



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
CLR-6	Utilize English language skills along with technical skills in building wider career orientations

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
CO6	Build listening, speaking, reading, writing abilities in English to interact with English speaking people.

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	-	-	-
CO6	1	1	1	3	3	3	1	3	3	3	-	3	-	-	-
CO (Avg)	1	2.66	1	3.00	3.00	2.83	1	3.00	3.00	3.00	-	3.00	-	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	COMMUNICATION	6
<p>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).</p>		
UNIT II	VOCABULARY AND GRAMMAR	7
<p>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)</p>		
UNIT III	DISCOURSE TECHNIQUES	7
<p>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)</p>		
UNIT IV	WORKPLACE COMMUNICATION	6
<p>Reading Comprehension, Guidelines questions (Referential, Critical, Interpretative)(Practice Exercise) - Précis-writing Guidelines(Practice Exercise) - 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).</p>		
UNIT V	PROJECT WRITING	5
<p>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).</p>		
LIST OF EXPERIMENTS		14
<ol style="list-style-type: none"> Often Mispronounced sounds (Audio Visual Material - Listening to minimal pairs and reproducing) Barriers of communication Language barriers – videos (Identifying the Language Barriers of communication –Written) Short Biographical Account on Famous Personalities –Video(Oral Paraphrasing of the Content Shown) Listening to Long Conversations, Daily Life (Identify Various Communication Contexts and Answering Questions – Collocation) 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.icee.org/index.html





Regulation 2018		Semester I	Total Hours			60
Category	Course Code		Course Name	Hours / Week		
		L		T	P	C
B	18MAB101T	CALCULUS AND LINEAR ALGEBRA	3	1	0	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Apply the Matrices in problems of Science and Engineering
- 2 Utilize Taylor series, Maxima minima and Jacobian in solving real- time application problems
- 3 Utilize the concepts of radius of curvature, evolute, envelope in problems of Science and Engineering
- 4 Apply the concept of Differential Equations in problems of Science and Engineering
- 5 Applications of Sequences and Series in all problems involving Science and Engineering
- 6 Utilize appropriate mathematical techniques for the different solutions required in Science and Engineering applications

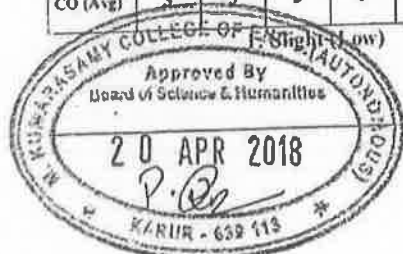
Course Outcome (s) (COs):

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

- CO1 Apply Matrices, Eigenvalues and Eigen Vectors and Reduction of Quadratics form in Science and Engineering problem solving
- CO2 Apply Maxima and Minima, Jacobian, and Taylor series to solve problems in Science and Engineering
- CO3 Identify Radius, Centre, envelope and Circle of curvature and apply them in the problem solving
- CO4 Solve the different types of Differential Equations in Science and Engineering applications
- CO5 Apply convergence and divergence of series using different tests and apply sequences and Series in the problem solving
- CO6 Identify, Analyze and Apply mathematical techniques to arrive at solutions in Science and Engineering

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	-	-	-
CO2	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	3	-	-	3	-	-	-
CO4	-	3	-	-	-	-	-	-	3	-	-	3	-	-	-
CO5	-	3	3	-	-	-	-	-	3	-	-	3	-	-	-
CO6	3	-	3	-	-	-	-	-	3	-	-	3	-	-	-
CO (Avg)	3	3	3	3	3	-	-	-	3	-	-	3	-	-	-



2: Moderate (Medium)

3: Substantial (High)

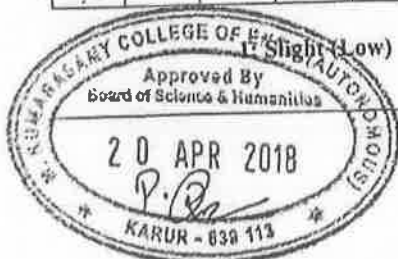


UNIT I	EIGEN VALUE PROBLEMS	9 + 3
Characteristic equation- Cayley-Hamilton theorem (excluding proof)- Eigen values and Eigen vectors of a real matrix - Properties- Orthogonal transformation of a symmetric matrix to diagonal form-Quadratic form-Reduction of quadratic form to canonical form by orthogonal transformation.		
UNIT II	FUNCTIONS OF SEVERAL VARIABLES	9 + 3
Partial derivatives-Euler's theorem for homogenous functions-Total derivatives-Differentiation of implicit functions-Jacobians-Taylor's expansion- Maxima and Minima-Method of Lagrangian multipliers.		
UNIT III	APPLICATIONS OF DIFFERENTIAL CALCULUS	9 + 3
Curvature and Radius of curvature – Circle of curvature and Centre of curvature-Envelope- Evolute as Envelope of Normals.		
UNIT IV	DIFFERENTIAL EQUATIONS OF SECOND ORDER	9 + 3
Second order linear differential equations with constant coefficients- Particular Integrals for x^n , e^{ax} , $\cos ax/\sin ax$, $e^{ax}\cos bx/e^{ax}\sin bx$ - Method of variation of parameters-Cauchy and Legendre's linear equation-Simultaneous first order linear equations with constant coefficients.		
UNIT V	SEQUENCES AND SERIES	9 + 3
Sequences: Definition and examples-Series : Types and Convergence - Series of positive terms-Test of convergence: Comparison test, D'Alembert's ratio test, Integral test, Raabe's Root test and Log test-Alternating series-Leibnitz's test-Series of positive and negative terms(Alternating series)- Absolute and Conditional convergence.		
Text Book (s)		
1	B. H. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.	
2	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.	
Reference (s)		
1	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008	
2	N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008	
3	G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson,Reprint, 2002	
4	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 th Reprint, 2010	





Regulation 2018		Semester I / 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														
CLR-6	Utilize the concepts in physics for the understanding of engineering and technology														
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														
CO6	Apply the concepts of electromagnetic theory and mechanics in real time 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	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-

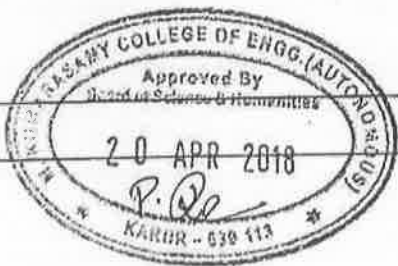


2: Moderate (Medium)

3: Substantial (High)



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
<ol style="list-style-type: none">1. Basics of experimentation2. Determine dielectric constant of the sample3. Calibrate Ammeter using Potentiometer4. Calibrate voltmeter using Potentiometer5. Determine the energy loss of magnetic materials using B-H curve experiment6. Determine Planck's Constant7. Study of I-V characteristics of a light dependent resistor (LDR)8. Determine wavelength of monochromatic light by Newton's ring9. Determine particle size using laser10. Determine wavelength of using diffraction grating11. Determine wavelength for a given laser source12. Study of numerical aperture and acceptance angle of optical fiber13. 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	



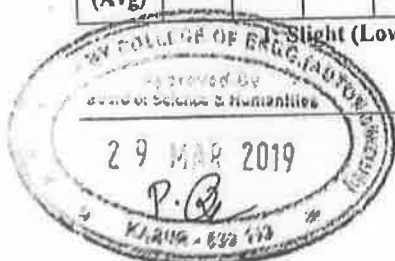


Regulation 2018		Semester I / Semester II			Total Hours			90							
Category	Course Code	Course Name	Hours / Week			C									
			L	T	P										
B	I8CYB101J	CHEMISTRY	3	1	2	5									
Prerequisite Course (s)															
NIL															
Course Objective (s):															
The purpose of learning this course is to:															
<ul style="list-style-type: none"> 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	Categorize the Engineering materials for their applications														
CO6	Develop analytical proficiency through the lab skill sets to demonstrate in professional practices														
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	-	-	-	-	-	-	-	-	-	-	-	-	-
CO6	3	3	-	3	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3.00	3.00	-	3.00	-	-	-	-	-	-	-	-	-	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	ENGINEERING ORGANIC MATERIALS	9+3
<p>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.</p>		
UNIT II	COORDINATION AND ORGANOMETALLIC COMPOUNDS	9+3
<p>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)</p>		
UNIT III	THERMODYNAMICS AND KINETICS	9+3
<p>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.</p>		
UNIT IV	ENGINEERING ELECTROCHEMISTRY	9+3
<p>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.</p>		
UNIT V	INDUSTRIAL APPLICATIONS OF CHEMISTRY	9+3
<p>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.</p>		
LIST OF EXPERIMENTS		30
<ol style="list-style-type: none"> 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 		





M.KUMARASAMY

COLLEGE OF ENGINEERING

NAAC Accredited Autonomous Institution

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Thalavapalayam, Karur, Tamilnadu.



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/Semester II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES101J	ENGINEERING GRAPHICS (COMPUTER SCIENCE)	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		
	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	PSO2	PS O3
CO1	3	2	2	2	2	-	2	3	2	2	-	3	-	-	-
CO2	3	2	3	2	2	-	1	2	3	2	-	3	2	1	-
CO3	3	2	3	2	3	-	1	2	3	2	-	2	1	1	-
CO4	3	2	3	2	3	-	1	2	3	2	-	2	1	1	-
CO5	3	2	2	2	2	-	1	2	2	2	-	3	1	1	-
CO (Avg)	3	2	2.6	2	2.4	-	1.2	2.2	2.6	2	-	2.6	1.25	1	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Curriculum and Syllabus 2018 Regulation 2018



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 ORTHOGRAPHIC 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. Dhananjay A. 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.	

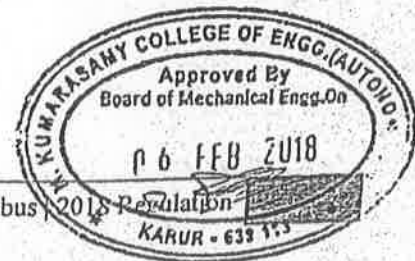
Curriculum and Syllabus





List of Experiments.

1	Spiral and involutes using b-spline 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			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18CSS101J	PROGRAMMING FOR PROBLEM SOLVING	1	0	4	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CO1	To learn programming using a structured programming language
CO2	To provide exposure on C programming.
CO3	To 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	-	-	-	-	-	-	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)

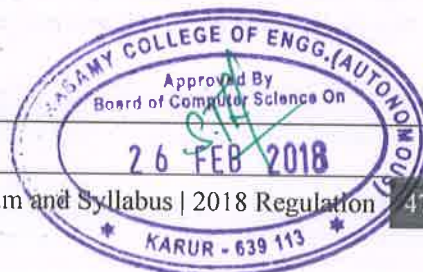
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION TO C	9
Evolution of Programming & Languages - Problem solving through programming - Creating algorithms - Drawing flowcharts - Writing pseudocode - Evolution of C language, its usage history - Input and output functions: Printf and scanf - Variables and identifiers - Expressions, Constants - Keyword ,Single line and multiline comments- Values, Names, Scope - Binding, Storage Classes - Input and Output Statement - Numeric Data types - Non-Numeric Data types: char string - Non-Numeric Data types: string - Increment operator - decrement operator - Comma, Arrow and Assignment operator - sizeof operator - Bitwise operators - Relational Operators - logical Operators - Conditional Operators - Operator Precedence		
UNIT II	CONTROL STATEMENT AND ARRAY	9
If statement in expression - L value and R value in expression - Control Statements – if and else – else if – nested if - switch case - Iterations – While loop - do..While loop - For loop - Goto, break, continue - Array Basic and Types - Array Initialization and Declaration - Initialization: one Dimensional Array, Accessing - Indexing one Dimensional Array Operations - Initializing and Accessing 2D Array - Initializing Multidimensional Array - Array Advantages and Limitations		
UNIT III	STRINGS AND FUNCTIONS	9
String Basics - String Declaration and Initialization - String Functions: gets(), puts(), getchar() - putchar(), printf()atoi(), strlen()strcat(), strcmp()sprintf(), sscanf()strcpy(), strstr()Strrev(), strtok()Functions basics - Functions declaration and definition - Types: Call by Value - Call by Reference - Function with Arguments and no Return Values - Function without Arguments and no Return Values - Function with Arguments and Return Values - Function without Arguments and Return Values - Passing Array to Functions - Returning array from functions - Formal and Actual Parameters - Recursion Functions - Advantages of using Functions		
UNIT IV	POINTERS	9
Pointers Basics - Address operator - Pointer Declaration - dereferencing pointers - Size of Pointer Variable and Pointer Operator - Void Pointers and size of Void Pointers - Arithmetic Operations - Incrementing Pointers - Constant Pointers - Null Pointers - Pointers to array elements - Pointers to strings - Function Pointers		
UNIT V	STRUCTURES AND UNIONS	9
Structure basics & declaration - Initializing Structure, Accessing members - Nested structure - Array of structure - Accessing elements in a structure array - Passing Array of structure to function - Union Basic and declaration - Accessing Union Members - file: opening, defining - File closing, File Modes, File Types - Writing contents into a file - Reading file contents - Appending an existing file - File permissions and rights - Changing permissions and rights		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 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 Function prototypes 9. Programs on Passing and returning Array to Functions 		





10. Programs on Recursion Functions
11. Programs on Pointers
12. Programs on Structure
13. Programs on Union
14. Programs on Files

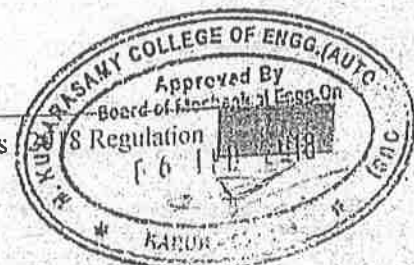
Text Book (s)

1	Zed A Shaw, Learn C the Hard Way: Practical Exercises on the Computational Subjects You Keep Avoiding (Like C), Addison Wesley, 2015
2	Bharat Kinariwala, TepDobry, Programming in C, eBook
3	W. Kernighan, Dennis M. Ritchie, The C Programming Language, 2nd ed. Prentice Hall, 1996





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 (CSE)	3	0	2	4								
Prerequisite Course (s)														
Nil														
Course Objective (s):														
<ul style="list-style-type: none"> ➤ 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	-	-
CO2	3	-	3	-	3	3	3	-	3	-	-	3	-	-
CO3	3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	3	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO (Avg)	3		3		3	3	3		3			3		





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 Brihadewswarar 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: 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, 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 (fans), 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
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Reference (s)

1	Serope Kalpakjian, 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, Leenus Jesu Martin and Murali. G, "Basic Mechanical Engineering", Suma Publications, Chennai, 2007.

