIL KUMAR S	50	FIVE ZERO
38	18BIT4083	SHANTHOSH KUMAR S	44	FOUR FOUR
39	18BIT4085	SNEHAPRABHA S B	37	THREE SEVEN
40	18BIT4091	SURENKUMAR M	40	FOUR ZERO
41	18BIT4095	TAMIL SELVAN E	37	THREE SEVEN
42	18BIT4096	THAMEEM ANSARI S	27	TWO SEVEN
43	18BIT4097	THARANIDHARAN T	37	THREE SEVEN
44	18BIT4098	UDAYA KUMAR S	45	FOUR FIVE
45	18BIT4099	UGADHI A	50	FIVE ZERO
46	18BIT4100	VETRIVEL K S	50	FIVE ZERO
47	18BIT4101	VIDHYASREE M	50	FIVE ZERO
48	18BIT4102	VIJAY R S	40	FOUR ZERO
49	18BIT4103	VIJAY S	29	TWO NINE
50	18BIT4105	VIVEKA C	50	FIVE ZERO
51	18BIT4106	YUVARAJ V	50	FIVE ZERO
52	18BIT4301	Shajith B	44	FOUR FOUR
53	18BIT4302	THAMARAI CHELVAN S	46	FOUR SIX

Name	Mrs. Kanimozhi S Assistant Professor B.TECH.(Information Technology)	Dr. Punithavathi R Professor	
Signature with Date			
	Teaching Faculty	**Head of The Department**	**Principal**

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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Consolidated Internal Marks

Department : B TECH (Information Technology)

Batch : 2018-2022

Semester : 5

S.No.	Reg. No.	Name	18ITC301T FLAT (Max 50)	18ITC302T ST (Max 50)	18ITE001T PP (Max 50)	18ITE015T MC (Max 50)	18ITE040T GC (Max 50)	18ITE021T UID (Max 50)	18MEO001T ISE (Max 50)	18ITC303L MAD LAB (Max 50)	18ITC302L ST LAB (Max 50)	18ITE001L PP LAB (Max 50)	18ITP301L MP (Max 100)	[illegible]	[illegible]
1	18BIT4001	AAKASH R	29	33	30	28	28	--	32	48	49	43	98	100	63
2	18BIT4002	ABINAYA K N	26	37	27	27	--	31	32	43	49	50	72	100	60
3	18BIT4003	AJAY S	25	34	26	29	32	--	30	40	38	45	53	71	63
4	18BIT4004	AKASH G	39	41	34	36	--	38	39	49	49	50	85	100	65
5	18BIT4005	ANANDA NAARAYANAN B	25	27	26	26	--	26	26	30	34	25	74	100	61
6	18BIT4006	ANANTHI S	26	40	37	35	37	--	39	47	49	50	68	100	63
7	18BIT4007	ANBARASU M	33	40	33	36	36	--	38	48	49	50	82	100	62
8	18BIT4008	ARAVIND P	35	38	37	29	--	40	33	48	47	50	70	100	65
9	18BIT4009	ARUN G	33	35	25	29	--	31	31	50	49	50	59	100	63
10	18BIT4010	ARUN N	25	37	25	28	--	31	34	48	44	50	73	100	61
11	18BIT4011	ARVIND A M	28	37	32	32	--	32	32	49	46	49	85	100	61
12	18BIT4012	ASWANTHI D S	40	40	41	36	42	--	43	50	49	50	73	100	65
13	18BIT4013	BHARATH K	26	32	29	28	--	32	31	35	37	50	57	100	64
14	18BIT4014	BHUBESH M	38	40	35	38	40	--	36	45	50	50	83	100	63
15	18BIT4015	BHUVANESHWARI P	40	42	42	40	42	--	39	46	49	50	61	100	66
16	18BIT4016	DEEPA N	34	38	30	35	--	38	37	48	49	42	81	100	63
17	18BIT4017	DEEPAK M	26	33	26	28	27	--	29	48	44	30	82	100	61
18	18BIT4018	DEEPAKKUMAR K	28	29	25	27	--	27	27	47	39	50	61	100	63
19	18BIT4019	DHANALAKSHMI M	35	40	33	37	37	--	38	45	49	50	60	96	65
20	18BIT4020	DHANANJAYAN D	35	37	36	34	38	--	38	47	46	50	50	100	64
21	18BIT4021	DHARSHINI M	25	37	26	29	--	35	36	35	44	50	72	100	66
22	18BIT4022	DINESHKUMAR P	22	26	26	26	26	--	26	33	34	25	72	100	60
23	18BIT4023	DIVYABHARATHY S	38	40	36	41	40	--	37	43	49	50	56	100	64
24	18BIT4025	ELAKKIYA P	38	42	37	40	38	--	39	45	49	50	68	100	66
25	18BIT4026	ELAKKIYA T	35	41	40	38	--	40	44	45	40	50	67	100	64
26	18BIT4027	GNANAPRAKASAM S	31	38	32	32	--	35	32	40	44	49	68	100	64
27	18BIT4028	GOKUL M	31	37	32	30	--	32	30	43	44	50	75	100	64
28	18BIT4029	GOWTHAM SUKUMAR	30	35	25	27	--	37	30	45	40	43	56	98	63
29	18BIT4030	HANSHIYA D	36	38	38	36	40	--	38	48	49	50	66	100	66
30	18BIT4031	HARIHARAN K	25	28	26	26	26	--	28	40	40	26	73	100	61

Signature with Date	3/2/2021	
Name	Dr. Punithavathi R	Dr. Ramesh Babu N
	Head of The Department	Principal

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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COE

Consolidated Internal Marks

Department : B TECH (Information Technology)

Batch : 2018-2022

Semester : 5

S.No	Reg. No.	Name	18ITC301T FLAT (Max 50)	18ITC302JT BT (Max 50)	18ITE001JT PP (Max 50)	18ITE015T MC (Max 50)	18ITE040T GC (Max 50)	18ITE021T UID (Max 50)	18MEO001T ISE (Max 50)	18ITC303L MAD LAB (Max 50)	18ITC302A ST LAB (Max 50)	18ITE001A PP LAB (Max 50)	[illegible]	[illegible]	[illegible]
31	18BIT4032	HARINI R M	26	37	31	31	--	35	36	48	44	50	81	100	81
32	18BIT4033	HARISH R	40	42	36	38	--	44	38	48	49	50	83	100	83
33	18BIT4034	ISHWARYA M	33	40	29	36	--	41	36	48	49	50	72	100	84
34	18BIT4035	JAMUNA K	36	38	29	29	--	34	33	43	46	50	60	100	81
35	18BIT4036	JANANI S	38	42	40	41	--	41	42	50	46	50	97	100	84
36	18BIT4037	JEEVADHARSHINI G	31	36	32	27	--	34	34	48	49	50	80	100	83
37	18BIT4038	KARTHICK B	34	35	31	35	--	36	38	45	44	50	56	100	85
38	18BIT4039	KARUPPUSAMY S	25	27	31	29	31	--	28	40	41	43	73	100	87
39	18BIT4041	KAVIN P	28	36	28	31	31	--	32	48	46	50	80	100	82
40	18BIT4042	KAVIPRIYA N	30	34	28	30	--	34	37	48	49	50	81	100	82
41	18BIT4043	KAVIYARASU B	32	39	37	32	37	--	38	47	49	50	65	100	82
42	18BIT4044	KEERTHI VENI V	32	38	34	30	--	34	38	45	46	46	67	100	83
43	18BIT4045	LOGESHWARAN S	32	32	28	30	--	32	30	48	49	50	80	100	83
44	18BIT4046	MADHAN SINGH A	32	36	30	30	--	34	33	49	44	36	95	100	85
45	18BIT4048	MAHIBAALA V	27	29	29	27	--	32	26	47	38	48	50	100	83
46	18BIT4049	MANIKANDAN C	32	35	35	31	--	36	31	48	49	50	64	100	84
47	18BIT4050	MANIKANDAN M	28	32	30	26	--	29	27	45	49	39	71	91	81
48	18BIT4051	MEIYAPPAN S	26	36	31	31	--	30	30	44	49	50	69	100	84
49	18BIT4052	MOHANRAJ B	29	37	27	29	30	--	27	36	37	47	56	95	89
50	18BIT4053	MUTHUKUMARAN M	28	31	32	27	--	28	26	40	44	50	62	100	82
51	18BIT4054	NAVEEN KR	22	28	26	25	26	--	26	43	34	34	77	100	80
52	18BIT4055	NISHITHRAA N	37	40	40	40	--	38	37	42	49	50	66	100	84
53	18BIT4056	NITHYA BALA G	37	43	41	39	--	43	43	50	49	50	74	100	85
54	18BIT4057	PONRAVIRAJ M	34	36	30	30	31	--	29	46	48	40	98	100	81
55	18BIT4058	POORNIMA K P	37	38	36	34	38	--	38	48	49	50	71	100	85
56	18BIT4059	POOVITHA R	31	35	30	32	--	35	37	44	49	50	72	100	82
57	18BIT4060	PRANAVAJOTHI A	37	37	37	35	--	36	37	42	49	50	61	100	84
58	18BIT4061	RAAJESHWARI KSP	37	44	43	38	41	--	38	50	49	50	83	100	83
59	18BIT4062	RABIN RAJ B	27	28	27	26	26	--	29	45	34	45	74	100	84
60	18BIT4063	RAGUL E	41	42	36	38	--	43	41	50	49	48	88	100	82

Signature with Date	3/2/2021	
Name	Dr. Punithavathi R	Dr. Ramesh Babu N
	Head of The Department	Principal

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

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Consolidated Internal Marks

Department : B.TECH (Information Technology)

Batch : 2018-2022

Semester : 5

S.No.	Reg. No.	Name	18ITC301T FLAT (Max 50)	18ITC302JT ST (Max 50)	18ITE001JT PP (Max 50)	18ITE015T MC (Max 50)	18ITE640T GC (Max 50)	18ITE021T UID (Max 50)	18MEO001T ISE (Max 50)	18ITC303L MAD LAB (Max 50)	18ITC302JL ST LAB (Max 50)	18ITE001JL PP LAB (Max 50)	[illegible] (Max 100)	[illegible] (Max 100)	[illegible]
61	18BIT4064	RAJESH V	30	35	26	32	--	29	27	39	39	40	63	100	61
62	18BIT4065	RAMAR K	31	34	31	29	34	--	37	45	45	50	71	100	62
63	18BIT4066	RITHICK V	27	33	27	26	--	27	31	36	38	45	52	95	62
64	18BIT4067	ROSHINI B	32	37	33	30	--	33	35	40	41	50	73	100	64
65	18BIT4068	RUTHRAPRIYA S	33	36	31	35	--	35	36	48	49	48	81	100	63
66	18BIT4069	SABARI MANIKANDAN M	30	34	35	27	26	--	31	40	42	50	51	100	66
67	18BIT4071	SALINI M	43	41	38	43	--	39	44	49	46	49	97	100	63
68	18BIT4072	SANJAY P	34	35	34	34	32	--	37	47	49	50	74	100	63
69	18BIT4073	SANKAR GANESH D	32	33	28	30	--	29	31	42	40	50	64	100	62
70	18BIT4074	SANKAVI M	34	40	41	41	41	--	40	49	49	50	60	100	62
71	18BIT4075	SANTHISH S	26	36	28	28	--	32	27	38	45	39	50	100	63
72	18BIT4076	SANTHOSH S	28	33	25	31	--	28	28	43	39	50	50	95	62
73	18BIT4077	SARAN B	30	35	28	27	30	--	34	46	44	50	74	100	60
74	18BIT4078	SARANRAJ K R	33	34	34	30	30	--	35	40	47	50	73	100	64
75	18BIT4079	SARAVANAKUMAR M	25	30	26	25	26	--	25	43	34	25	77	72	64
76	18BIT4080	SATHISH KUMAR R	26	32	28	26	26	--	26	35	40	38	58	100	65
77	18BIT4081	SENTHIL KUMAR S	37	41	32	37	--	41	39	49	49	50	83	100	63
78	18BIT4082	SHANMUGAPRIYA N	28	35	30	26	--	31	28	40	48	50	67	97	65
79	18BIT4083	SHANTHOSH KUMAR S	27	36	27	27	--	33	33	46	44	44	95	100	60
80	18BIT4084	SHEELA X	36	41	35	39	41	--	37	49	49	50	65	100	64
81	18BIT4085	SNEHAPRABHA S B	30	41	32	38	--	38	41	47	47	37	82	100	62
82	18BIT4086	SRI SHAKTHI M R	27	35	32	33	--	33	33	48	46	50	64	100	64
83	18BIT4087	SRIKATHIRVEL R	28	36	29	32	--	32	32	48	46	50	50	100	65
84	18BIT4088	SUBHANU K	20	33	27	30	29	--	25	31	37	41	54	72	65
85	18BIT4089	SUGI S	30	38	30	36	--	35	32	44	40	50	50	100	64
86	18BIT4090	SUJITHA S	38	40	37	34	35	--	38	43	49	50	75	100	62
87	18BIT4091	SUREN KUMAR M	34	35	34	34	--	35	32	49	47	40	83	100	63
88	18BIT4092	SURYAKUMAR V	28	31	25	26	--	28	33	42	47	50	51	100	64
89	18BIT4093	SWATHI J	26	36	36	37	--	37	37	42	49	50	65	100	64
90	18BIT4094	SWETHA D	36	43	36	40	42	--	42	49	50	50	60	100	63

Signature with Date	3/2/2021	
Name	Dr. Punithavathi R	Dr. Ramesh Babu N
	Head of The Department	Principal

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR - 639 113

(An Autonomous Institution Affiliated to Anna University, Chennai)

Approved by AICTE New Delhi,Accredited by NAAC

COE

Consolidated Internal Marks

Department : B.TECH (Information Technology)