LIST OF EXPERIMENTS

Total: 30 hours

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			90									
Category	Course Code		Course Name	Hours / Week											
		L		T	P	C									
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)

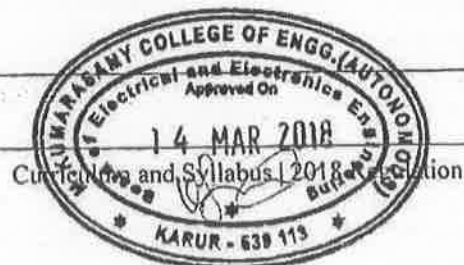
3: Substantial (High)



2018 Regulation



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
<ol style="list-style-type: none"> 1. Verification of Kirchoff's Law 2. Verification of all Theorems, 3. Time Domain Analysis (RL, RC). 		





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. Verlfention 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. |





Regulation 2018		Semester I/Semester II		Total Hours			30								
Category	Course Code	Course Name	Hours / Week			C									
			L	T	P										
H	ISMBH101L	PROFESSIONAL SKILLS AND PRACTICES	0	0	2	1									
Prerequisite Course (s)															
Nil															
Course Objective (s):															
The purpose of learning this course is to:															
CLR-1	Equip students with different aspects of Presentation														
CLR-2	Train students to use appropriate language for public speaking.														
CLR-3	Help students better understand basic leadership qualities and personality traits														
CLR-4	Train the students to face interview confidently.														
CLR-5	Make students understand how setting goals in life is important.														
CLR-6	Make students ready for work life.														
Course Outcome (s) (COs):															
At the end of this course, learners will be able to:															
CO1	Make presentation in a formal way.														
CO2	Speak with clarity and confidence, thereby enhancing their employability skills.														
CO3	Enable students to understand different aspects of leadership and evaluate in their own strengths.														
CO4	Clear the job interview successfully.														
CO5	Realize that selecting goal is a fundamental component to long-term success of an individual.														
CO6	Exhibit the professional skills well.														
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	3	3	2	3	-	-	-
CO2	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-
CO3	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-
CO4	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-
CO5	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-
CO6	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-
CO(Avg)	-	-	-	-	-	3	2	3	3	3	2	3	-	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	PRESENTATIONS	5
Tips and Techniques for an Effective Presentation - Effective presentation structure - Types of Presentation - Verbal aspect of a presentation - Non-verbal aspect of a presentation – body language - Stress management during a presentation		
UNIT II	PUBLIC SPEAKING	5
Importance of Public Speech - Dealing with fear and Anxiety - Tips and Techniques for Public Speaking - Informative Speech - Delivering a Persuasive Speech - Dealing with audience questions		
UNIT III	LEADERSHIP SKILLS	5
Communication – Motivation – Delegating – Creativity – Responsibility - Commitment		
UNIT IV	INTERVIEW SKILLS	5
Preparing for a Job Interview - The Interview Process - Telephone Interviews - Interview Techniques - Mock Interview - Mock Interview		
UNIT V	GOAL SETTING	5
Types of goals - Reasons for goal setting - Goal Setting Process - S.M.A.R.T. goals - Tips and Techniques for Goal Setting - Trouble in Setting Goals		
LIST OF EXPERIMENTS		5
<ol style="list-style-type: none"> 1. Make a presentation on a general topic 2. Give a persuasive speech 3. Exhibit your leadership qualities 4. Mock interview 5. Share your realistic short term and long term goals and the ways to attain them. 		
Text Book (s)		
NIL		
Reference(s)		
1	Aruna Koneru, Professional Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi	
2	Professional Skills and Practice, Oxford University Press	
3	https://www.skillsyouneed.com	
4	https://www.Business English Site.com	





Regulation 2018		Semester I/ Semester II	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18MBH102L	GENERAL APTITUDE	0	0	2	1

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CLR1	Recapitulate fundamental mathematical concepts and skills
CLR2	Hone critical thinking skills by analyzing the arguments with explicit and implicit premises
CLR3	Sharpen logical reasoning through skillful conceptualization
CLR4	Identify the relationships between words based on their function, usage and characteristics
CLR5	Nurture passion for enriching vocabulary
CLR6	Acquire the right knowledge, skill and aptitude to face any competitive examination.

Course Outcome (s) (COs):

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

CO1	Build a strong base in the fundamental mathematical concepts
CO2	Identify the approaches and strategies to solve problems with speed and accuracy
CO3	Gain appropriate skills to succeed in preliminary selection process for recruitment
CO4	Collectively solve problems in teams and groups
CO5	Build vocabulary through methodical approaches
CO6	Enhance lexical skills through systematic application of concepts and careful analysis of style, syntax, semantics and logic

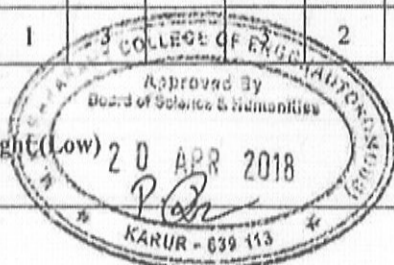
CO-PO Mapping

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

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I		6
Types of numbers, Divisibility tests -Introduction to Significance of Verbal Aptitude in Competitive Examinations - LCM and GCD -Vocabulary enrichment techniques - Unit digit, Number of zeroes , Factorial notation - Vocabulary enrichment Techniques.		
UNIT II		6
Square root, Cube roots, Remainder - Identities - Contextual Vocabulary Exercise - Synonyms Fractions and Decimals, surds -Contextual Vocabulary Exercise -Antonyms		
UNIT III		6
Percentage Introduction - Sentence Completion Basic Level Exercises : Single Blank - Percentage Problems - Sentence Completion Basic Level Exercises : Double Blank - Profit and Loss - Cloze Test		
UNIT IV		6
Discount -Reading Comprehension – Introduction -Simple Interest - Reading Comprehension – Summary & Main Idea - Compound Interest, Installments - Reading Comprehension – Summary & Main Idea		
UNIT V		6
Logarithms Intro - Grammar Rules :A comprehensive Introduction - Logarithms Rules - Sentence Completion – Grammar - Linear Equations - Spotting Errors		
Text Book (s)		
1	Nil	
Reference (s)		
1	Charles Harrington Elstor, Verbal Advantage: Ten Easy Steps to a Powerful Vocabulary, Random House Reference, 2002	
2	Merriam Webster's Vocabulary Builder, Merriam Webster Mass Market, 2010	
3	Norman Lewis, How to Read Better and Faster, Goyal, 4 th Edition	
4	Franklin GRE Word List, 3861 GRE Words, Franklin Vocab System, 2014	
5	Wiley's GMAT Reading Comprehension Grail, Wiley, 2016	
6	Manhattan Prep GRE : Reading Comprehension and Essays, 5 th Edition	
7	Martin Hewings, Advanced Grammar in Use. Cambridge University Press, 2013	
8	Nishit K. Sinha, The Pearson Guide to Quantitative Aptitude and Data Interpretation for the CAT	
9	Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations	





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.,

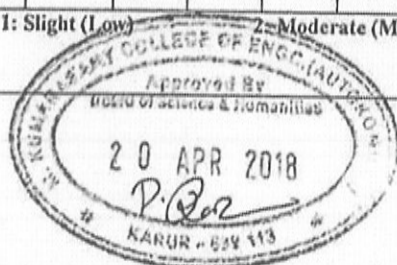
CO-PO Mapping

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)

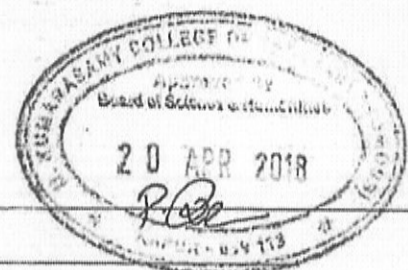
2: Moderate (Medium)

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
<ol style="list-style-type: none"> 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 |



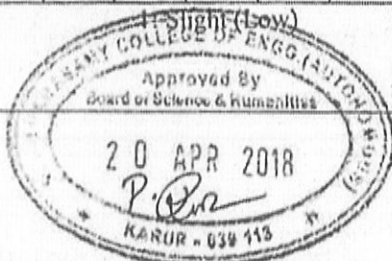


Regulation 2018		Semester II	Total Hours			60									
Category	Course Code	Course Name	Hours / Week			C									
			L	T	P										
B	18MAB102T	ADVANCED CALCULUS AND COMPLEX ANALYSIS	3	1	0	4									
Prerequisite Course (s)															
Calculus and Linear Algebra															
Course Objective (s):															
The purpose of learning this course is to:															
1	Evaluate Double and triple Integral and apply them in problems in Engineering Industries														
2	Evaluate Surface, Volume Integral and applications of Gauss theorem, Stoke's and Green's theorem in Engineering fields														
3	To know the properties of Complex functions and apply them in all the Engineering fields														
4	Evaluate improper integrals involving complex functions using Residue theorem and apply them in Engineering fields														
5	Transform engineering problems into ODE, PDE and Integrals and solve them using Laplace / complex analytic methods														
6	Identify how Engineering problems can be transformed in to simple mathematical constructs and solve the same														
Course Outcome (s) (Cos):															
At the end of this course, learners will be able to:															
CO1	Evaluate multiple integrals using change of variables														
CO2	Apply techniques of vector calculus in problems involving Science and Engineering.														
CO3	Apply complex analytic functions and its properties in solving problems														
CO4	Evaluate improper integrals using Residue theorem involving problems in Science and Engineering														
CO5	Apply techniques of Laplace Transforms and inverse transform for problems in Science and Engineering and Solving Ordinary Differential Equations														
CO6	Create mathematical constructs for engineering problems and identify solutions to solve them														
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	-	-	-
CO2	3	-	-	3	3	-	-	-	-	-	-	-	-	-	-
CO3	3	3	-	3	-	-	-	-	3	-	-	3	-	-	-
CO4	-	3	3	-	-	-	-	-	3	-	-	3	-	-	-
CO5	-	3	-	-	-	-	-	-	3	-	-	3	-	-	-
CO (Avg)	3	3	3	3	3	-	-	-	3	-	-	3	-	-	-

1: Slight (Low)

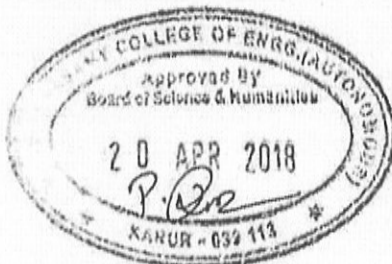
2: Moderate (Medium)

3: Substantial (High)





UNIT I	MULTIPLE INTEGRALS	9 + 3
Evaluation of double integration in cartesian and polar Coordinates - Evaluation of double integral by changing of order of integration - Area as a double integral (Cartesian and Polar) - Conversion from Cartesian to Polar in double integrals - Triple integration in Cartesian Coordinates - Volume as triple integral in Cartesian, Polar and Spherical Coordinates.		
UNIT II	VECTOR CALCULUS	9 + 3
Gradient, Divergence, Curl, Solenoidal, Irrotational fields - Directional derivative - Line integrals - Surface integrals - Volume Integrals - Green's theorem (excluding proof): Applications in evaluating Line and Region - Gauss divergence theorem (excluding proof): Applications to cubes and parallelopipeds - Stoke's theorem (excluding proof): Applications to cubes and parallelopipeds.		
UNIT III	ANALYTIC FUNCTION	9 + 3
Definition of Analytic function - Cauchy Riemann equations - Properties of Analytic function - Determination of Analytic function using Milne's Thomson method - Conformal mapping ($w=c+z$, $w=cz$, $w=\frac{1}{z}$) - Bilinear transformation.		
UNIT IV	COMPLEX INTEGRATION	9 + 3
Cauchy's integral theorems (without proof) - Cauchy's integral formulae - Taylor's expansions with simple problems - Laurent's expansions with simple problems - Singularities - Poles and their types - Residues - Cauchy's residue theorem (without proof) - Contour integration: unit circle and semicircle.		
UNIT V	LAPLACE TRANSFORMS	9 + 3
Laplace Transforms of standard functions - Transforms properties - Transform of derivatives and integrals - Initial & Final value theorems (without proof) and Verification for some problems - Inverse laplace transforms using Partial fractions and Shifting theorem - Convolution theorem - Periodic functions - Solution of linear second order ODE equations with constant coefficients.		
Text Book (s)		
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.	
2	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008	
Reference (s)		
1	B. H. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.	
2	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008	
3	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 th Reprint, 2010	
4	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002	





Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB203T	PROBABILITY STATISTICS AND QUEUING THEORY (B.E CSE & B.TECH IT)	3	1	0	4

Prerequisite Course (s)

NIL.

Course Objective (s):

The purpose of learning this course is to:

1	Have a well – founded knowledge of standard distributions which can describe real life phenomena.
2	Acquire skills in handling situations involving more than one random variable and functions of random variables.
3	Understand test of hypothesis and how they relate to engineering applications.
4	Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
5	Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

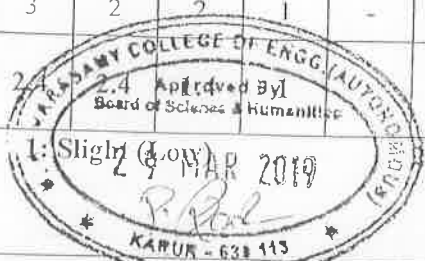
Course Outcome (s) (COs):

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

CO1	Apply basic probability techniques and models to analyze the performance of computer systems.
CO2	Illustrate and apply the concept of pairs of random variables from the knowledge of sampling distributions.
CO3	Understand the problems of Students T test for single mean and difference of means.
CO4	Use discrete time Markov chains to model computer systems.
CO5	Understand basic characteristic features of a queuing system and acquire skills in analyzing queuing model.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	-	-	-	-	-	-	-	-	-	3	2	-
CO2	2	2	1	-	-	-	-	-	-	-	-	-	3	2	-
CO3	2	3	2	1	-	-	-	-	-	-	-	-	3	2	-
CO4	3	2	1	-	-	-	-	-	-	-	-	-	2	2	-
CO5	3	2	2	1	-	-	-	-	-	-	-	-	3	3	-
CO (Avg)	2.4	2.4	2.4	1.4	-	-	-	-	-	-	-	-	2.8	2.2	-



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



UNIT I	RANDOM VARIABLE AND STANDARD DISTRIBUTIONS	9*+3*
Random variable - Probability mass function - Probability density functions- Properties - Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential, and Normal distributions and their properties .		
UNIT II	TWO DIMENSIONAL RANDOM VARIABLES	9*+3*
Joint distributions - Marginal and conditional distributions – Covariance – Correlation and regression - Transformation of random variables - Central limit theorem.		
UNIT III	TESTING OF HYPOTHESIS	9*+3*
Sampling distributions - Tests for single mean, Proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances – chi-square test for goodness of fit – Independence of attributes.		
UNIT IV	MARKOV PROCESSES AND MARKOV CHAINS	9*+3*
Classification-First order, Second order, strictly stationary order, wide-sense stationary - Markov process - Markov chains – Transition probabilities - Poisson process.		
UNIT V	QUEUEING THEORY	9*+3*
Markovian models – Birth and Death queuing models - Steady state results: Single and multiple server queuing models with finite and infinite service ((M/M/1:∞/FCFS), (M/M/1:N/FCFS), (M/M/C:∞/FCFS), (M/M/C:N/FCFS)) - Pollaczek- Khintchine formula.		
Text Book (s)		
1	Oliver Ibe, “Fundamentals of Applied Probability and Random Processes” 2nd Edition, Elsevier, 2014	
2	D. Gross and C.M. Harris, “Fundamentals of Queueing Theory”, Wiley Student edition, 2002	
3	R.E. Walpole, R.H. Myers, S.L. Myers, and K Ye, “Probability and Statistics for Engineers and Scientists”, Pearson Education, Asia , 8th edition, 2007.	
Reference (s)		
1	R.A Johnson, Miller & Freund’s Probability and Statistics for Engineers, Seventh Edition, Pearson Education, Delhi, 2009.	
2	Allen. A. O, Probability, Statistics and Queueing Theory: with computer Science Applications, Academic press, 2014.	
3	Trivedi. K.S, Probability and Statistics with Reliability, Queueing and Computer Applications, John Wiley and sons, Second edition, 2012.	
4	Taha.H.A, Operations Research: An Introduction, Eighth Edition, Prentice Hall of India Ltd, New Delhi, 2008.	