Batch : 2018-2022

Semester : 5

S.No.	Reg. No.	Name	18ITC301T FLAT (Max 50)	18ITC302JT ST (Max 50)	18ITE001JT PP (Max 50)	18ITE015T MC (Max 50)	18ITE040T GC (Max 50)	18ITE021T UID (Max 50)	18MEO001T ISE (Max 50)	18ITC303L MAD LAB (Max 50)	18ITC302JL ST LAB (Max 50)	18ITE001JL PP LAB (Max 50)	[illegible] MP I (Max 100)	[illegible] WORK (Max 100)	[illegible] AVG (Max 100)
91	18BIT4095	TAMIL SELVAN E	30	32	29	27	--	29	31	48	49	37	82	100	63
92	18BIT4096	THAMEEM ANSARI S	31	36	34	26	26	--	25	44	34	27	80	86	64
93	18BIT4097	THARANIDHARAN T	28	39	26	30	--	33	35	43	49	37	73	100	63
94	18BIT4098	UDAYA KUMAR S	35	37	29	36	--	36	32	46	46	45	76	100	63
95	18BIT4099	UGADHI A	37	35	36	34	39	--	37	48	44	50	82	100	61
96	18BIT4100	VETRIVEL K S	37	40	34	33	40	--	44	50	50	50	83	100	61
97	18BIT4101	VIDHYASREE M	33	40	32	39	--	36	40	46	50	50	72	100	62
98	18BIT4102	VIJAY R S	25	37	32	28	--	30	28	45	44	40	82	100	64
99	18BIT4103	VIJAY S	26	33	31	29	28	--	28	44	34	29	81	100	57
100	18BIT4104	VIMAL S	34	37	36	37	--	36	34	50	48	50	50	100	65
101	18BIT4105	VIVEKA C	33	39	30	39	--	39	42	47	49	50	81	100	66
102	18BIT4106	YUVARAJ V	35	38	34	35	--	41	36	44	49	50	85	100	62
103	18BIT4301	Shajith B	34	38	33	30	39	--	37	44	49	44	71	100	67
104	18BIT4302	THAMARAI CHELVAN S	28	34	32	33	27	--	30	45	44	46	80	100	62

Signature with Date	3/2/2021	
Name	Dr. Punithavathi R	Dr. Ramesh Babu N
	Head of The Department	Principal

Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC203J	FLUID MECHANICS AND MACHINERY	3	0	2	4

Course Objective (s):

- To gain knowledge in the basic concept of mechanics of fluids, properties of the fluid, conservation equations and their applications to fluid flow problems.
- To gain knowledge in the basic concept of Measurements and dimensions in fluid mechanics.
- To analyze the complexities involved in solving the solutions of practical flow problems.
- To familiarize the basic design aspects, working and operation principle of Turbines.
- To Understand the basic design aspects, working and operation principle of pumps.

Course Outcome (s) (COs):

CO1	Describe the properties of fluids and its flow characteristics.
CO2	Measure the flow and pressure of fluid and to apply dimensional parameters.
CO3	Calculate the losses during flow in a circular pipe
CO4	Explain Hydraulic turbines and its performance characteristics.
CO5	Demonstrate pumps and its performance characteristics.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3		1	2	2	2	1		2	3	2	3
CO2	3	3	3	3		1	2	2	2	1		2	3	2	3
CO3	3	3	3	3		1	2	2	2	1		2	3	2	3
CO4	3	3	3	3		1	3	2	2	1		2	3	2	3
CO5	3	3	3	3		1	3	2	2	1		2	3	2	3
CO (Avg)	3	3	3	3		1	2.4	2	2	1		2	3	2	3

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

UNIT I	INTRODUCTION	9
Properties of fluid: Density- Specific volume-Specific gravity- specific weight- viscosity-capillarity and surface tension- compressibility-Bulk modulus- vapor pressure – Cavitation- Types of fluids. Fluid Kinematics: Types of Fluid Flow -Concept of system, Continuum and Control Volume – Continuity Equation -Fluid Dynamics: Euler's energy equation – Bernoulli's Equation		
UNIT II	**MEASUREMENTS AND DIMENSIONAL ANALYSIS**	**9**
Measurement of Pressure : concept of fluid static pressure, absolute and gauge pressures – Pascal's law, Hydrostatic Law - pressure measurements by manometers and pressure gauges. Flow measurement: Orifice meter, Venturi meter, Pitot tube, advanced flow measurements instruments. Dimensional analysis: Dimension and units – Dimensional Homogeneity- Rayleigh's method - Buckingham's Π theorem		
UNIT III	**FLOW THROUGH CIRCULAR CONDUITS**	**9**
Viscous flow: Reynold's Experiment – Flow of Viscous Fluid in a circular pipe - Shear Stress Distribution, Velocity Distribution and Pressure Drop of a viscous fluid Flow through pipes:Friction Factor – Darcy Weisbach's Equation and Chezy's formula- Moody's Diagram- Minor Losses – HGL & TEL – Pipes in Series and parallel.		
UNIT IV	**HYDRAULIC TURBINES**	**9**
Introduction to Turbo machines and classification -Construction of velocity vector diagrams - head and specific work - components of energy transfer - degree of reaction. Pelton turbine - Francis turbine - Kaplan turbine - working principles - velocity triangles - work done – efficiencies – Performance Curves		
UNIT V	**HYDRAULIC PUMPS**	**9**
Introduction to pumps – classifications. Centrifugal Pump working principle, - velocity triangles, specific speed, efficiency and performance curves. Reciprocating pump: classification, working principle, indicator diagram- efficiency and performance curves .Rotary Pumps		

Text Book (s)

1	Bansal, R K, "Fluid Mechanics and Hydraulics Machines", Laxmi publications (P) Ltd, New Delhi, 9th Edition, 2017
2	Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi 2013.

Reference (s)

1	Kumar K. L., "Engineering Fluid Mechanics", Eurasia Publishing House(p) Ltd., New Delhi 2016
2	Graebel. W.P, "Engineering Fluid Mechanics", Taylor & Francis, Indian Reprint, 2011
3	Robert W.Fox, Alan T. McDonald, Philip J.Pritchard, "Fluid Mechanics and Machinery", 2011.
4	Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co. 2010
5	Vasandani, V P, "Hydraulic Machines - Theory and Design", Khanna Publishers, 11th Edition, 2010

LIST OF EXPERIMENTS

Total:30 Hours

1.	Determination of the Coefficient of discharge of given Orificemeter.
2.	Determination of the Coefficient of discharge of given Venturi meter.
3.	Calculation of the rate of flow using Rotameter / Flow meter.
4.	Determination of friction factorfor agivenset of pipes – Major losses and minor losses
5.	Conducting experiments and drawing thecharacteristic curves of centrifugal pump
6.	Conducting experiments and drawing thecharacteristic curves of submergible pump
7.	Conducting experiments and drawing thecharacteristic curves of pumps in series and parallel operations
8.	Conducting experiments and drawing the characteristic curves of reciprocating pump.
9.	Conduction experiments and drawing the characteristic curves of Jet pump.
10.	Conducting experiments and drawing the characteristic curves of Gear pump.
11.	Conducting experiments and drawing the characteristic curves of Pelton wheel.
12.	Conducting experiments and drawing the characteristics curves of Francis turbine.
13.	Conducting experiments and drawing the characteristic curves of Kaplan turbine.

Regulation 2018		Semester III	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC204J	MANUFACTURING TECHNOLOGY	3	0	2	4

Course Objective (s):

- To acquire knowledge about the mechanism of chip formation, cutting tool materials, tool life, cutting fluids and welding processes
- To familiarize the working of machine tools such as semi-automatic, automatic lathes and CNC lathe.
- To obtain knowledge about Reciprocating machines and Gear Manufacturing
- To get wide knowledge and the concept of Additive Manufacturing
- To gain knowledge about the mechanism of unconventional machining process.

Course Outcome (s) (Cos):

CO1	Classify the various welding methods for fabrication process.
CO2	Explain concept and mechanism of center lathe and special purpose lathe.
CO3	Describe the working of milling machine, reciprocating and hole making machine.
CO4	Describe the concept of Additive Manufacturing
CO5	Illustrate the principle of unconventional machining process.

CO-PO Mapping

Cos	Pos												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2					2	2	2	1		3	1		2
CO2	3	2					2	2	2	1		3	1		2
CO3	3	2					2	2	2	1		3	1		2
CO4	3	2					2	2	2	1		3	1		2
CO5	3	2					2	2	2	1		3	1		2
CO (Avg)	3	2					2	2	2	1		3	1		2

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

UNIT I	JOINING PROCESSES	9

Fusion welding processes – Types of Gas welding – Equipments used – Flame characteristics – Filler and Flux materials – Arc welding equipments – Electrodes – Coating and specifications – Principles of Resistance welding – Spot/butt, seam welding – Gas metal arc welding– Submerged arc welding – Tig welding –Plasma arc welding – Thermit welding – Electron beam welding – Friction welding – Weld defects – Brazing and soldering process.

UNIT II	CENTRE LATHE AND SPECIAL PURPOSE LATHES	9

Centre lathe, constructional features, cutting tool geometry, various operations, taper turning methods, thread cutting methods, special attachments, machining time and power estimation. Capstan and turret lathes – automats – single spindle, Swiss type, automatic screw type, multi spindle –Introduction to CNC-Working principle-types of codes

UNIT III	RECIPROCATING MACHINE TOOLS AND GEAR MANUFACTURING	9

Reciprocating machine tools: shaper, planer, slotter – Milling : types, milling cutters, operations – Grinding Machines – Grinding wheel Specifications – Honing – Tapping – Burnishing – Super Finishing – Surface Integrity concepts – Gear Manufacturing Processes – Gear Hobbing – Gear Shaping Machines – Manufacture of Spur – Helical – Bevel – Worm and Worm Wheel – Gear Finishing.

UNIT IV	ADDITIVE MANUFACTURING	9

Overview – History – Need-Classification -Additive Manufacturing Technology in product development- Materials for Additive Manufacturing Technology – Tooling – Applications - Liquid based system – Stereo lithography Apparatus (SLA)- Principle, process, advantages and applications – Solid based system –Fused Deposition Modeling – Principle, process, advantages and applications, Laminated Object Manufacturing

UNIT V	UNCONVENTIONAL MACHINING PROCESSES	9

Principle of operations – Advantages and disadvantages – applications: Abrasive Jet machining process (AJM), Water Jet Machining process (WJM), Ultrasonic Machining process (USM), Electric Discharge machining process (EDM), Laser Beam Machining process (LBM) Chemical Machining process (CHM) and Electro Chemical Machining process (ECM)

Text Book (s)

1	S K Hajra Choudhury, Elements of Workshop Technology - Vol. I, Media Promoters & Publishers Private Limited, Mumbai,2013
2	Kaushish J P, "Manufacturing Processes", PHI Learning Pvt. Ltd., New Delhi, 2010
3	S. K. Hajra Choudhury, Elements of Workshop Technology. Vol. II, Media Promoters & Publishers Private Limited., Mumbai, 2013.
4	P.C. Sharma, Manufacturing Technology - I, S Chand and Company Private Limited,New Delhi,2010
5	P.C Sharma, Manufacturing Technology - II, S.Chand & Company Limited. New Delhi, 2012.

Reference (s)

1	P. N. Rao, Manufacturing Technology vol. I, Tata McGraw-Hill Publishing Company Private Limited, New Delhi, 2010
2	Serope Kalpakjian, Steven R. Schmid, Manufacturing Engineering and Technology,Pearson Education Limited,New Delhi, 2013.

3	J. P. Kaushish, Manufacturing Processes, Prentice Hall of India Learning Private Limited, New Delhi, 2013.
4	P. N. Rao, Manufacturing Technology- Metal Cutting and Machine Tools, Tata McGraw Hill Publishing Company Private Limited., New Delhi, 2013
5	http://nptel.ac.in/courses/112107144/1

LIST OF EXPERIMENTS (Total:30 Hours)	
I LATHE	
1.1	Facing, plain turning, step turning and Taper turning
1.2	Single start V thread, cutting and knurling operations
1.3	Assembly of Machined Components for different fits
1.4	Tool wear, Cutting force measurements.
II RECIPROCATING MACHINE	
2.1	Round to square in Shaper
2.2	Keyway cutting in slotter
III GEAR MANUFACTURING, DRILLING MACHINE	
3.1	Gear Making, Hexagonal Milling in Milling Machine
3.2	Drilling, reaming, tapping in Drilling Machine
IV GRINDING MACHINE	
4.1	Prepare good surface finish on flat metal
4.2	Prepare good surface finish on circular metal
V FOUNDRY	
5.1	Mould with solid and split patterns
5.2	Mould with loose-piece pattern
5.3	Mould with Core
VI WELDING	
6.1	TIG welding of metal plate
6.2	MIG Welding of different types of joints

Regulation 2018		Semester IV	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC205J	STRENGTH OF MATERIALS	3	0	2	4

Course Objective (s):

- To gain knowledge in stresses, strains and deformation in components due to external loads.
- To gain knowledge on shear force and bending stress distribution in different beams under various loads.
- To learn the deformation of shaft under torsion and deflection of closed helical springs.
- To impart knowledge on finding slope and deflection of beams and buckling of columns for various boundary conditions.
- To learn two dimensional stress systems and stresses in thin cylinders and spherical shells.

Course Outcome (s) (COs):

CO1	Explain the fundamental concepts of stress and strain in simple and compound bar.
CO2	Construct shear force and bending moment diagram for mechanism in beams in various loading conditions.
CO3	Illustrate the basic equation of simple torsion in designing of shafts and helical spring
CO4	Calculate the slope and deflection in beams using different methods and Familiarize the behavior of column under axial and eccentric loads.
CO5	Examine the stresses related to thin and thick cylinders subjected to fluid pressure.

CO-PO Mapping

Cos	POs												PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3		1	1	2	2	2		2	2	2	1
CO2	3	3	3	3		2	2	2	2	2		2	2	2	1
CO3	3	3	3	3		2	2	2	2	2		2	2	2	1
CO4	3	3	3	3		2	2	2	2	2		2	2	2	1
CO5	3	3	3	3		1	1	2	2	2		2	2	2	1
CO (Avg)	3	3	3	3		1.6	1.6	2	2	2		2	2	2	1