Regulation 2018		Semester III			Total Hours			60						
Category	Course Code	Course Name	Hours / Week			C								
			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
CO1	3	3	2	2	2	1	-	-	3	2	-	2	2	2
CO2	3	3	2	2	2	1	-	-	3	2	-	2	2	2
CO3	3	3	2	2	2	1	-	-	3	2	-	2	2	2
CO4	3	2	2	2	2	1	-	-	3	2	-	2	2	2
CO5	3	3	2	2	2	1	-	-	3	2	-	2	2	2
CO (Avg)	3	3	2	2	2	1	-	-	3	2	-	2	2	2

1: Slight (Low)

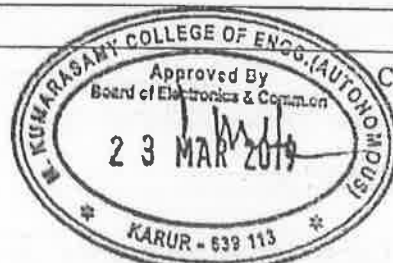
2: Moderate (Medium)

3: Substantial (High)





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
<ol style="list-style-type: none"> 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.



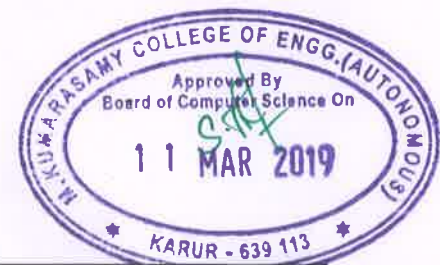


Regulation 2018		Semester III											Total Hours		60	
Category	Course Code	Course Name											Hours / Week			C
													L	T	P	
C	18CSC201J	DATA STRUCTURES AND ALGORITHMS											3	0	2	4
Prerequisite Course (s)																
18CSS101J – Programming for Problem Solving																
Course 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)

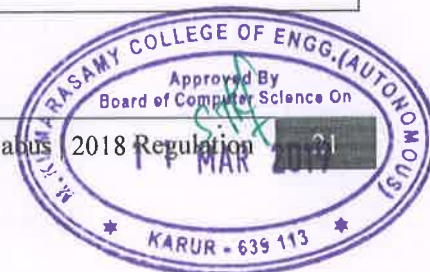
2: Moderate (Medium)

3: Substantial (High)





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
<ol style="list-style-type: none"> 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.	





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 Multithreading 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	GENERIC 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
<ol style="list-style-type: none"> 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 Programming!, 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.	





Regulation 2018		Semester III										Total Hours		45	
Category	Course Code	Course Name										Hours / Week			C
												L	T	P	
C	18CSC203T	OPERATING SYSTEMS										3	0	0	3
Prerequisite Course (s)															
Nil															
Course Objective (s): The purpose of learning this course is to:															
1	Study the basic concepts and functions of operating systems.														
2	Learn about processes, threads and scheduling algorithms.														
3	Learn about deadlock and various memory management schemes.														
4	Understand the files and disk management.														
5	Learn the basics of Linux system and windows 7.														
Course Outcome (s) (COs): At the end of this course, learners will be able to:															
CO1	Explain the concepts of OS, Process and Threads.														
CO2	Apply various CPU Scheduling algorithms and Synchronization Techniques.														
CO3	Utilize various schemes for deadlock handling and memory management.														
CO4	Make use of various file and disk management strategy.														
CO5	Explain the design principles of Linux and windows 7 Operating 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	-	-	-	-	-	2	1	-	-	3	2	
CO2	3	3	2	1	-	-	-	-	2	1	-	1	3	2	
CO3	3	2	1	-	-	-	-	-	2	1	-	-	3	2	
CO4	3	2	1	-	-	-	-	-	2	1	-	-	3	2	
CO5	3	2	2	1	-	-	-	-	2	1	-	1	3	2	
CO (Avg)	3	2.2	1.4	1	-	-	-	-	2.	1	-	1	3	2	

1: Slight (Low)

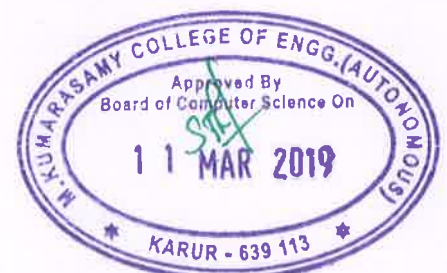
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Introduction to operating systems - Types of computer systems – System structure: System calls and its types – System programs – Operating system structure – Operating system generation and System boot – Process management: Process concept– Process scheduling – Operations on processes –Inter Process Communication – Multithreaded Programming: Overview – Models.		
UNIT II	PROCESS SCHEDULING	9
Scheduling criteria – Scheduling algorithms – Thread scheduling– Real time scheduling – Process Synchronization: The critical section problem – Semaphores – Classic problems of synchronization – Monitors.		
UNIT III	DEADLOCK AND MEMORY MANAGEMENT	9
Deadlock: Deadlock characterization – Methods for handling deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock detection – Recovery from deadlock – Memory management: Swapping – Contiguous memory allocation – Paging – Segmentation – Structure of the page table – Virtual Memory: Demand paging – Page replacement – Allocation of frames.		
UNIT IV	STORAGE MANAGEMENT	9
File concept – Access methods – Directory and Disk structure – File system mounting – File sharing – Protection – File system implementation – Directory implementation – Allocation methods – Free-space management – Mass Storage Structure: Disk scheduling – Swap-space management.		
UNIT V	CASE STUDY	9
Linux System: Design principles – Kernel modules – Process management – Scheduling – Memory management – File systems – Windows 7: Design principles – System components – Terminal services and Fast user switching - File systems.		
Text Book (s)		
1	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 9th Edition, John Wiley and Sons Inc., 2015.	
Reference (s)		
1	Andrew S. Tanenbaum, Herbert Bos “Modern Operating Systems”, Fourth Edition, Pearson Education 2017.	
2	William Stallings, “Operating Systems – Internals and Design Principles”, 7th Edition, Prentice Hall, 2011.	





Regulation 2018		Semester III											Total Hours		45	
Category	Course Code	Course Name											Hours / Week			C
													L	T	P	
C	18CSC204T	COMPUTER ARCHITECTURE AND ORGANIZATION											3	0	0	3
Prerequisite Course (s)																
Nil																
Course Objective (s):																
The purpose of learning this course is to:																
1	Understand the basic structure and operations of digital computer.															
2	Study the design of arithmetic and logic unit and implementation of fixed-point and floating-point arithmetic operations.															
3	Study the concepts of control unit and pipelining.															
4	Study the organization of memory unit.															
5	Study the interfacing of I/O devices.															
Course Outcome (s) (COs):																
At the end of this course, learners will be able to:																
CO1	Explain the organization and working principle of computer hardware components.															
CO2	Solve the problems using various arithmetic algorithms.															
CO3	Analyze the execution sequence of instruction.															
CO4	Explain the hierarchy of memory systems.															
CO5	Summarize the concepts of I/O organization.															
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	-	-	3	2		
CO2	3	3	-	-	-	-	-	-	3	-	-	-	3	2		
CO3	3	3	-	-	-	-	-	-	3	-	-	-	3	2		
CO4	3	2	-	-	-	-	-	-	-	2	-	-	3	2		
CO5	2	2	-	-	-	-	-	-	-	-	-	-	3	2		
CO (Avg)	2.8	2.4	-	-	-	-	-	-	2.6	2	-	-	3	2		

1: Slight (Low)

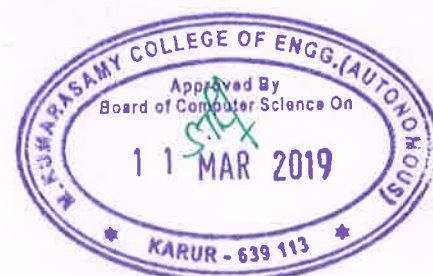
2: Moderate (Medium)

3: Substantial (High)





UNIT I	BASIC STRUCTURE OF COMPUTERS	9
Functional Units – Basic Operational Concepts – Bus Structures – Software Performance – Memory Locations and Addresses – Memory Operations – Instruction and Instruction Sequencing – Addressing Modes – Assembly Language.		
UNIT II	ARITHMETIC UNIT	9
Addition and Subtraction of Signed Numbers – Multiplication of Unsigned Numbers – Signed Operand Multiplication – Fast Multiplication – Integer Division – Floating-Point Numbers and Operations.		
UNIT III	BASIC PROCESSING UNIT AND PIPELINING	9
Basic Processing Unit : Fundamental Concepts – Execution of a Complete Instruction – Multiple Bus Organization – Hardwired Control – Micro Programmed Control – Pipelining : Basic Concepts – Data Hazards – Instruction Hazards – Influence on Instruction Sets – Data Path and Control Consideration – Superscalar Operation.		
UNIT IV	MEMORY SYSTEM	9
Memory Concepts – Semiconductor RAMs – ROMs – Speed, Size and Cost – Cache Memories – Performance Considerations – Virtual Memories – Memory Management Requirements.		
UNIT V	I/O ORGANIZATION	9
Accessing I/O Devices – Interrupts – Direct Memory Access – Buses – Standard I/O Interfaces: PCI - SCSI – USB.		
Text Book (s)		
1	Carl Hamacher, Zvonko Vranesic and Safwat Zaky, “Computer Organization”, Sixth Edition, McGraw Hill Education (India) Edition, 2012.	
Reference (s)		
1	David A. Patterson and John L. Hennessey, “Computer organization and design, The Hardware/Software interface”, Morgan Kauffman / Elsevier, Fifth edition, 2014.	
2	William Stallings, “Computer Organization and Architecture - Designing for Performance”, Ninth Edition, Prentice Hall, 2012.	
3	John P.Hayes, “Computer Architecture and Organization”, Third Edition, McGraw Hill, 2012.	





Regulation 2018		Semester III	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18MBM201L	COMPETENCIES IN SOCIAL SKILLS	0	0	2	1

Course Objective (s):

The purpose of learning this course is to:

- 1 Sharpen problem solving skill and to improve thinking capability of the students
- 2 Hone soft skill and analytical ability of students
- 3 Engage learners in using language purposefully and cooperatively
- 4 Expertise the writing and presentation skill to fulfill the corporate expectations

Course Outcome (s) (Cos):

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

- CO1 Solve both analytical and logical problems in an effective manner
- CO2 Design and deliver information in a proper manner
- CO3 Improve their presentation skills individually as well as a team member

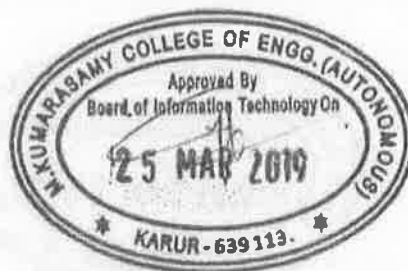
CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-			
CO2	-	-	-	-	-	-	-	-	-	2	-	-			
CO3	-	-	-	-	-	-	-	-	2	-	-	-			
CO4	-	-	-	-	-	-	-	-	-	-	-	-			
CO5	-	-	-	-	-	-	-	-	-	-	-	-			
CO (Avg)	3.00	-	-	-	-	-	-	-	2.00	2.00	-	-			

1: Slight (Low)

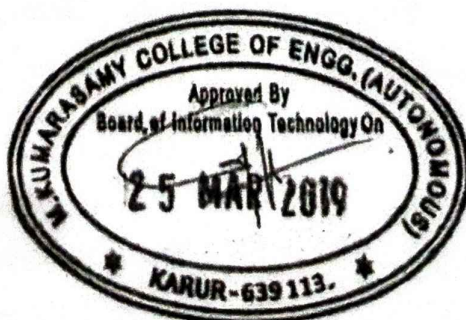
2: Moderate (Medium)

3: Substantial (High)





UNIT I	Module - 1	6
<p>Aptitude: Coding & Decoding - Direction Sense Test. Communication: Self-Introduction and SWOT analysis - Letter writing - types.</p>		
UNIT II	Module - 2	6
<p>Aptitude: Venn Diagrams - Data Interpretation. Communication: Phrasal verbs - Voice of Valluvar.</p>		
UNIT III	Module - 3	6
<p>Aptitude: Averages. Communication: Idioms and Phrases - Skits.</p>		
UNIT IV	Module - 4	6
<p>Aptitude: Time and Distance - Problems on Trains. Communication: Prefix/Suffix - Root words - Adjectives - JAM (Extempore Speech).</p>		
UNIT V	Module - 5	6
<p>Aptitude: Clocks & Calendars. Communication: Homophones - Frame Tales.</p>		
Text Book (s)		
1	Dr.R.S.Aggarwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Company Limited, 2015	





Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB206T	DISCRETE MATHEMATICS (B.E CSE & B.TECH IT)	3	1	0	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Obtain general knowledge about the area of discrete mathematics
- 2 Understand a variety of methods and to construct mathematical proofs
- 3 Model situations in a mathematical way and derive useful results

Course Outcome (s) (Cos):

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

- CO1 Demonstrate their knowledge in propositional calculus
- CO2 **Demonstrate their knowledge in predicate calculus**
- CO3 Obtain the perception in the area of sets and the knowledge about functions.
- CO4 **Obtain perception in the area of combinatorics**
- CO5 Obtain perception in the area of graph theory

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	-	-	-	-	-	-	-	-	3	2	-
CO2	3	2	1	1	-	-	-	-	-	-	-	-	3	2	-
CO3	2	1	1	-	-	-	-	-	-	-	-	-	3	2	-
CO4	2	1	1	-	-	-	-	-	-	-	-	-	3	2	-
CO5	3	2	2	1	-	-	-	-	-	-	-	-	3	3	-
CO (Avg)	2.6	1.6	1.2	1	-	-	-	-	-	-	-	-	3	2.2	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	PROPOSITIONAL CALCULUS	9 + 3
Propositions- Logical connectives-Compound propositions-Conditional and Biconditional propositions- Truth tables - Tautologies and Contradictions - Logical and equivalences and implications - DeMorgan's Laws-Normal forms-Principal conjunctive and disjunctive normal forms - Rules of inference-Arguments-Validity of arguments.		
UNIT II	PREDICATE CALCULUS	9 + 3
Predicates-Statement Function -Variables-free and bound variables- Quantifiers- Universe of discourse- Logical equivalences and implications for quantified statements- Theory of inference - The rules of universal specification and generalization-Validity of arguments.		
UNIT III	SET THEORY AND FUNCTIONS	9 + 3
Set Operations-properties-Power set-Relations-Graph and matrix of a relation- Partial Ordering- Equivalence relations-Partitions- Functions -Types of Functions- composition of relation and functions- inverse functions.		
UNIT IV	COMBINATORICS	9 + 3
Basics of Counting - Counting arguments- Pigeonhole Principle- Permutations and Combinations- Recursion and Recurrence relations-Generating Functions- Mathematical Induction- Inclusion -Exclusion		
UNIT V	GRAPH THEORY	9 + 3
Introduction to Graphs-Graph Operations- Graph and Matrices-Graph Isomorphism- Connected Graphs- Euler Graphs- Hamilton Paths and Circuits- Planar Graph-Graph Colouring-Trees- Shortest Path Problem-Directed and Undirected Graphs- Flows in Networks.		
Text Book (s)		
1	Trembly J.P and Manohar R. —Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw-Hill Pub. Co. Ltd, New Delhi, 2003.	
2	Ralph. P. Grimaldi, —Discrete and Combinatorial Mathematics: An Applied Introduction, Fourth Edition, Pearson Education Asia, Delhi, 2002.	
Reference (s)		
1	Kenneth H Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, Seventh Edition, McGraw Hill Education India Private Limited, New Delhi, 2013.	
2	A.Doerr and K.Levasseur, Applied Discrete Structures, Galgotia Publication, New Delhi, 2004.	
3	Gilbert Strang, "Introduction to Linear Algebra", 4th edition Wellesley- Cambridge Press, 2009.	
4	Johnsonbaugh, Richard, "Discrete Mathematics", Sixth Edition, Maxwell, International Edition, 2006.	



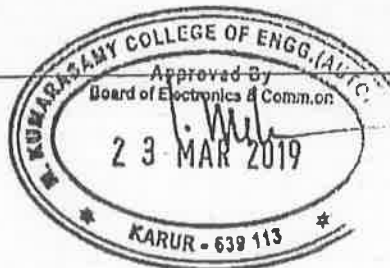


Regulation 2018		Semester IV			Total Hours			60						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
S	18ECS203J	Microprocessor and Microcontroller	3	0	2	4								
Prerequisite Course (s)														
Analog and Digital Electronics														
Course Objective (s):														
1	To understand Basic architectures and operational features of the processors and Controllers													
2	To Design and understand the multiprocessor configurations													
3	To Understand the interfacing concepts of the peripheral devices with that of the Processors													
4	To study the Architecture of 8051 microcontroller													
5	To design a microcontroller based system													
Course Outcome (s) (COs):														
CO1	Observe the architecture, instruction set and addressing modes of 8086.													
CO2	Record the configurations of multiprocessor.													
CO3	Describe the various interfaces such as 8255, 8251, 8254 etc.,													
CO4	Discuss the architecture of 8051 and apply the fundamentals of assembly level programming of 8051 controller.													
CO5	Know various real time applications of Microcontrollers.													
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	2	-	-	-	3	2	-	-	3	3
CO2	3	2	3	2	2	-	-	-	3	2	-	-	2	3
CO3	3	3	2	3	2	-	-	-	3	2	-	-	3	3
CO4	3	2	3	2	2	-	-	-	3	2	-	-	3	3
CO5	3	3	2	3	2	-	-	-	3	2	-	-	3	3
CO (Avg)	3	3	3	3	2	-	-	-	3	2	-	-	3	3

1: Slight (Low)

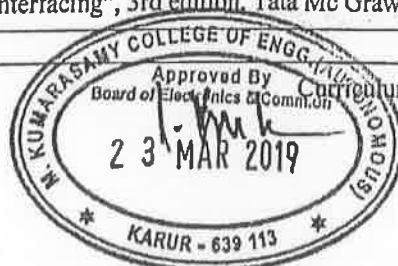
2: Moderate (Medium)

3: Substantial (High)





UNIT I	8086 MICROPROCESSOR	9
8086 microprocessor –Register organization of 8086- Architecture – Signal description of 8086 – Minimum and maximum mode of 8086 system - Addressing Modes - Instruction Set - Assembly Language Programming - Interrupts and Interrupt Service Routines.		
UNIT II	MULTIPROCESSOR CONFIGURATION	9
Interconnection Topologies - Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration – 8087 Numeric Data Processor – Architecture – Bus Arbitration - 8089 I/O Processor – Architecture.		
UNIT III	INTERFACING WITH MICROPROCESSORS	9
Memory interfacing with Microprocessors – Parallel Communication Interface (8255) – Serial Communication Interface (8251) – Timer (8254) - Keyboard/display controller (8279) – DMA controller (8237).		
UNIT IV	MICROCONTROLLER	9
Architecture of 8051 – Special Function Registers (SFRs) - I/O Pins Ports and Circuits - Instruction set - Addressing modes - Assembly language programming.		
UNIT V	MICROCONTROLLER PROGRAMMING	9
Programming 8051 Timers - Serial Port Programming - Interrupts Programming – LCD & Keyboard Interfacing - ADC, DAC & Sensor Interfacing - External Memory Interface- Stepper Motor, Traffic light Controller.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Arithmetic and Logical Operation using 8086 Microprocessor. 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 with 8086 - Keyboard and Display Controller. 6. Arithmetic and Logical Operation using 8051 Microcontroller. 7. Stepper motor Interfacing with 8051 Microcontroller 		
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	A.K.Ray & K.M Bhurchandi, “Advanced Microprocessor and Peripherals – Architecture, Programming and Interfacing”, 3rd edition, Tata Mc Graw Hill, 2015.	





Reference (s)	
1	Muhammad Ali Mazidi, Jamice Gillispit Mazidi, "The 8051 micro controller and Embedded System", 2nd Edition, Pearson Education 2006
2	Kenneth Ayala, "The Microcontroller Architecture - Programming and Applications", 3rd Edition, Cengage Learning, 2004.
3	N. Senthil Kumar, M. Saravanan, S. Jeevananthan "Microprocessors and Microcontrollers", 2nd Edition, Oxford Higher Education, 2018.
4	Douglas V.Hall and SSSP Rao, " Microprocessors and Interfacing", third edition, Tata Mc Graw Hill ,2012.





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)

18CSC201J - Data Structures and Algorithms

Course Objective (s):

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):

CO1	Explain database and various data models .
CO2	Illustrate the features of SQL and PL/SQL 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 .

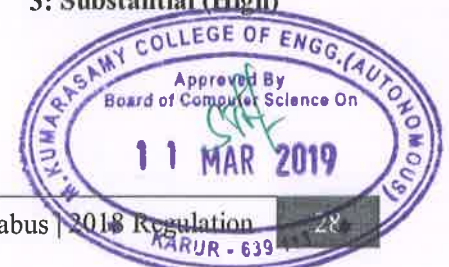
CO-PO Mapping

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)

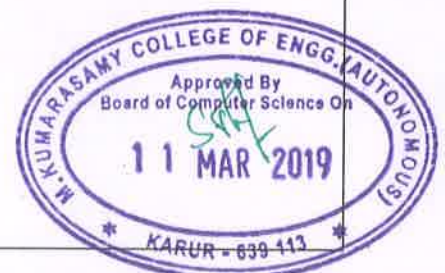
2: Moderate (Medium)

3: Substantial (High)





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
<ol style="list-style-type: none"> 1. Design a database for enterprise applications with the various Data Models 2. DDL commands <ol style="list-style-type: none"> a. Creation of tables b. Usage of alter, drop commands 3. DML commands <ol style="list-style-type: none"> a. Data Insertion using different ways b. Integrity constraints c. Usage of truncate command 4. SQL Queries <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> a. Setting privileges and revoke privileges 		





- b. Save point, rollback and rollback 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 Opper — SQL: The Complete Reference, 3rd Edition, McGraw-Hill, 2009.





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)

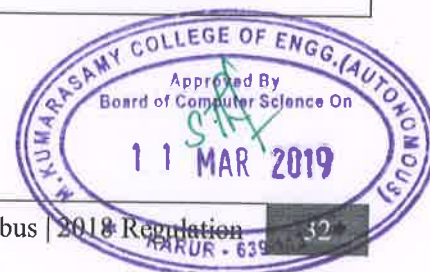
2: Moderate (Medium)

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
<ol style="list-style-type: none"> 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.	



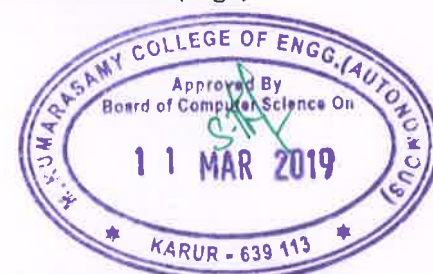


Regulation 2018		Semester IV											Total Hours		45	
Category	Course Code	Course Name											Hours / Week			C
													L	T	P	
C	18CSC207T	DESIGN AND ANALYSIS OF ALGORITHMS											3	0	0	3
Prerequisite Course (s)																
18CSC201J - Data Structures and Algorithms																
Course Objective (s): The purpose of learning this course is to:																
1	Develop an understanding about basic algorithms and different problem solving strategies.															
2	Improve creativeness and the confidence to solve non-conventional problems and expertise for analyzing existing solutions.															
Course Outcome (s) (COs): At the end of this course, learners will be able to:																
CO1	Solve recurrence equations using Iteration Method, Recurrence Tree Method and Master's Theorem.															
CO2	Design algorithms using Divide and Conquer Strategy and Greedy Strategy.															
CO3	Design efficient algorithms using Dynamic Programming, Back Tracking and Branch Bound Techniques for solving problems.															
CO4	Solve Optimization problems using Flow networks and String matching.															
CO5	Classify computational problems into P, NP, NP-Hard and NP-Complete.															
CO-PO Mapping																
COs	POs												PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2		
CO1	3	2	-	-	-	-	-	-	2	1	-	-	3	2		
CO2	3	2	-	-	-	-	-	-	2	1	-	-	3	2		
CO3	3	2	-	-	-	-	-	-	2	1	-	-	3	2		
CO4	3	2	-	-	-	-	-	-	2	1	-	-	3	2		
CO5	3	2	-	-	-	-	-	-	2	1	-	-	3	2		
CO (Avg)	3	2	-	-	-	-	-	-	2	1	-	-	3	2		

1: Slight (Low)

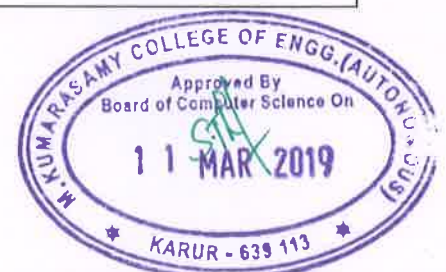
2: Moderate (Medium)

3: Substantial (High)





UNIT I	ANALYSING ALGORITHMS	9
The Role of Algorithms in Computing - Growth of Functions – Recurrences - The Substitution Method - The Recurrence Tree Method - The Master Method - Probabilistic Analysis and Randomized Algorithms – Amortized Analysis – Aggregate Analysis – Accounting Method - Asymptotic Notation.		
UNIT II	DIVIDE AND CONQUER & GREEDY DESIGN STRATEGIES	9
Analysis of Quick Sort, Merge Sort – Quick Sort Randomized Version – Sorting in Linear Time - Lower Bounds for Sorting - Selection in Expected Linear Time - Selection in Worst case Linear Time – Greedy Algorithms - Elements of Greedy Strategy - Huffman Code, Dijkstra's Shortest Path Algorithm.		
UNIT III	DYNAMIC PROGRAMMING AND BACKTRACKING	9
Dynamic Programming – Matrix Chain Multiplication - Elements of Dynamic programming – Longest Common Sequences – Warshall's and Floyd's Algorithm – Transitive Closure - All Pairs Shortest Path Algorithm – Analysis – Backtracking – Graph Coloring Problem - Branch and Bound Strategy - Knapsack Problem.		
UNIT IV	FLOW NETWORKS AND STRING MATCHING	9
Flow Networks – Ford Fulkerson Method - String Matching - Naive String Matching Algorithm – Knuth Morris Pratt Algorithm.		
UNIT V	NP PROBLEMS	9
NP-Completeness – Polynomial Time Verification – Theory of Reducibility - Circuit Satisfiability – NP - Completeness Proofs – NP Complete Problems: Vertex Cover, Hamiltonian Cycle and Travelling Salesman Problems – Approximation Algorithms – Approximation Algorithms to Vertex-Cover and Travelling Salesman Problems.		
Text Book (s)		
1	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, —Introduction to Algorithms, Third Edition, Prentice Hall, 2010.	
2	Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran, —Fundamentals of Computer Algorithms, Second Edition, Universities Press, 2008.	
Reference (s)		
1	Harsh Bhasin, —Algorithms Design and Analysis, Oxford university press, 2016.	
2	S. Sridhar, —Design and Analysis of Algorithms, Oxford university press, 2014.	
3	Anany Levitin, —Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012	
4	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, —Data Structures and Algorithms, Pearson Education, Reprint 2006.	