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

UNIT I	STRESS STRAIN AND DEFORMATION OF SOLIDS	9
Rigid and Deformable bodies – Strength, Stiffness and Stability – Stresses; Tensile, Compressive and Shear – Deformation of simple and compound bars under axial load – Thermal stress – Elastic constants.		
UNIT II	**BEAMS - LOADS AND STRESSES**	**9**
Types of beams: Supports and Loads – Shear force and Bending Moment in beams – Cantilever, Simply supported and Overhanging beams – Stresses in beams – Theory of simple bending – Stress variation along the length and in the beam section.		
UNIT III	**TORSION**	**9**
Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts – Fixed and simply supported shafts – Application to close-coiled helical springs – Maximum shear stress in spring section including Wahl Factor – Deflection of helical coil springs under axial loads.		
UNIT IV	**BEAM DEFLECTION**	**9**
Elastic curve of Neutral axis of the beam under normal loads – Evaluation of beam deflection and slope: Double integration method, Macaulay Method, and Moment-area Method –Columns – End conditions – Equivalent length of a column – Euler equation – Slenderness ratio – Rankine formula for columns.		
UNIT V	**ANALYSIS OF STRESSES IN TWO DIMENSIONS**	**9**
Biaxial state of stresses – Thin cylindrical and spherical shells – Deformation in thin cylindrical and spherical shells – Biaxial stresses at a point – Stresses on inclined plane– Principal planes and stresses – Mohr's circle for biaxial stresses – Maximum shear stress		

Text Book (s)	
1	Rajput, R K, "Strength of Materials", S.Chand & Co, New Delhi, 2014.
2	Beer F P and Johnston R," Mechanics of Materials", McGraw-Hill Book Co, Seven Edition, 2016
Reference (s)	
1	Bansal R.K, "Strength of Materials", Laxmi Publications, New Delhi, 2017.
2	Rattan S.S, "Strength of Materials", Tata McGraw-Hill Education, 2011
3	R S Khurmi & N. Khurmi, "Strength of Materials", S.Chand & Co, New Delhi, 2015
4	Jindal U.C., "Strength of Materials", Pearson Education India, 2012
5	Russell C Hibbler, "Mechanics of Materials", 2014

LIST OF EXPERIMENTS

Total:30 Hours

1	Tension test on a mild steel rod, Aluminum & Cast Iron
2	Double shear test on Mild steel and Aluminum rods
3	Torsion test on mild steel rod
4	Impact tests on metal specimen
5	Hardness test on metals - Brinnell and Rockwell Hardness Number
6	Deflection test on beams (Aluminium, Steel, Wood)
7	Compression test on helical springs.
8	Microscopic examination of ferrous alloys (plain carbon steels, stainless steels, tool steels etc.)
9	Microscopic examination of non ferrous alloys (Magnesium alloys, Aluminium alloys, Titanium alloys).
10	Microscopic examination of welded samples (ferrous and or non ferrous alloys).
11	Quantitative metallography of specimen by measure the volume fraction of a phase in a polycrystalline material (image analysis).
12	Hardness measurement on heat treated samples (unhardened specimen, quenched, quenched and tempered specimen.

Regulation 2018		Semester IV	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC206J	THERMAL ENGINEERING	3	0	2	4

Course Objective (s):

- Integrate concepts, laws and methodologies from the first course in thermodynamics and cyclic processes
- Apply thermodynamic concepts in IC engines
- Understand the principles of nozzles and steam turbines
- Describe the principles of air compressors
- Explain the working of refrigeration ,air conditioning and cooling tower.

Course Outcome (s) (COs):

CO1	Analyze thermodynamic cycles.
CO2	Summarize the construction, operation and performance of IC engines.
CO3	Understand the working of Steam Nozzles and & Steam Turbines and their performance.
CO4	Calculate the performance of reciprocating air compressor.
CO5	Describe the working of refrigeration and Air conditioning system.

CO-PO Mapping

Cos	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3			2	1	1	1		2	3	2	3
CO2	3	3	3	3			2	1	1	2		2	3	2	3
CO3	3	3	3	3			2	1	1	2		2	3	2	3
CO4	3	3	3	3			2	1	1	1		2	3	2	3
CO5	3	3	3	3			3	1	1	2		2	3	2	3
CO (Avg)	3	3	3	3			2.2	1	1	1.6		2	3	2	3

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

UNIT I	GAS POWER CYCLES	9
Otto, Diesel, Dual, Brayton, with PV and TS diagrams-heat supply methods .Calculation of mean effective pressure, and air standard efficiency - Actual and theoretical PV diagram of four stroke and two stroke engines.		
UNIT II	**PERFORMANCE OF IC ENGINES**	**9**
Introduction to basic Construction-Performance test- Measurement of brake power – Indicated power – Fuel consumption – Air consumption; Heat balance test – heat carried away by exhaust gases and Morse test on IC engines – Standard testing procedure of IC engines – Performance curves and effect of various parameters on the performance of the engines-Knocking and Detonation.		
UNIT III	**STEAM NOZZLES AND TURBINES**	**9**
Flow of steam through nozzles, shapes of nozzles, effect of friction, critical pressure ratio, supersaturated flow, Impulse and Reaction principles, compounding of Turbines, velocity diagram for single-stage turbine, speed regulations –Governors.		
UNIT IV	**AIR COMPRESSOR**	**9**
Classification of Air compressors - working principle, work of compression - with and without clearance, Volumetric efficiency, Isothermal efficiency and Isentropic efficiency. Multistage air compressor with Intercooling. Working principle and comparison of Rotary compressors with reciprocating air compressors.		
UNIT V	**REFRIGERATION AND AIR CONDITIONING**	**9**
Vapour compression refrigeration cycle, Effect of Superheat and Sub-cooling, Performance calculations, Working principle of air cycle, vapour absorption system, and Thermoelectric refrigeration. Air conditioning systems, concept of RSHF, GSHF and ESHF, Cooling load calculations. Cooling towers – concept and types.		

List of Practical Experiments (Practical-30 Hours)

1. Draw the Valve timing diagram and Port timing diagram for IC Engine
2. Determine Flash and Fire point of sample of oil by open cup and Closed Cup apparatus
3. Determine absolute viscosity by Saybolt viscometer / Redwood viscometer
4. Determine COP of Refrigeration test rig
5. Determine COP of Air Conditioning test rig
6. Determine Performance characteristics of Air Blower test rig
7. Determine Performance characteristics of Reciprocating Air Compressor
8. Determine Performance characteristics of four stroke diesel engine by load test
9. Draw the heat balance sheet of four stroke diesel engine
10. Determine performance characteristics of four stroke diesel engine by speed test

Text Book (s)

1.	Rajput. R K , "Thermal Engineering", S.Chand Publishers, 2017
2.	Mahesh M Rathore,"Thermal Engineering", McGraw Hill Education (India) Pvt. Ltd.,2015

Reference (s)

1.	Sarkar, B K, "Thermal Engineering" ,Tata McGraw-Hill Publishers, 2016,
2.	Arora.C P,"Refrigeration and Air Conditioning," Tata McGraw-Hill Publishers 2015
3.	Ganesan V " Internal Combustion Engines", Third Edition, Tata McGraw-Hill 2016
4.	Rudramoorthy, R, "Thermal Engineering", Tata McGraw-Hill, New Delhi, 2010.
5.	Kothandaraman C P, Domkundwar S, Domkundwar A V, "A course in thermal engineering," Dhanpat Rai and sons, 2015

Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC207T	METROLOGY AND MEASUREMENTS	3	0	0	3

Prerequisite Course (s)

Engineering Materials and Metallurgy

Course Objective (s):

- Learn the linear and angular measuring equipments with their principle of operation and application.
- Gain knowledge about laser principles and advances in metrology.
- Learn about various methods of measurements of mechanical parameters
- Demonstrate modern measuring equipments using Laser
- Measure mechanical parameters

Course Outcome (s) (COs):