Regulation 2018		Semester IV										Total Hours		45	
Category	Course Code	Course Name										Hours / Week			C
												L	T	P	
C	18CSC208T	HUMAN COMPUTER INTERACTION										3	0	0	3
Prerequisite Course (s)															
Nil															
Course Objective (s):															
The purpose of learning this course is to:															
1	Provide in-depth understanding of the methods and techniques that can be utilized in the design, implementation and testing of user interfaces.														
2	Develop critical capabilities that enable evaluation and selection of appropriate methods and techniques for interface design.														
3	Engender practical abilities in visual and technical aspects of the design process.														
Course Outcome (s) (COs):															
At the end of this course, learners will be able to:															
CO1	Explain basics of human computer interacting criterion.														
CO2	Outline standard design heuristics for making human computer interactive systems.														
CO3	Evaluating strategies and assisting methodologies of HCI systems.														
CO4	Explain user models and task models to study various norms available in human computer interactions.														
CO5	Explain impact and necessity of dialogs and groupware prospective in HCI 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	3	1	
CO2	3	1	-	-	-	-	-	-	1	-	-	1	3	1	
CO3	3	2	2	-	-	-	-	-	-	1	-	1	3	1	
CO4	3	2	-	-	-	-	-	-	1	-	-	1	3	1	
CO5	3	2	2	1	1	-	-	-	-	1	-	1	3	1	
CO (Avg)	3	1.6	2	1	1	-	-	-	1	1	-	1	3	1	

1: Slight (Low)

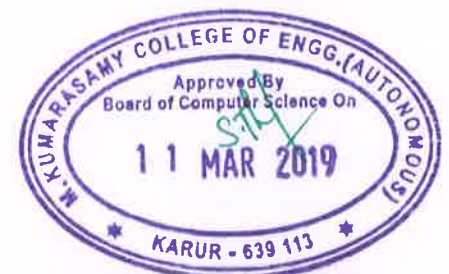
2: Moderate (Medium)

3: Substantial (High)





UNIT I	FOUNDATIONS OF HUMAN-COMPUTER INTERACTION	9
Introduction – Input channels and Output channels: Vision, Hearing, Touch, Movement – Human memory: Sensory memory, STM and LTM – Thinking-Reasoning and problem solving, Emotions, Individual difference, psychology – Text entry devices, display devices: 3D interaction, paper, memory, processing and networks, Ergonomics, Interaction styles.		
UNIT II	DESIGN PROCESS	9
The User Interface Design Process –Design Standards or Style Guides – System Training and Documentation needs - Menus – Structures of Menus – Functions of Menus – Contents of Menu – Formatting – Phrasing the Menu – Selecting Menu Choices – Navigating Menus – Graphical Menus.		
UNIT III	WINDOWS	9
Characteristics – Components – Presentation Styles – Types of windows – Window Management – Organizing Window Functions – Window Operations – Web Systems – Device Based Controls – Characteristics of Device Based Controls – Selecting the Proper Device Based Controls – Screen Based Controls – Operable Controls – Text Entry / Read-Only Controls – Selection Controls – Combination Entry – Custom Controls – Presentation Controls – Other Operable Controls.		
UNIT IV	MULTIMEDIA	9
Text for Web Pages – Providing Effective Feedback and Guidance and Assistance – Providing the Proper Feedback – Guidance and Assistance – International Considerations – Accessibility – Icons and Images – Multimedia – Coloring – Choosing the Proper Colors.		
UNIT V	WINDOWS LAYOUT TEST	9
Prototypes – Kinds of tests – Retest – Information Search – Visualization – Hypermedia – WWW–Software Tools.		
TEXT BOOK(S):		
1.	Wilbert. O. Galitz, —The Essential Guide to User Interface Design, Wiley - India, Second Edition, 2012.	
2.	Alan Dix, Janet Finlay, Gregory D. Abowd and Russel Beale, "Human Computer Interaction", 3rd Edition, 2004, Pearson Education, ISBN: 978-0130461094	
3.	Deborah Mayhew, —The Usability Engineering Lifecycle, Morgan Kaufmann, 1999.	
REFERENCE(S):		
1.	Ben Shneiderman, —Design the User Interface, Pearson Education, 1998.	
2.	Alan Cooper, —The Essential of User Interface Design, Wiley – Dream Tech Ltd 2002.	
3.	Sharp, Rogers, Preece, ‘Interaction Design’, Wiley India Edition, 2007.	



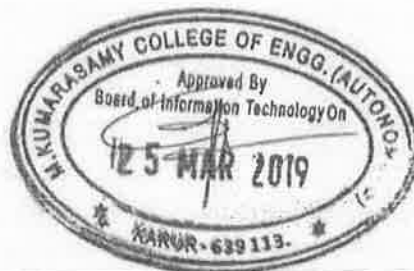


Regulation 2018		Semester IV	Total Hours			30									
Category	Course Code	Course Name	Hours / Week			C									
			L	T	P										
M	18MBM202L	CRITICAL AND CREATIVE THINKING SKILLS	0	0	2	1									
Course Objective (s):															
The purpose of learning this course is to:															
1	Focus on listening, speaking, & writing skills through audio & video sessions														
2	Hone soft skill and analytical ability of students														
3	Overcome the fear in group communication and to provide the effective communication														
4	Expertise intelligible pronunciation, stress and intonation patterns														
Course Outcome (s) (Cos):															
At the end of this course, learners will be able to:															
CO1	Solve both analytical and logical problems in an effective manner														
CO2	Demonstrate an ability to design and deliver messages														
CO3	Improve their communication with practical experience														
CO-PO Mapping															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-			
CO2	-	-	-	-	-	-	-	-	-	2	-	-			
CO3	-	-	-	-	-	-	-	-	-	2	-	-			
CO4	-	-	-	-	-	-	-	-	-	-	-	-			
CO5	-	-	-	-	-	-	-	-	-	-	-	-			
CO (Avg)	3.00	-	-	-	-	-	-	-	-	2.00	-	-			

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	Module - 1	6
Aptitude: Time and Work - Pipes and Cisterns. Communication: Sentence Pattern - Debate.		
UNIT II	Module - 2	6
Aptitude: Boats and Streams. Communication: Tenses and voices - Tech Talk.		
UNIT III	Module - 3	6
Aptitude: Problems on Ages - Probability Communication: Analogies - Biography.		
UNIT IV	Module - 4	6
Aptitude: Data sufficiency - Logical Puzzles. Communication: Punctuation - Connection.		
UNIT V	Module - 5	6
Aptitude: Mensuration. Communication: Preposition - News of the Week.		
Text Book (s)		
1	Dr.R.S.Aggarwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Company Limited, 2015	





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)

Approved in 9th BoS Meeting – 27 October 2020

Curriculum and Syllabus





UNIT I	INTRODUCTION OF MACHINE LEARNING	9
<p>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.</p>		
UNIT II	DESCRIPTIVE STATISTICS	9
<p>Central tendency: Mean, Median, Mode - Measures of Dispersion: Variance, Standard Deviation- Measures of Shape: Skewness, 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.</p>		
UNIT III	SUPERVISED	9
<p>Supervised Learning: Regression, Simple Linear Regression, Multiple Linear Regression, Logistic Regression - Classification - Decision Tree, k-Nearest Neighbors, Support Vector Machine (SVM).</p>		
UNIT IV	UNSUPERVISED LEARNING	9
<p>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.</p>		
UNIT V	NEURAL NETWORKS AND INTRODUCTION TO DATA SCIENCE	9
<p>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.</p>		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 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.





Regulation 2018		Semester V					Total Hours	60		
Category	Course Code	Course Name					Hours / Week			C
							L	T	P	
C	18CSC302T	COMPILER DESIGN					3	1	0	4

Prerequisite Course (s)

18CSS101J / 18CSS101J(R) - Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

1	Learn the various phases of compiler.
2	Learn the various parsing techniques.
3	Understand intermediate code generation.
4	Learn to implement code generator.
5	Learn the various code optimization techniques.

Course Outcome (s) (COs):

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

CO1	Explain the phases of a compiler and lexical analyzer.
CO2	Identify the similarities and differences among various parsing techniques and grammar transformation techniques.
CO3	Translate given input to intermediate code.
CO4	Apply the techniques for code generation.
CO5	Identify the various types of optimizations for language transformation.

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	1	-	-	3	2
CO2	3	3	3	1	-	-	-	-	3	1	-	-	3	2
CO3	3	2	1	-	-	-	-	-	3	1	-	-	3	2
CO4	3	3	2	-	-	-	-	-	3	-	-	-	3	2
CO5	3	3	3	1	-	-	-	-	3	-	-	-	3	2
CO (Avg)	3	2.6	2	1	-	-	-	-	3	1	-	-	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Approved in 9th BoS Meeting – 27 October 2020

Curriculum and Syllabus | 2018 Regulation





UNIT I	INTRODUCTION TO COMPILER	9 + 3
Introduction to Compiler - Analysis of the Source Program - The Phases of Compiler - Compiler Construction Tools - Lexical Analyzer - Input Buffering - Specification of Tokens - Recognition of Tokens.		
UNIT II	SYNTAX ANALYSIS	9 + 3
Syntax analysis: The Role of the Parser - Top Down Parsing - Recursive Descent Parser , Predictive Parser - LL(1) Parser, Bottom Up Parsing - Shift Reduce Parser - Operator Precedence Parser - LR Parsers - Constructing SLR Parsing Table.		
UNIT III	INTERMEDIATE CODE GENERATION	9 + 3
Intermediate Languages – Declarations - Assignment Statements - Boolean Expressions - Flow of Control Statements - Back Patching - Procedure Calls.		
UNIT IV	CODE GENERATION	9 + 3
Issues in the Design of a Code Generator - Target Machine - Basic Block and Flow Graphs - Next use Information - Simple Code Generator - Register Allocation and Assignment - The DAG Representation of Basic Blocks - Generating Code from DAGs.		
UNIT V	CODE OPTIMIZATION	9 + 3
Principle Sources of Optimization - Peephole Optimization - Optimization of Basic Blocks - Loops in Flow Graphs - Introduction to Global Data - Flow Analysis - Code Improving Transformations.		
Text Book (s)		
1	Alfred V. Aho, Ravi Sethi Jeffrey D.Ullman, —Compilers: Principles, Techniques and Tools,Pearson Education, 2011.	
Reference (s)		
1	David Galles ,Modern compiler design, Pearson Education, 2008.	
2	Steven S.Muchnick,Advanced compiler Design & implementation —Morgan Kaufmann Publishers, 2000.	
3	Charles N.Fischer, Richard. J.LeBlanc,—Crafting a compiler with C, Pearson Education, 2008.	





Regulation 2018		Semester V	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18MBM301L	ANALYTICAL AND LOGICAL THINKING SKILLS	0	0	2	1

Course Objective (s):

The purpose of learning this course is to:

- 1 Sharpen problem solving skills and to improve thinking capability of the students
- 2 Drive the students to use language with great commitment and cooperation
- 3 Expertise the creative thinking and presentation skills to meet the company needs

Course Outcome (s) (Cos):

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

- CO1 Solve both analytical and logical problems in a fruitful manner
- CO2 **Organize and convey the information in such an incomparable way**
- CO3 Improve their presentation skills

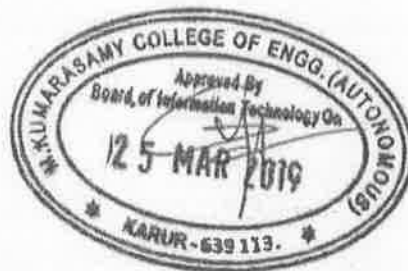
CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-			
CO2	-	-	-	-	-	-	-	-	2	-	-	-			
CO3	-	-	-	-	-	-	-	-	-	2	-	-			
CO4	-	-	-	-	-	-	-	-	-	-	-	-			
CO5	-	-	-	-	-	-	-	-	-	-	-	-			
CO (Avg)	3.00	-	-	-	-	-	-	-	2.00	2.00	-	-			

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	Module - 1	6
<p>Aptitude: Alligations or Mixtures - Blood Relations.</p> <p>Communication: How to set Goals - Interpersonal Relationships - JOHARI Window - Work & Business Etiquette</p>		
UNIT II	Module - 2	6
<p>Aptitude: Partnership - Statement and Assumptions.</p> <p>Communication: Transition to Corporate World - Career opportunities in Various Sectors and know your industry.</p>		
UNIT III	Module - 3	6
<p>Aptitude: Arithmetic and Geometric Progressions - Syllogisms.</p> <p>Communication: Time Management - Anger and Stress Management - Conflict Management.</p>		
UNIT IV	Module - 4	6
<p>Aptitude: Permutations and Combinations - Statements & Conclusions.</p> <p>Communication: Launch a Product - Telephonic Etiquette.</p>		
UNIT V	Module - 5	6
<p>Aptitude: Geometric Problems.</p> <p>Communication: Presentation Skills - Oral presentation and public speaking skills, Business presentations.</p>		
Text Book (s)		
1	Dr.R.S.Aggarwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Company Limited, 2015	





Regulation 2018		Semester VI	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18MBH201T	MANAGEMENT PRINCIPLES FOR ENGINEERS	2	0	0	2

Prerequisite Course (s)

Nil

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

- 1 Enable the students to study the evolution of management.
- 2 Study about planning tools and techniques in management for engineers.
- 3 Learn about career planning for engineers.
- 4 Enable the effective and barriers communication in the organization.
- 5 Study the system and process of effective controlling in the organization.

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

- CO1 Acquired the knowledge on fundamental concept of management and its various functions.
- CO2 Gained knowledge on planning and decision making process.
- CO3 Attained the knowledge of organization structure and career planning.
- CO4 Demonstrate the ability to directing, leadership and communicate effectively.
- CO5 Analysis isolates issues and formulates best control methods.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	-	-	-	-	1	-	-	1	-	1	2	-	-
CO2	2	2	-	-	-	1	-	-	1	1	1	1	-	-
CO3	2	-	-	-	-	1	-	-	-	-	1	2	-	-
CO4	1	-	-	-	-	1	-	-	1	1	1	-	-	-
CO5	2	-	-	-	-	1	-	-	-	1	1	3	-	-
CO (Avg)	1.80	2.00	-	-	-	1.00	-	-	1.00	1.00	1.00	2.00	-	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION TO MANAGEMENT PRINCIPLES	6
Meaning, Definition of Management – Managerial Role - POSDCORB -Management vs. Administration- Evolution of Management Thoughts- Henry Fayol’s 14 Principles- Opportunities and Challenges in Management.		
UNIT II	PLANNING	6
Nature and purpose of planning – Planning process – Types of planning – Objectives – Setting - Objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques – Decision making steps and process.		
UNIT III	ORGANIZING	6
Nature and purpose – Formal and informal organization – organization chart – Organization Structure– Types – Line and staff authority – Departmentalization – Delegation of Authority – Centralization and Decentralization – Job Design.		
UNIT IV	DIRECTING	6
Foundations of individual and group behavior – Motivation – Motivation Theories – Motivational - Techniques –Leadership – Types and Theories of Leadership – Communication – Process of Communication – Barrier in Communication – Effective Communication.		
UNIT V	CONTROLLING	6
System and Process of Controlling – budgetary and Non-Budgetary Control Techniques – Use of Computers and IT in Management control – Control and performance – Direct and Preventive control – Reporting.		
Reference (s)		
1	P.C.Tripathi., P.N Reddy, Principles of Management, McGraw Hill, 5 th Edition 2012.	
2	Harold Koontz, Heinz Wehrich, A RamachandraAryasri, Tata McGraw Hill, Principles of Management, 2016	
3	Charles W Hill, Stephen L Meshane, Principles of Management, McGraw Hill, Special Indian Edition 2007.	
4	I.Stephen A. Robbins & David A. Decenzo & Mary Coulter, “Fundamentals of Management” 7th Edition, Pearson Education, 2011.	
5	Harold Koontz & Heinz Wehrich “Essentials of management” Tata McGraw Hill, 1998.	





Regulation 2018		Semester VI	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18CSC303J	WEB PROGRAMMING	3	0	2	4

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

- 1 Learn the basic and programming concepts of web technology.
- 2 Understand the importance of Scripting Languages.
- 3 Explore the knowledge in HTML, XML, Node.js, PHP, Servlet and JSP.

Course Outcome (s) (COs):

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

- CO1 Build web pages using HTML and Cascading Style Sheets.
- CO2 Build Dynamic Web Pages using JavaScript, XML and Node.js.
- CO3 Develop Dynamic Web Page using Servlet and JSP.
- CO4 Develop Client Server application with Database Connectivity using PHP.
- CO5 Describe different methodologies of Web Services.

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	2
CO2	3	3	3	-	-	-	-	-	2	-	-	-	3	2
CO3	3	3	2	-	-	-	-	-	-	-	-	-	3	2
CO4	3	2	2	-	-	-	-	-	2	-	-	-	3	2
CO5	3	2	2	-	-	-	-	-	-	-	-	-	3	2
CO (Avg)	3	2.60	2.40	-	-	-	-	-	2	-	-	-	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	HTML AND CSS	7
HTML - Basic HTML Tags - List Tags - Table Tags - Frameset - CSS - Inline - Internal - External CSS - Border - Margin - Padding.		
UNIT II	CLIENT SIDE SCRIPTING LANGUAGE , XML AND NODE JS	11
Introduction to JavaScript - Data types – Operators - Objects - Loops - Built-in Objects - DOM Events - Regular Expression - Validation - Basic XML - DTD - Introduction to Node JS - Modules - HTTP Module - File System.		
UNIT III	SERVLET AND JSP	9
Java Servlet - Servlet Lifecycle - GET and POST Method - Sessions - Cookies - JSP - Expressions - Scriptlets - Declarations - JSTL.		
UNIT IV	PHP	9
Introduction to PHP - Variables - Built-In Functions - Connecting to MySQL Database - Session Variables - Cookies - Building Web Applications.		
UNIT V	INTRODUCTION TO WEB SERVICES	9
Definition - Web Services - Basics - Service Roles - Architectural Process - WSDL - SOAP - RESTFUL - Micro Service Architecture.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Create a simple webpage using HTML Semantic and Structural Elements 2. Create a simple college website using Internal and External CSS 3. Design a dynamic web page with validation using JavaScript 4. Design a web page with forms to compare dates 5. Create a simple application using servlet 6. Create a simple web page using JSP 7. Write XML DTD to validate the XML file 8. Create your own modules, and easily include them in your applications using Node JS 9. Interact with the file system, and serve a web page from a file using Node JS 10. Design a simple web page using PHP 		
Text Book (s)		
1	Jeffrey C Jackson, "Web Technology - A computer Science perspective", Pearson Education, 2007.	
2	Chris Bates, "Web Programming - Building Internet Applications", Wiley India, 2006.	
Reference (s)		
1	David Chappell," Java Web Services", O'Reilly, 2002.	
2	Deitel, Nieto, Lin and Sadhu —"XML How to Program, first edition, Pearson Education", USA, 2002.	





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)

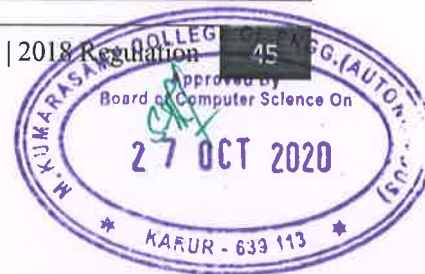
2: Moderate (Medium)

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
<ol style="list-style-type: none"> 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, Matei Zaharia, 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





Regulation 2018		Semester VI	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18MBM302L	EMPLOYABILITY SKILLS AND PRACTICES	0	0	2	1

Course Objective (s):

The purpose of learning this course is to:

- 1 Learn the application of mathematical or statistical models to different real-world contexts
- 2 Focus on writing & speaking skills through vigorous practices.
- 3 Enhance soft skills and analytical ability of students
- 4 Defeat the fear while communicating in group and to master the effective communication

Course Outcome (s) (Cos):

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

- CO1 Solve both analytical and logical problems in a productive manner
- CO2 Launch their ability of comprising and delivering the information
- CO3 Upgrade their communication quality in near future

CO-PO Mapping

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

1: Slight (Low)

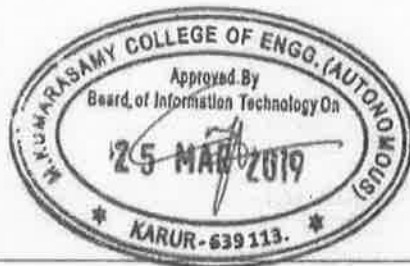
2: Moderate (Medium)

3: Substantial (High)





UNIT I	Module - 1	6
<p>Aptitude: Time and Distance (Speed, Streams) - Problems on Trains - Arrangements and Blood Relations.</p> <p>Communication: Job Application - Cover letter, Bio-data, Resume & CV building.</p>		
UNIT II	Module - 2	6
<p>Aptitude: Time and Work - Pipes & Cisterns - Situation Reaction Test & Data Interpretations.</p> <p>Communication: Writing practices on circulars, notices, memos, Agenda preparation and Minutes of meeting.</p>		
UNIT III	Module - 3	6
<p>Aptitude: Ages - Averages - Probability - Profit and Loss.</p> <p>Communication: Email Etiquette - Essay writing.</p>		
UNIT IV	Module - 4	6
<p>Aptitude: Mensuration - SI & CI - Cause and Effect Analysis - Statement, Assumptions & Conclusions.</p> <p>Communication: Group Discussion and guidelines.</p>		
UNIT V	Module - 5	6
<p>Aptitude: Permutation and Combinations - Partnership - Alligations or Mixtures.</p> <p>Communication: Interview skills - General instructions, Review of interview questions, Mock Interviews.</p>		
Text Book (s)		
1	Dr.R.S.Aggarwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Company Limited, 2015	





Regulation 2018		Semester VII	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18MBH202T	SOCIAL ENGINEERING	2	0	0	2

Prerequisite Course (s)

Nil

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

1	Learn about fundamental concept of social engineering
2	Know the different elements of ethical hacking and social engineering.
3	Understand the concepts of threats and attack vectors
4	Understand the ethical hacking
5	Learn about the attacks against individuals and organizations

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

CO1	Understand the concept of social engineering and types of attacks.
CO2	Identify the key security concepts, CIA and IT governance and best practices
CO3	Understand principles of social engineering.
CO4	Exhibit the ethical hacking concepts and scopes, threats and attack vectors and common areas of vulnerability.
CO5	Gain knowledge of attacks against individuals and organizations.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	-	-	1	1	1	1	1	-	1	-	-
CO2	1	1	-	-	-	2	-	2	1	-	-	1	-	-
CO3	-	1	-	-	-	-	1	2	1	-	-	1	-	-
CO4	-	-	-	-	-	-	-	3	-	-	-	1	-	-
CO5	1	1	-	-	-	-	-	-	1	1	-	1	-	-
CO (Avg)	1.33	1.25	-	-	-	1.50	1.00	2.00	1.00	1.00	-	1.00	-	-

1: Slight (Low)

2: Moderate (Medium)





UNIT I	INTRODUCTION TO SOCIAL ENGINEERING	6
Social Engineering Defined - Why Does Social Engineering Work - Identify Communication Style - key aspects of social engineering - Categories of Social Engineering Attacks – human – based attacks and technology - based attacks		
UNIT II	KEY SECURITY	6
Key security - concepts - Types of key security concepts – Cyber security position. The CIA Triad - the significance of incident response and frameworks around cyber security. IT Governance - Best practices - compliance.		
UNIT III	PSYCHOLOGY OF SOCIAL ENGINEERING	6
Mind Tricks: Psychological Principle - Four fundamental aspects of human nature that social engineers - the desire to be helpful - the tendency to be trusting - the fear of offending others - the tendency to cut corners		
UNIT IV	ETHICAL HACKING AND SOCIAL ENGINEERING	6
Ethical Hacking Concepts and Scopes - Threats and Attack Vectors - Information Assurance - Threat Modelling - Enterprise Information Security Architecture - Vulnerability Assessment and Penetration Testing - Types of Social Engineering - Insider Attack - Preventing Insider Threats - Social Engineering Targets and Defence Strategies. Common Areas of Vulnerability - Appropriate access - Assessed resistance - Information availability		
UNIT V	CASES OF SOCIAL ENGINEERING	6
Notable Cases of Social Engineering - Attacks against Individuals - Attacks against Organizations - Preventing Social Engineering Attacks - Mitigating the Damage of Social Engineering Attacks - Segregation of Access - Maintain Access Logs - Ensure That Backups Occur Regularly - Automatically Revoke User Privileges If Suspicious Activity Is Detected		
Reference (s)		
1	Kevin D. Mitnick, William L. Simon, Steve Wozniak, The Art of Deception: Controlling the Human Element of Security, Wiley, October 17th 2003	
2	Christopher Hadnagy, Social Engineering: The Science of Human Hacking Paperback- Wiley Publishing Inc., Edition 2018	
3	Lester Evans, Cybersecurity: An Essential Guide to Computer and Cyber Security for Beginners, Including Ethical Hacking, Risk Assessment, Social Engineering, Attack and Defense Strategies, and Cyberwarfare Paperback –2018	
4	Dr. Erdal Ozkaya, Learn Social Engineering: Learn the art of human hacking with an internationally renowned expert-2018	





Regulation 2018												Total Hours	45		
Category	Course Code	Course Name										Hours / Week			C
												L	T	P	
E	18CSE002T	AGILE METHODOLOGY (Recommended by TCS)										3	0	0	3
Prerequisite Course (s)															
Nil															
Course Objective (s): The purpose of learning this course is to:															
1	Understand the basic concepts of Agile based Software Development.														
2	Gain knowledge in the area of various Agile Methodologies.														
3	Gain Knowledge in Agile Testing.														
4	Awareness of Jile Product.														
Course Outcome (s) (COs): At the end of this course, learners will be able to:															
CO1	Understand the fundamentals of SDLC Models and Agile Software Development.														
CO2	Understand the concepts of Agile Scrum Framework.														
CO3	Perform Testing Activities within an Agile Project.														
CO4	Summarize Agile Software Design Development and Industry Trends.														
CO5	Gain practical knowledge of a tool that implements Agile Methodology– JILE.														
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	2	2	2	1	2	2	2	
CO2	3	2	2	2	2	1	-	2	2	2	1	2	2	2	
CO3	3	2	1	1	2	1	1	-	-	-	-	2	2	2	
CO4	3	1	1	-	-	-	-	2	2	2	1	2	2	2	
CO5	3	3	3	3	3	1	1	3	3	3	3	3	3	3	
CO (Avg)	3	2	1.75	1.75	2.33	1	1	2.25	2.25	2.25	1.5	2.20	2.20	2.20	

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	FUNDAMENTALS OF AGILE	9
Software Development models - Comparison between Agile and Generic Models - The Genesis of Agile - Introduction and Background - Agile Manifesto and Principles - Overview of Scrum - Extreme Programming - Feature Driven Development - Lean Software Development - Agile Project Management - Design and Development Practices in Agile projects - Test Driven Development - Continuous Integration - Refactoring - Pair Programming - Simple Design - User Stories.		
UNIT II	AGILE SCRUM FRAMEWORK	9
Introduction to Scrum - Project phases - Agile Estimation - Planning Game - Product backlog - Sprint backlog - Iteration planning - User Story definition - Characteristics and Content of User Stories - Acceptance Test and Verifying Stories - Project Velocity - Burn down chart - Sprint Planning and Retrospective - Daily Scrum - Scrum Roles - Product Owner - Scrum Master - Scrum Team - Scrum Case study - Tools for Agile project management.		
UNIT III	AGILE TESTING	9
The Agile lifecycle and its impact on Testing - Test Driven Development (TDD) - xUnit Framework and Tools for TDD - Testing User Stories-Acceptance Test and Scenarios - Planning and Managing Testing Cycle - Exploratory Testing - Risk based Testing - Regression Test - Test Automation - Tools to support the Agile Tester.		
UNIT IV	AGILE SOFTWARE DESIGN AND INDUSTRY TRENDS	9
Agile Software Design and Development: Continuous Integration/Deployment - Automated Build Tools - Version Control - Agile Design Practices: Role of Design Principles - Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principle , Dependency Inversion Principle - Industry Trends: Market Scenario and Adaption of Agile - Agile ALM - Agile in Distributed Teams - Agile Rapid Development Technologies.		
UNIT V	IMPLEMENTING AGILE USING JILE	9
What is Jile? Understanding Jile and its features- Implementing Case Study using Jile		
Text Book (s)		
1	Ken Schawber, Mike Beedle," Agile Software Development with Scrum", Pearson Edition 1, 2008.	
2	Lisa Crispin, Janet Gregory," Agile Testing: A Practical Guide for Testers and Agile Teams", Addison Wesley, 2008.	
3	Robert C. Martin," Agile Software Development, Principles, Patterns and Practices", Pearson Edition 1, 2013.	
Reference (s)		
1	Richard Fairley, "Software Engineering Concepts" -, Tata Mcgraw Hill, 2008.	
2	Alistair Cockburn, "Agile Software Development", Second Edition, Pearson Education Asia, 2006.	