CO1	Explain the measurement methods, instruments and errors in measurements.
CO2	Describe the techniques of comparators, linear and the angular measuring instruments.
CO3	Illustrate form measurement of surface roughness and surface finish measurements.
CO4	Describe the coordinate measuring machine and the applications of Laser in Metrology.
CO5	Calculate the force, torque, power, flow and temperature in the system.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	2					2	3	2	2		3	2		2
CO2	3	2					1	2	3	2		3	3		2
CO3	3	2					1	2	3	2		2	2		3
CO4	3	2					1	2	3	2		2	2		3
CO5	3	2					1	2	2	2		3	3		2
CO (Avg)	3	2					1.2	2.2	2.6	2		2.6	2.4		2.4

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

M.KUMARASAMY COLLEGE OF ENGINEERING
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Board of Mechanical Engg.
05 MAR 2019
KARUR - 639 113

Regulation 2018		Semester V	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC301J	HEAT AND MASS TRANSFER	3	0	2	4

Prerequisite Course (s)

Fluid Mechanics and Machinery, Engineering Thermodynamics

Course Objective (s):

- To impart the knowledge of conduction heat transfer mechanisms
- To provide the knowledge on the principles of free and forced convection.
- To study the performance of various types of heat exchanger.
- To impart the knowledge on black body radiation and grey body radiation
- To learn about diffusion and convective mass transfer.

Course Outcome (s) (COs):

CO1	Apply the principle mechanism of heat transfer under steady state and transient conditions.
CO2	Apply the fundamental concept and principles in convective heat transfer
CO3	Apply the theory of phase change heat transfer and design of heat exchangers.
CO4	Apply the fundamental concept and principles in radiation heat transfer.
CO5	Analyze the relation between heat and mass transfer and to solve simple mass transfer problems.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	-	-	-	-	2	2	-	1	3	-	1
CO2	3	3	3	3	-	-	-	-	2	2	-	1	3	-	1
CO3	3	3	3	2	-	-	-	-	1	1	-	1	3	-	1
CO4	3	3	3	2	2	1	-	1	2	2	-	1	3	-	1
CO5	3	3	3	2	-	-	-	-	-	-	-	1	3	-	1
CO (Avg)	3	3	3	2.2	2	1	-	1	1.75	1.75	-	1	3	-	1

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

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UNIT I	**CONDUCTION**	**9**
General Differential equation – Cartesian, Cylindrical and Spherical Coordinates – One Dimensional Steady State Heat Conduction — plane and Composite Systems – Conduction with Internal Heat Generation – Extended Surfaces – Unsteady Heat Conduction – Lumped Analysis,Semi Infinite and Infinite Solids –Use of Heisler's charts.		
UNIT II	**CONVECTION**	**9**
Conservation Equations, Boundary Layer Concept – Forced Convection: External Flow – Flow over Plates, Cylinders Spheres and Bank of tubes. Internal Flow – Entrance effects. Free Convection – Flow over Vertical Plate, Horizontal Plate, Inclined Plate, Cylinders and Spheres.		
UNIT III	**PHASE CHANGE HEAT TRANSFER AND HEAT EXCHANGERS**	**9**
Nusselt's theory of condensation- Regimes of Pool boiling and Flow boiling, correlations in boiling and condensation. Heat Exchanger Types - Overall Heat Transfer Coefficient – Fouling Factors. LMTD and NTU methods		
UNIT IV	**RADIATION**	**9**
Radiation laws, Black Body and Gray body Radiation. Shape Factor. Electrical Analogy. Radiation Shields.		
UNIT V	**MASS TRANSFER**	**9**
Basic Concepts – Diffusion Mass Transfer – Fick's Law of Diffusion – Steady state Molecular Diffusion. Convective Mass Transfer – Momentum, Heat and Mass Transfer Analogy – Convective Mass Transfer Correlations		

Text Book (s)

1	R.C. Sachdeva, "Fundamentals of Engineering Heat & Mass transfer", New Age International Publishers, 2010
2	Yunus A. Cengel, "Heat Transfer A Practical Approach" – Tata McGraw Hill, 5 thEdition – 2013

Reference (s)

1	Frank P. Incropera and David P. Dewitt, "Fundamentals of Heat and Mass Transfer", John Wiley & Sons, 7th Edition, 2014.
2	Holman, J.P., "Heat and Mass Transfer", Tata McGraw Hill, 2010
3	Kothandaraman, C.P., "Fundamentals of Heat and Mass Transfer", New Age International, New Delhi, 2014
4	Ozisik, M.N., "Heat Transfer", McGraw Hill Book Co., 1994
5	S.P. Venkateshan, "Heat Transfer", Ane Books, New Delhi, 2014

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Approved By
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19 OCT 2020
KARUR - 639 113

LISTOFEXPERIMENTS

Total:30 Hours

1.	Determination of thermal conductivity of Composite wall
2.	Determination of thermal conductivity of Insulating material
3.	Determination of heat transfer coefficient for forced convection through horizontal pipe
4.	Determination of heat transfer coefficient for natural convection on vertical cylinder
5.	Determination of heat transfer coefficient for forced convection on Pin fin
6.	Determination of heat transfer coefficient for natural convection on Pin fin
7.	Determination of emmissivity of grey surface
8.	Verification of Stefan Boltzman Constant
9.	Compare the performance of parallel flow and counter flow heat exchanger
10.	Determination of performance of cooling tower
11.	Study of Critical Heat Flux in Pool boiling

Regulation 2018		Semester V	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18MEC303J	AUTOMOBILE ENGINEERING	3	0	2	4

Prerequisite Course (s)

Engineering Thermodynamics , Fluid Mechanics and Machinery

Course Objective (s):

- To impart knowledge on the principles of operation and constructional details of various automobile engine power source.
- To impart knowledge on the working of fuel supply system and combustion technique in various automobiles.
- To provide knowledge on the requirement and function of various components in power transmission and suspension system in vehicle.
- To impart knowledge on the emission in automobile.
- To provide advance automotive driving control.

Course Outcome (s) (COs):

CO1	Explain the operating principles and constructional details of various automobile engine power source.
CO2	Identify the appropriate Fuel supply system for a particular automobile vehicle based on the requirements.
CO3	Analyze the function of various components in transmission and safety driving line of a vehicle.
CO4	Explain the emission control technique and its importance.
CO5	Analyze the advance automotive driving methods.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	3	-	1	-	3	2	2	-	3	3	-	2
CO2	3	2	2	2	-	2	-	2	2	2	-	3	3	-	2
CO3	3	2	3	2	-	1	-	2	2	2	-	3	3	-	-
CO4	3	2	3	2	-	3	3	2	2	2	-	3	3	-	1
CO5	3	3	2	2	-	1	2	2	2	2	-	3	3	-	1
CO (Avg)	3	2.2	2.2	2.2	-	1.6	2.5	2.2	2	2	-	3	3	-	1.5