Regulation 2018		-											Total Hours		45	
Category	Course Code	Course Name											Hours / Week			C
													L	T	P	
E	18CSE013T	DEEP LEARNING											3	0	0	3
Prerequisite Course (s)																
Nil																
Course Objective (s):																
The purpose of learning this course is to:																
1	Explain the basic concepts of Neural Networks and Deep Neural Networks.															
2	Discuss the major architectures of Deep Neural Networks.															
3	Examine the core concepts in Deep architecture tuning.															
4	Demonstrate the applications of Deep Learning.															
Course Outcome (s) (Cos):																
At the end of this course, learners will be able to:																
CO1	Discuss the foundation of Neural Networks.															
CO2	Describe the fundamentals of Deep Networks.															
CO3	Select the appropriate Deep Network Architecture.															
CO4	Analyze the performance of a deep learning network.															
CO5	Apply deep learning for solving 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	-	1	-	-	1	1	1	-	1	3	2		
CO2	3	2	1	-	1	-	-	1	1	1	-	1	3	2		
CO3	3	2	2	-	1	-	-	1	1	1	-	1	3	2		
CO4	3	3	3	2	1	-	-	1	1	1	-	1	3	2		
CO5	3	3	3	2	1	-	-	1	1	1	-	1	3	2		
CO (Avg)	3	2.4	2	2	1	-	-	1	1	1	-	1	3	2		

1: Slight (Low)

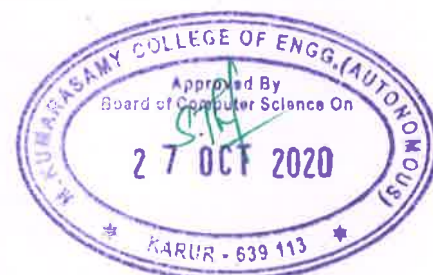
2: Moderate (Medium)

3: Substantial (High)





UNIT I	FOUNDATIONS OF NEURAL NETWORKS	9
Neural Networks - Training Neural Networks - Activation Functions - Loss Functions - Hyperparameters.		
UNIT II	FUNDAMENTALS OF DEEP NETWORKS	9
Defining Deep Learning - Common Architectural Principles of Deep Networks - Building Blocks of Deep Networks.		
UNIT III	MAJOR ARCHITECTURES OF DEEP NETWORKS	9
Unsupervised Pre-Trained Networks - Convolutional Neural Networks - Recurrent Neural Networks - Recursive Neural Networks.		
UNIT IV	TUNING DEEP NETWORKS	9
Basic Concepts in Tuning Deep Networks - Matching Input Data and Network Architectures - Relating Model Goal and Output Layers - Working with Layer Count, Parameter Count and Memory - Weight Initialization Strategies - Using Activation Functions.		
UNIT V	APPLICATIONS	9
Large-Scale deep learning Computer Vision - Speech Recognition - Natural Language Processing - Recommender systems - Case Study- Applications of Deep Learning in Health Care.		
Text Book (s)		
1	Adam Gibson, Josh Patterson, Deep Learning, O'Reilly Media, 2017.	
2	Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016.	
Reference (s)		
1	Daniel Graupe, Deep Learning Neural Networks: Design and Case Studies, World Scientific Publishing, 2016.	
2	Yu and Li Deng, Deep Learning: Methods and Applications, Now Publishers Inc, 2014.	
3	Zurada, J.M. "Introduction to Artificial Neural Systems", Jaico Publishing Hours, 2012.	





Regulation 2018			Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18CSE016T	DISTRIBUTED COMPUTING SYSTEMS	3	0	0	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

- 1 Layout foundations of Distributed Systems.
- 2 Introduce the idea of Middleware and related issues.
- 3 Understand in detail the system level and support required for Distributed System.
- 4 Understand the issues involved in studying data and design of Distributed Algorithms.

Course Outcome (s) (Cos):

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

- CO1 Distinguish Distributed Computing Paradigm from other Computing Paradigms.
- CO2 Illustrate the mechanisms of Inter Process Communication in Distributed System.
- CO3 Identify the core concepts of Distributed Systems.
- CO4 Apply appropriate Distributed System Principles in ensuring Transparency, Consistency and Fault-tolerance in Distributed File System
- CO5 Compare the Concurrency Control Mechanisms in Distributed Transactional Environment.

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	2
CO2	3	2	2	-	-	-	-	-	-	-	-	1	3	2
CO3	2	2	2	-	2	-	-	-	-	2	-	1	3	2
CO4	3	2	2	-	-	-	-	-	-	-	-	1	3	2
CO5	2	2	2	-	-	-	-	-	-	-	-	1	3	2
CO (Avg)	2.60	2	2	-	2	-	-	-	-	2	-	1.20	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Introduction - Examples of Distributed Systems - Trends in Distributed Systems - Focus on Resource Sharing - Challenges - Case study: World Wide Web.		
UNIT II	COMMUNICATION IN DISTRIBUTED SYSTEM	9
System Model - Inter-process Communication - API for Internet Protocols - External data representation and Multicast Communication - Network Virtualization: Overlay Networks - Case study: MPI		
UNIT III	REMOTE METHOD INVOCATION AND OBJECTS	9
Remote Invocation - Introduction - Request-Reply Protocols - Remote Procedure Call - Remote Method Invocation - Case study: Java RMI - Group Communication - Publish-Subscribe Systems - Message Queues - Shared Memory Approaches - Distributed Objects - Case study: CORBA - from objects to components		
UNIT IV	PEER TO PEER SERVICES AND FILESYSTEM	9
Peer-to-Peer Systems – Introduction - Napster and its Legacy - Peer-to-peer – Middleware - Routing Overlays - Overlay Case Studies: Pastry, Tapestry- Distributed File Systems –Introduction - File Service Architecture - Andrew File System.		
UNIT V	SYNCHRONIZATION AND REPLICATION	9
Introduction - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time and Logical Clocks - Global States - Coordination and Agreement - Introduction - Distributed Mutual Exclusion - Elections - Transactions and Concurrency Control - Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Distributed Deadlocks - Replication - Case study – Coda		
Text Book (s)		
1	George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design” Fifth edition – 2011- Addison Wesley.	
2	Pradeep K Sinha, Distributed Operating Systems : Concepts and Design, Prentice Hall of India	
Reference (s)		
1	Tanenbaum A.S., Van Steen M., “Distributed Systems: Principles and Paradigms” , Pearson Education ,2007.	
2	Liu M.L., “Distributed Computing, Principles and Applications”, Pearson and education, 2004.	
3	A S Tanenbaum and M V Steen, Distributed Systems: Principles and paradigms, Pearson Education, 2007.	
4	M Solomon and J Krammer, Distributed Systems and Computer Networks, PHI.	





Regulation 2018				Total Hours			60							
Category	Course Code	Course Name			Hours / Week			C						
					L	T	P							
E	18CSE022J	INSIGHT INTO CLOUD COMPUTING (Recommended by Infosys)			3	0	2	4						
Prerequisite Course (s)														
Nil														
Course Objective (s): The purpose of learning this course is to:														
1	Learn the overview of Cloud Computing.													
2	Learn about Virtualization.													
3	Learn Building blocks of Private Cloud and its deployment models.													
4	Learn about the various Players of Public Cloud and their offerings.													
5	Learn the Security concerns of Cloud Computing and various vendors of a secure Cloud model.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Discuss the overview of Cloud Computing.													
CO2	Explain about Virtualization.													
CO3	Describe the Building blocks of Private Cloud and its deployment models.													
CO4	Explain about the various Players of Public Cloud and their offerings.													
CO5	Describe Security concerns of Cloud Computing and various vendors of a secure Cloud model.													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	1	-	1	-	-	-	1	1	-	1	3	2
CO2	2	1	1	-	1	-	-	-	1	1	-	1	3	2
CO3	2	2	1	-	1	-	-	-	1	1	-	1	3	2
CO4	3	2	1	-	1	-	-	-	1	1	-	1	3	2
CO5	3	2	1	-	1	-	-	-	1	1	-	1	3	2
CO (Avg)	2	1.6	1	-	1	-	-	-	1	1	-	1	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	OVERVIEW OF CLOUD COMPUTING	10
Brief history and evolution - History of Cloud Computing - Evolution of Cloud Computing - Traditional vs. Cloud Computing - Why Cloud Computing - Cloud service models (IaaS, PaaS & SaaS) - Cloud deployment models (Public, Private, Hybrid and Community Cloud) - Benefits and Challenges of Cloud Computing - Introduction to AWS Public Cloud Vendor.		
UNIT II	VIRTUALIZATION	8
Basics of virtualization - Server virtualization - VM migration techniques - Role of virtualization in Cloud Computing.		
UNIT III	WORKING WITH PRIVATE CLOUD	8
Private Cloud Definition - Characteristics of Private Cloud - Private Cloud deployment models - Private Cloud Vendors - Cloud Stack - Eucalyptus and Microsoft - Private Cloud - Benefits and Challenges - Private Cloud implementation in Amazon EC2 service.		
UNIT IV	WORKING WITH PUBLIC CLOUDS	11
Public Cloud Introduction - need for Public Cloud - Appropriate time span to opt for Public Cloud - Public Cloud Service Models - Public Cloud Vendors and offerings(IaaS, PaaS, SaaS) - Demonstrating public cloud with AWS - Introduction to EC2 and Storage services of AWS - Private vs. Public Cloud.		
UNIT V	OVERVIEW OF CLOUD SECURITY	8
Security concerns in Traditional IT - Introduce challenges in Cloud Computing in terms of Application Security, Server Security, and Network Security - Security reference model - Abuse and Nefarious Use of Cloud Computing - Insecure Interfaces and APIs - Malicious Insiders - Shared Technology Issues - Data Loss or Leakage - Account or Service Hijacking - Unknown Risk Profile - Shared Security model between vendor and customer in IAAS/PAAS/SAAS - Implementing Security in AWS.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Install Virtual box/VMware Workstation with different flavors of Linux or Windows OS on top of windows7 or 8 2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs 3. Install Google App Engine. Create hello world app and other simple web applications using python/java 4. Use GAE launcher to launch the web applications 5. Study and installation of Storage as Service 6. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim 7. Find a procedure to transfer the files from one virtual machine to another virtual machine 8. Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version) 9. User Management in Cloud 10. Securing Servers in Cloud 		





Text Book (s)	
1	Michael Miller, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing, August 2008.
2	Cloud Computing: Principles and paradigms ByRaj Kumar Buyya, James Broberg, Andrezei M.Goscinski, 2011
3	Cloud Computing for dummies, By Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, 2009.
4	Cloud Computing: A Practical Approach, ByAnthony T. Velte, Toby J. Velte, and Robert Elsenpeter, McGraw Hill, 2010.
5	Handbook of Cloud Computing, By Borko Furht, Armando Escalante (Editors), Springer, 2010
Reference (s)	
1	Cloud computing: Implementation, management and security By Rittinghouse, John, W.
2	Cloud Computing Bible, By Barrie Sosinsky; Wiley, 2011.
3	Cloud Computing Architected: Solution Design Handbook by Rhoton, John.
4	Cloud Security, A comprehensive Guide to Secure Cloud Computing by Krutz, Ronald L.; Vines, Russell Dean.





Regulation 2018		-										Total Hours		45	
Category	Course Code	Course Name										Hours / Week			C
												L	T	P	
E	18CSE023T	INTELLECTUAL PROPERTY RIGHTS										3	0	0	3
Prerequisite Course (s)															
Nil															
Course Objective (s):															
The purpose of learning this course is to:															
1	Introduce fundamental aspects of Intellectual Property Rights.														
2	Disseminate knowledge on patents, patent regime in India and abroad and registration aspects.														
3	Understand the agreements and legislations in IPR.														
4	Disseminate knowledge on Digital developments and competitions.														
5	Aware about current trends in IPR and Government steps in fostering IPR.														
Course Outcome (s) (COs):															
At the end of this course, learners will be able to:															
CO1	Ability to manage Intellectual Property Portfolio to enhance the value of the firm.														
CO2	Review an Intellectual Property Portfolio and comprehend the extent of their protection.														
CO3	Develop a business plan that advances the value of their Intellectual Property Portfolio.														
CO4	Develop a strategy of marketing their intellectual property and understand some negotiation basics.														
CO5	Explain some of the limits of their Intellectual Property Rights and comprehend some basic legal Pitfalls.														
CO-PO Mapping															
COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
CO1	1	2	-	3	1	1	-	3	1	-	-	-	2	3	
CO2	1	2	-	3	1	1	-	3	1	-	-	-	2	2	
CO3	1	2	-	3	1	1	-	3	1	-	-	-	3	3	
CO4	1	2	-	3	1	1	-	3	1	-	-	-	3	3	
CO5	1	2	-	3	1	1	-	3	1	-	-	-	2	2	
CO (Avg)	1	2	-	3	1	1	-	3	1	-	-	-	2.40	2.60	

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Introduction to IPRs - Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications - IPR in India and Abroad - Genesis and Development - the way from WTO to WIPO -TRIPS - Nature of Intellectual Property - Industrial Property - Technological Research - Inventions and Innovations - Important examples of IPR.		
UNIT II	REGISTRATION OF IPRs	10
Meaning and practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications, Trade Secrets and Industrial Design registration in India and Abroad.		
UNIT III	AGREEMENTS AND LEGISLATIONS	10
International Treaties and Conventions on IPRs - TRIPS Agreement - PCT Agreement - Patent Act of India - Patent Amendment Act - Design Act - Trademark Act - Geographical Indication Act.		
UNIT IV	DIGITAL PRODUCTS AND LAW	9
Digital Innovations and Developments as Knowledge Assets - IP Laws, Cyber Law and Digital Content Protection - Unfair Competition - Meaning and Relationship between Unfair Competition and IP Laws - Case Studies.		
UNIT V	ENFORCEMENT OF IPRs	7
Infringement of IPRs - Enforcement Measures - Emerging issues - Case Studies.		
Text Book (s)		
1	V. ScopleVinod, Managing Intellectual Property, Prentice Hall of India pvt Ltd, 2012	
2	S.V. Satarkar, Intellectual Property Rights and Copy Rights, EssEss Publications, New Delhi, 2002	
Reference (s)		
1	Deborah E. Bouchoux, "Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets", Cengage Learning, Third Edition, 2012.	
2	PrabuddhaGanguli,"Intellectual Property Rights: Unleashing the Knowledge Economy", McGraw Hill Education, 2011.	
3	Edited by Derek Bosworth and Elizabeth Webster, The Management of Intellectual Property, Edward Elgar Publishing Ltd., 2013.	





Regulation 2018		-	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18CSE024T	INTERNET OF THINGS (Recommended by Infosys)	3	0	0	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Learn about various IOT related protocols.
2	Explore various simple IoT systems using Arduino and Raspberry Pi.
3	Learn Data Analytics and Cloud in the context of IoT.
4	Understand Internet of Things based solution for real world problems.