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

UNIT I	**VEHICLESTRUCTUREAND ENGINES**	**9**
Types ofautomobiles, Automotive components, sub systems and their positions, vehicleconstruction and differentlayouts, chassis,frame and body,resistancestovehiclemotion and aerodynamics of vehicles. Introduction to automobile engine power source.		
UNIT II	**ENGINEAUXILIARYSYSTEMS**	**9**
Carburetor-basic type and working principles- Electronic fuel injection system for petrol and diesel engine- supercharging and turbo charging. Review of cooling and lubrication system. Electrical sytem (General electrical circuits. Battery, Starting motor, DC generator, Alternator, Ignition circuit, Dash board instrumentation, Lighting system) and electronics system - Ignition system (Magneto coil and Electronic type). Electronic engine management system.		
UNIT III	**TRANSMISSIONSYSYTEMS**	**9**
Clutch-typesandconstruction, gearboxes- manualandautomatic, Wheel drive components, Wheel and tyres - Steeringgeometry ,PowerSteering, Front and Rear Axle-Suspension Systems.BrakingSystems- ABS and electronic brake force distribution (EBD).Stabilizer, Air Bags		
UNIT IV	**EMISSION CONTROL AND ALTERNATIVEENERGYSOURCES**	**9**
Emission Norms and Bharat standard – Non exhaust and exhaust emission (SCR).Useofalternative fuels in Automobiles -Enginemodificationsrequired–Performance and Combustion CharacteristicsofSIandCIengineswiththesealternatefuels.		
UNIT V	**ADVANCES IN AUTOMOTIVE TECHNOLOGY**	**9**
Electric andHybridVehicles,Fuel Cell. Advanced driving controls – Electronic Stability Program (ESP), Traction control system (TCS), Hill hold control, automatic climate control. Fuel smart engines. Autonomous driving – Google car-GPS Technology.		

Text Book (s)

1	Kirpal Singh, "Automobile Engineering Vol. 1& 2" , Standard Publishers, 7th Edition 2012
2	William. H. Crouse, Donald L Anglin, Automotive Mechanics, 10th Edition, McGraw-Hill, 2017.

Reference (s)

1	Ganesan V.." Internal Combustion Engines" , Third Edition, Tata Mcgraw-Hill ,2007
2	Jain,K.K.,and Asthana .R.B, "Automobile Engineering" Tata McGraw Hill Publishers,New Delhi,2002
3	Julian Happian-Smith "Introduction to Modern Vehicle Design", Publisher: Society of Automotive Engineers Inc.2012.
4	Bosch Automotive Hand Book, 8th Edition, Bentley Publishers, 2011.
5	Hand Book - Automotive Research Association of India (ARAI- Pune)

Total:30 Hours

SL.NO	LIST OF EXPERIMENTS
1	STUDY OF TYPES OF CLUTCHES
2	DISMANTLING AND ASSEMBLING OF SINGLE PLATE CLUTCH
3	DISMANTLING AND ASSEMBLING OF SINGLE CYLINDER I.C ENGINE
4	STUDY OF MULTI CYLINDER ENGINES
5	STUDY OF GEAR BOX
6	DISMANTLING AND ASSEMBLING OF FRONT AXLE AND REAR AXLE
7	DISMANTLING AND ASSEMBLING OF DIFFERENTIAL UNIT
8	TESTING OF THE BATTERY
9	TESTING OF THE WHEEL BALANCING
10	TESTING OF THE VALVE CLEARENCE ADJUSTMENT IN ENGINE
11	STUDY OF FUEL SUPPLY SYSTEM IN I.C ENGINE
12	STUDY AND DEMONSTRATION OF AUTOMOBILE CHASSIS
13	MOTORING TEST ON SINGLE CYLINDER FOUR STROKE DIESEL ENGINE
14	RETARDATION TEST ON SINGLE CYLINDER FOUR STROKE DIESEL ENGINE
15	MORSE TEST ON MULTI CYLINDER PETROL ENGINE

COE

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

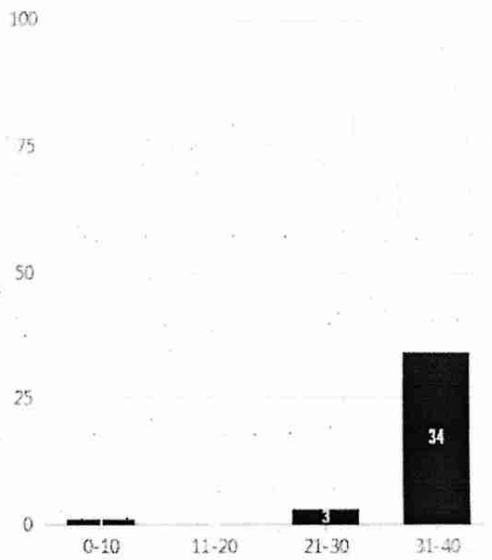
Mark Analysis Report

Course Name : FLUID MECHANICS AND MACHINERY
Course Code : 18MEC203J
Batch : 2021-2025 3rd Semester MECH B

Name : EMMANUAL LOGANATHAN
Report : Final Internal Mark
Date : 23-12-2022

SNo	Register Number	Name	Marks	Attendance Percentage
1	927621BME038	MUTHUKUMAR S	40.00	85.00
2	927621BME039	NIGIL RAGAVENTHIRA S	43.00	100.00
3	927621BME040	NITHIN V	34.00	100.00
4	927621BME041	PRAKASH M	40.00	85.00
5	927621BME042	PRANEETH R	37.00	86.67
6	927621BME043	PRASANNA V	40.00	95.00
7	927621BME044	PRATHISH M	42.00	95.00
8	927621BME045	RAGUL R	41.00	95.00
9	927621BME046	RAJESH M	35.00	81.67
10	927621BME047	RAJESWARAN K	40.00	83.33
11	927621BME048	SAILESH C S	41.00	86.67
12	927621BME049	SAKTHIVEL R	44.00	96.67
13	927621BME050	SAMIYULLA V E	36.00	98.33
14	927621BME051	SANTHOSH L	43.00	91.67
15	927621BME052	SANTHOSH M	41.00	75.00
16	927621BME053	SANTHOSH S V	41.00	83.33
17	927621BME054	SARANRAJ R	42.00	88.33
18	927621BME055	SARAVANAKUMAR A	37.00	96.67
19	927621BME056	SASITHARAN R	30.00	66.67
20	927621BME057	SETHU MADHAVAN M	41.00	93.33
21	927621BME058	SILAMBARASAN D	41.00	88.33
22	927621BME059	SIVASAMY P	37.00	86.67
23	927621BME060	SRI NATH L	39.00	81.67
24	927621BME061	SRIRAM T	41.00	90.00
25	927621BME062	SUDESH KUMAR J	43.00	96.67
26	927621BME063	SUGUVANAN R	34.00	83.33
27	927621BME064	SUPREET S	39.00	83.33
28	927621BME065	TAMIL SELVAN V	37.00	100.00
29	927621BME066	THIYANESHWAR ASHOKA N	43.00	95.00
30	927621BME067	VETRIVEL S	33.00	81.67
31	927621BME068	VIGNESH KARTHIKEYAN K	40.00	91.67
32	927621BME069	VIMAL VELAN S	37.00	85.00
33	927621BME070	VIMAL KUMAR R	40.00	75.00
34	927621BME071	VISHNUDHAR D	41.00	95.00
35	927621BME072	VISHWA B	42.00	88.33
36	927621BME073	VISHNU S	33.00	88.33
37	927621BME074	YUGESHWARAN S	46.00	100.00
38	927621BME302	ADHITHYAN A	36.00	93.33
39	927621BME304	ARUN KUMAR A	40.00	100.00
40	927621BME310	KAVIYARASAN T	3.00	80.00
41	927621BME313	KRISHNA CHARAN	37.00	95.00
42	927621BME315	LOGESHWARAN B	32.00	86.67
43	927621BME320	NANDA KRISHNAN V	42.00	91.67
44	927621BME326	RITHICK M	26.00	81.67
45	927621BME328	SANJAY R	34.00	53.33
46	927621BME329	SANTHOSH KUMAR S	43.00	98.33
47	927621BME330	SANTHOSH SIVAN M	30.00	76.67
48	927621BME331	SHEIK MUHAMMED SHIMAR K M	35.00	88.33
49	927621BME332	SIRAJUDEEN H	36.00	96.67

Range Analysis



Range Analysis

Range	No.of.Students
0 - 10	1
11 - 20	0
20 - 30	3
31 - 50	55

SNo	Register Number	Name	Marks	Attendance Percentage
50	927621BME333	SRIVENKATESH J	36.00	76.67
51	927621BME334	SUJITH A	40.00	96.67
52	927621BME335	SUKANT K	40.00	93.33
53	927621BME336	SURENDAR M	41.00	90.00
54	927621BME337	SURYA C	41.00	93.33
55	927621BME338	VARADHARAJ B	35.00	91.67
56	927621BME339	VINOTH V	32.00	88.33
57	927621BME340	VISHNU R	38.00	88.33
58	927621BME341	YOONUS KHAN P	34.00	83.33
59	927621BME342	YUVARAJ N	40.00	85.00

Signature of the Faculty Class Advisor

Head of the Department

Head of The Department
Department of Mechanical Engineering
M.Kumarasamy College of Engineering,
Karur - 639 113, Tamil Nadu.

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COE

M KUMARASAMY COLLEGE OF ENGINEERING , KARUR-639 113

(An Autonomous Institution Affiliated to Anna University,chennai)

Mark Analysis Report

Course Information:FLUID MECHANICS AND MACHINERY Printed On:23-12-2022

Batch:2021-2025 3rd Semester MECH B Test Name:Labcourse examination

Name:EMMANUAL LOGANATHAN

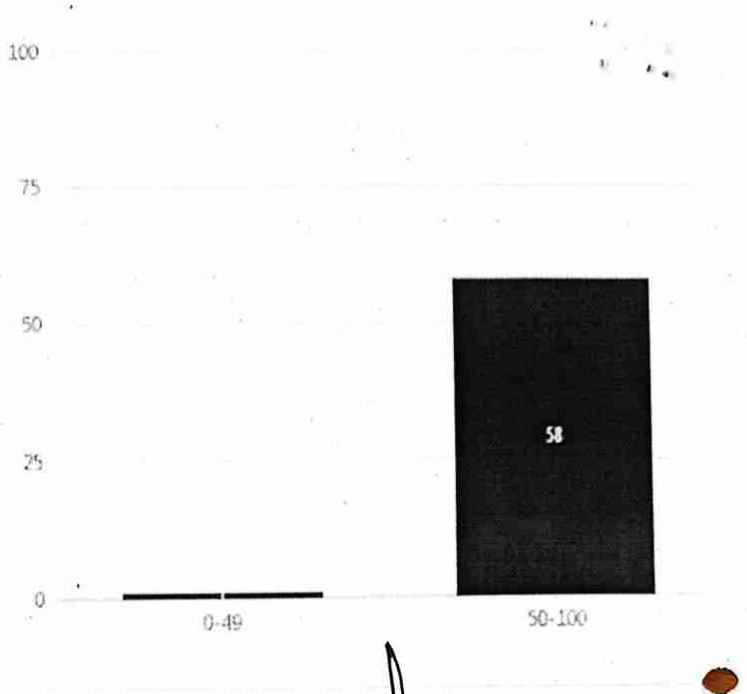
Sno	Register Number & Name	Marks (100)
[1]	220297545942 MUTHUKUMAR S	77
[2]	321690427249 NIGIL RAGAVENTHIRA S	86
[3]	887598928670 NITHIN V	76
[4]	735663649773 PRAKASH M	86
[5]	860632686854 PRANEETH R	80
[6]	579981732955 PRASANNA V	77
[7]	573878025642 PRATHISH M	87
[8]	291174098974 RAGUL R	79
[9]	567407440701 RAJESH M	78
[10]	760284430202 RAJESWARAN K	82
[11]	335704688857 SAILESH C S	76
[12]	921091831884 SAKTHIVEL R	88
[13]	331363704243 SAMIYULLA V E	76
[14]	499089462887 SANTHOSH L	84
[15]	911700192821 SANTHOSH M	83
[16]	767659261208 SANTHOSH S V	86
[17]	374197441355 SARANRAJ R	82
[18]	367070077648 SARAVANAKUMAR A	80
[19]	279454834635 SASITHARAN R	74
[20]	336558597982 SETHU MADHAVAN M	80
[21]	735363714312 SILAMBARASAN D	83
[22]	222684772524 SIVASAMY P	75
[23]	466131532420 SRI NATH L	81
[24]	563416911274 SRIRAM T	78
[25]	646991039639 SUDESH KUMAR J	92
[26]	290643762446 SUGUVANAN R	64
[27]	238071003033 SUPREET S	80

Sno	Register Number & Name	Marks (100)
[28]	733011371303 TAMIL SELVAN V	77
[29]	829759953619 THIYANESHWAR ASHOKA N	94
[30]	292048023550 VETRIVEL S	75
[31]	685143495429 VIGNESH KARTHIKEYAN K	81
[32]	563809945883 VIMAL VELAN S	77
[33]	539499211990 VIMAL KUMAR R	86
[34]	679372282823 VISHNUDHAR D	84
[35]	323268674057 VISHWA B	83
[36]	783289628425 VISHNU S	83
[37]	271506868659 YUGESHWARAN S	94
[38]	300513968654 ADHITHYAN A	80
[39]	660018958252 ARUN KUMAR A	93
[40]	375431500027 KAVIYARASAN T	0
[41]	245664833064 KRISHNA CHARAN	83
[42]	505127912239 LOGESHWARAN B	88
[43]	259594880198 NANDA KRISHNAN V	89
[44]	451045084653 RITHICK M	65
[45]	545697785049 SANJAY R	76
[46]	513567880662 SANTHOSH KUMAR S	90
[47]	478853226360 SANTHOSH SIVAN M	78
[48]	370928681359 SHEIK MUHAMMED SHIMAR K M	78
[49]	896812534055 SIRAJUDEEN H	78
[50]	597327594867 SRIVENKATESH J	84

Sno	Register Number & Name	Marks (100)
[51]	750244449050 SUJITH A	87
[52]	970988679923 SUKANT K	87
[53]	469730208813 SURENDAR M	81
[54]	608277095303 SURYA C	87

Range Analysis

Sno	Register Number & Name	Marks (100)
[55]	593896961611 VARADHARAJ B	79
[56]	204416596953 VINOTH V	75
[57]	366105763955 VISHNU R	86
[58]	801055341859 YOONUS KHAN P	88
[59]	815086605489 YUVARAJ N	88



Range Analysis

Range	No.of.Students
0 - 49	1
50 - 100	58

Signature of the Faculty

Class Advisor

Head of the Department

Head of The Department
Department of Mechanical Engineering
M.Kumarasamy College of Engineering,
Karur - 639 113, Tamil Nadu.