Course Outcome (s) (COs):

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

CO1	Summarize various Protocols and Standards of Internet of Things.
CO2	Understand simple IoT Systems using Arduino.
CO3	Build simple IoT Systems using Raspberry Pi.
CO4	Understand Data Analytics and Cloud in the context of IoT.
CO5	Design and develop Smart Devices using IoT.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	-	-	-	-	-	1	1
CO2	3	2	2	1	1	2	2	2	2	2	1	2	2	2
CO3	3	2	2	1	1	2	2	2	2	2	1	2	2	2
CO4	3	3	1	1	1	-	-	2	2	2	2	3	2	2
CO5	3	3	3	2	2	3	3	2	2	2	2	3	3	3
CO (Avg)	3	2.50	2	1.25	1.25	2.33	2.33	2	2	2	1.5	2.5	2	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	IoT ARCHITECTURE AND ITS PROTOCOLS	9
Evolution of Internet - IoT Architecture - Web 3.0 View of IoT - Protocol Standardisation for IoT- IEEE802.15.1 - IEEE 802.15.4 - BACNet Protocol - Modbus - Zigbee Architecture - CoAP and MQTT.		
UNIT II	PROGRAMMING IoT USING ARDUINO	9
Basics of Arduino - Setting up - Programming the Board - Reading from Sensors - Connecting Arduino with Mobile Devices - Communication via Bluetooth and USB - Connection with Internet via WIFI/Ethernet.		
UNIT III	PROGRAMMING IoT USING RASPBERRY PI	9
Installation and Setting up of the Raspberry Pi - Programming the Raspberry Pi - Communication via Bluetooth and USB - Connection with Internet via WIFI/Ethernet.		
UNIT IV	IoT IN CLOUD AND SECURITY	9
Internet of Things (IoT) as Interconnection of Threats (IoT) - Privacy Preservation for IoT used in Smart Buildings - Authentication in IoT - Cloud and IoT - Cloud Platforms - Data Analytics and Applications.		
UNIT V	IoT APPLICATIONS	9
IoT Applications - Weather Monitoring system, Forest Fire Detection System, Smart Buildings and Infrastructure, Smart Health, Smart Lighting, Smart Parking Architecture and Smart Traffic Control.		
Text Book (s)		
1	Charalampos Doukas, 'Building Internet of Things with the Arduino', Create space, April 2012.	
2	Donald Norris, 'The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black', Mc.Graw Hill, 2015.	
3	Fei Hu, 'Security and Privacy in Internet of Things (IoTs): Models, Algorithms, and Implementations', CRC press, 2016	
Reference (s)		
1	Dieter Uckelmann, Mark Harrison, Florian Michahelles, 'Architecting the Internet of Things', Springer, 2011	
3	Cuno Pfister, 'Getting Started with the Internet of Things, O'Reilly Media', Inc., 2011	
4	Honbo Zhou, 'The Internet of Things in the Cloud: A Middleware Perspective', CRC Press, 2012	





Regulation 2018		-	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18CSE026J	MOBILE COMPUTING	3	0	2	4

Prerequisite Course (s)

18CSC206J-Computer Networks

Course Objective (s):

The purpose of learning this course is to:

- 1 Understand the basic concepts of Mobile Computing.
- 2 Learn the basics of Mobile Telecommunication System.
- 3 Be familiar with the Network Layer Protocols and Ad Hoc Networks.
- 4 Understand the basis of Transport and Application Layer Protocols.
- 5 Learn the knowledge about different Mobile Platforms and Application Development.

Course Outcome (s) (COs):

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

- CO1 Explain the basics of Mobile Computing Systems.
- CO2 Illustrate the generations of Telecommunication Systems in Wireless Networks.
- CO3 Explain the Concepts of Mobile Network Layer.
- CO4 Explain the functionality of Transport and Application layers.
- CO5 Understand the Mobile Application using Android/Blackberry/iOS/Windows SDK.

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	-	-	3	2
CO3	3	1	1	1	-	-	-	-	-	1	-	-	3	2
CO4	2	2	1	-	-	-	1	-	-	1	-	-	3	2
CO5	3	2	1	-	-	-	2	-	-	1	-	-	3	2
CO (Avg)	2.8	1.8	1	1	-	-	1.5	-	-	1	-	-	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

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Curriculum and Syllabus | 2018 Regulation

101





UNIT I	INTRODUCTION	9
Introduction to Mobile Computing - Applications of Mobile Computing - Generations of Mobile Communication Technologies - Multiplexing - Spread Spectrum - MAC Protocols - SDMA - TDMA - FDMA – CDMA.		
UNIT II	MOBILE TELECOMMUNICATION SYSTEM	9
Introduction to Cellular Systems - GSM - Services & Architecture - Protocols - Connection Establishment - Frequency Allocation - Routing - Mobility Management - Security - GPRS/UMTS - Architecture - Handover - Security.		
UNIT III	MOBILE NETWORK LAYER	9
Mobile IP - DHCP - AdHoc - Proactive protocol - DSDV - Reactive Routing Protocols – DSR, AODV - Hybrid routing - ZRP, Multicast Routing - ODMRP, Vehicular Ad Hoc networks(VANET) - MANET Vs VANET - Security.		
UNIT IV	MOBILE TRANSPORT AND APPLICATION LAYER	9
Mobile TCP- WAP - Architecture - WDP - WTLS - WTP - WSP - WAE - WTA Architecture – WML.		
UNIT V	MOBILE PLATFORMS AND APPLICATIONS	9
Mobile Device Operating Systems - Special Constraints & Requirements - Commercial Mobile Operating Systems - Software Development Kit: iOS, Android, BlackBerry, Windows Phone - MCommerce - Structure - Pros & Cons - Mobile Payment System - Security Issues.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Android platform and Project Structure 2. Developing a simple Android Application 3. Creating Applications with Multiple Activities and a Simple Menu using ListView 4. Developing an application with the support of activity lifecycle 5. Write an application that uses SQLite Databases 6. Creating activity for parsing the XML file 7. Write an application to implement Fragment 8. Develop an android application that makes use of GPS 9. Media and Camera API 10. Sensor programming 		
Text Book (s)		
1	Jochen Schiller, —Mobile CommunicationsI, PHI, Second Edition, 2003	
2	Prasant Kumar Pattnaik, Rajib Mall, —Fundamentals of Mobile ComputingI, PHI Learning Pvt.Ltd, New Delhi – 2012	





Reference (s)	
1	Dharma PrakashAgarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005
2	UweHansmann, LotharMerk, Martin S. Nicklons and Thomas Stober, —Principles of Mobile Computing, Springer, 2003.
3	William.C.Y.Lee,—Mobile Cellular Telecommunications-Analog and Digital Systems,Second Edition,TataMcGraw Hill Edition ,2006.
4	C.K.Toth, —AdHoc Mobile Wireless Networks , First Edition, Pearson Education, 2002.
5	Android Developers : http://developer.android.com/index.html





Regulation 2018		Course Name	Total Hours			C
Category	Course Code		Hours / Week			
			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)

Approved in 9th BoS Meeting – 27 October 2020

Curriculum and Syllabus | 2018 Regulation | 106





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
<ol style="list-style-type: none"> 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





Regulation 2018		-	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
E	18CSE032T	SOFTWARE PROJECT MANAGEMENT	3	0	0	3

Prerequisite Course (s)

18CSE031T- Software Engineering / 18CSE002T Agile Methodology

Course Objective (s):

The purpose of learning this course is to:

- 1 Learn the need for Software Project Management.
- 2 Highlight different techniques for Software Cost Estimation.
- 3 Make the students to understand Activity Planning and Risk Management.
- 4 Make the students to Manage and Control Projects.
- 5 Make the students to understand how to manage people in an organization.

Course Outcome (s) (COs):

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

- CO1 Estimate project cost and perform Cost-Benefit evaluation among projects.
- CO2 Apply quality models in software projects for maintaining software quality and reliability.
- CO3 Perform project scheduling, activity network analysis and risk management.
- CO4 Apply schedule and cost control techniques for project monitoring including contract management.
- CO5 Use suitable project organization structure, leadership, decision and motivation styles, proper safety and ethical practices and be responsible to the society.

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	1	-	1	3	2	2	1	3	2
CO2	3	3	2	2	3	1	-	1	3	2	2	1	3	2
CO3	3	3	2	2	3	1	-	1	3	2	2	1	3	2
CO4	3	3	2	2	3	1	-	1	3	2	2	1	3	2
CO5	3	3	2	2	3	1	-	1	3	2	2	1	3	2
CO (Avg)	3	3	2	2	3	1	-	1	3	2	2	1	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	PROJECT EVALUATION AND PROJECT PLANNING	9
Importance of Software Project Management - Activities Methodologies - Categorization of Software Projects - Setting objectives - Management Principles - Management Control - Project Portfolio Management - Cost-Benefit Evaluation Technology - Risk Evaluation - Strategic Program Management - Stepwise Project Planning.		
UNIT II	PROJECT LIFE CYCLE AND EFFORT ESTIMATION	9
Software process and Process Models - Choice of Process models - Mental Delivery - Rapid Application Development - Agile methods - Extreme Programming - SCRUM - Managing Interactive Processes - Basics of Software Estimation - Effort and Cost estimation techniques - COSMIC Full function points - COCOMO II a Parametric Productivity Model - Staffing Pattern.		
UNIT III	ACTIVITY PLANNING AND RISK MANAGEMENT	9
Objectives of Activity planning - Project schedules - Activities - Sequencing and scheduling - Network Planning models - Forward Pass & Backward Pass techniques - Critical path (CRM) method - Risk identification - Assessment - Monitoring - PERT technique - Monte Carlo Simulation - Resource Allocation - Creation of Critical Patterns - Cost schedules. Case Study- (MyCollab)		
UNIT IV	PROJECT MANAGEMENT AND CONTROL	9
Framework for Management and control - Collection of Data Project termination - Visualizing progress - Cost Monitoring - Earned Value Analysis - Project tracking - Change control - Software Configuration Management - Managing contracts - Contract Management.		
UNIT V	STAFFING IN SOFTWARE PROJECTS	9
Managing people - Organizational behaviour - Best methods of staff selection - Motivation - Oldham-Hackman job characteristic model - Ethical and Programmed concerns - Working in teams - Decision making - Team structures - Virtual teams - Communications genres - Communication plans.		
Text Book (s)		
1	Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.	
Reference (s)		
1	Robert K. Wysocki “Effective Software Project Management” – Wiley Publication, 2011.	
2	Walker Royce: “Software Project Management”- Addison-Wesley, 1998.	
3	Gopalaswamy Ramesh, “Managing Global Software Projects” – McGraw Hill Education (India), Fourteenth Reprint 2013.	
4	Royce, “Software Project Management”, Pearson Education, 1999.	





Regulation 2018													Total Hours	45		
Category	Course Code	Course Name											Hours / Week			C
													L	T	P	
E	18CSE033T	SOFTWARE TESTING (Recommended by Infosys)											3	0	0	3
Prerequisite Course (s)																
18CSE031T- Software Engineering / 18CSE002T Agile Methodology																
Course Objective (s):																
The purpose of learning this course is to:																
1	Understand the basics of Testing, Test planning & Design and Test team organization.															
2	Study the various types of test in the life cycle of the Software Product.															
3	Build design concepts for System Testing and Execution.															
4	Understand Test Management and Test Automation techniques.															
5	Apply Test Metrics and Measurements.															
Course Outcome (s) (COs):																
At the end of this course, learners will be able to:																
CO1	Understand the Test plan, Design test cases and Team development.															
CO2	Design test cases suitable for a Software Development for different domains.															
CO3	Perform functional and Non Functional tests in the life cycle of the Software Product.															
CO4	Understand System Testing and Test Execution Process.															
CO5	Understand the Test Automation using Automation Tools.															
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	1	-	1	3	1	1	1	3	2		
CO2	3	3	2	1	2	1	-	1	3	1	1	1	3	2		
CO3	3	3	2	1	2	1	-	1	3	1	1	1	3	2		
CO4	3	3	2	1	2	1	-	1	3	1	1	1	3	2		
CO5	3	3	2	1	2	1	-	1	3	1	1	1	3	2		
CO (Avg)	3	3	2	1	2	1	-	1	3	1	1	1	3	2		

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Approved in 9th BoS Meeting – 27 October 2020

Curriculum and Syllabus





UNIT I	INTRODUCTION	9
Testing as an Engineering Activity - Testing as a Process - Testing Maturity Model - Testing axioms - Basic definitions - Software Testing Principles - Tester's Role in a Software Development Organization - Origins of Defects - Cost of defects - Defect Classes - Defects life cycle - Using Bugzilla for logging and tracing defects.		
UNIT II	TEST CASE DESIGN STRATEGIES	9
Test case Design Strategies - Using Black Box Approach to Test Case Design - Boundary Value Analysis - Equivalence Class Partitioning - State based Testing - Cause-effect graphing - Compatibility Testing - User Documentation Testing - Domain Testing - Random Testing - Requirements based Testing - Using White Box Approach to Test design - Test Adequacy Criteria - Static Testing vs. Structural Testing - Code Functional Testing - Coverage and Control Flow Graphs - Covering Code Logic - Paths - Code Complexity Testing - Additional White box testing approaches - Evaluating Test Adequacy Criteria.		
UNIT III	LEVELS OF TESTING	9
The need for Levels of Testing - Unit Test - Unit Test Planning - Designing the Unit Test - Test Harness - Running the Unit test and Recording results - Integration Test - Designing Integration Test - Integration Test Planning - Scenario Testing - Defect Bash Elimination System Testing - 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 IV	TEST MANAGEMENT	9
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 - Creating sample test data using MS-Excel.		
UNIT V	TEST AUTOMATION	9
Software Test Automation using Selenium IDE - Skills needed for Automation - Scope of Automation - Design and Architecture for Automation - Requirements for a Test Tool - Challenges in Automation - Test Metrics and Measurements - Project, Progress and Productivity metrics.		
Text Book (s)		
1	Software Testing – Principles and Practices, Naresh Chauhan, Oxford University Press, 2010	
2	Srinivasan Desikan and Gopalaswamy Ramesh, —Software Testing – Principles and Practices, Pearson Education, 2006.	
Reference (s)		
1	Effective Methods for Software Testing, Third edition, William E. Perry, Wiley India, 2009	
2	Testing Computer Software, Cem Kaner, Jack Falk, Hung Quoc Nguyen, Wiley India, rp2012.	
3	Software Testing – Principles, Techniques and Tools, M.G.Limaye, Tata McGraw-Hill, 2009.	

