**IMS ENGINEERING COLLEGE GHAZIABAD**
**(YEAR OF ESTABLISHMENT – 2002)**
**[Approved by AICTE & Affiliated to AKTU, Lucknow]**

**2.6.1 : Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students**

## COs for all Programmes


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**DEPERATMENT: CSE/BT/ME/EC/EN/CE**

### Course Outcomes (COs): B.Tech. I & II Semester

### Session:2019-20

| Code | Course Name | Course Outcomes |
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| **B.Tech-I Semester** | | |
| KAS-101 | Physics | CO1. To solve the classical and wave mechanics problems |
| | | CO2. To develop the understanding of laws of thermodynamics and their application in various processes. |
| | | CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. |
| | | CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams. |
| KAS-103 | Mathematics-I | CO1. To Remember the concept of matrices and apply for solving linear simultaneous equations |

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| | | CO2. To Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems. |
| | | CO3. To Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. |
| | | CO4. To Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity. |
| | | CO5. To Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals. |
| KEE-101 | Basic Electrical Engineering | CO1. Tto Apply the concepts of KVL/KCL and network theorems in solving DC circuits. |
| | | CO2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. |
| | | CO3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. |
| | | CO4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. |
| | | CO5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption. |
| KCE-101 | Engineering Graphics & Design | CO1. Understanding of the visual aspects of engineering design |
| | | CO2. Understanding of engineering graphics standards and solid modeling |
| | | CO3. Effective communication through graphics |
| | | CO4. Applying modern engineering tools necessary for engineering practice |
| | | CO5. Appling computer-aided geometric design |
| | | CO6. Analysis of Isometric views |
| | | CO7. Creating working drawings |
| KAS-102 | Chemistry | CO1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. |
| | | CO2. Know the fundamental concepts of determination of structure with various techniques. |
| | | CO3. Know the fundamental concepts of chemistry applicable in industrial processes. |
| KCS-101 | Programming for Problem Solving | CO1. To develop simple algorithms for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |

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| | | CO3. To implement conditional branching, iteration and recursion. |
| | | CO4. To decompose a problem into functions and synthesize a complete program using<br>divide and conquer approach. |
| | | CO5. To use arrays, pointers and structures to develop algorithms and programs. |
| KWS-101 | Workshop Practices | CO1. Study and practice on machine tools and their operations |
| | | CO2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding |
| | | CO3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping |
| | | CO4. Welding and soldering operations |
| | | CO5. Apply basic electrical engineering knowledge for house wiring practice |
| | Physics Laboratory | CO1. To determine the wavelength of sodium light by Newton‟s ring experiment |
| | | CO2. To determine the wavelength of sodium light with the help of Fresnel‟s bi-prism |
| | | CO3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil. |
| | | CO4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss. |
| | Chemistry Laboratory | CO1. Use of different analytical instruments. |
| | | CO2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water |
| | | CO3. Measure hardness of water. |
| | | CO4. Estimate the rate constant of reaction |
| | Basic Electrical Engineering Laboratory | CO1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits |
| | | CO2. Demonstrate the behavior of AC circuits connected to single phase AC supply and<br>measure power in single phase as well as three phase electrical circuits. |
| | | CO3. Perform experiment illustrating BH curve of magnetic materials. |
| | | CO4. Calculate efficiency of a single phase transformer and DC machine. |
| | | CO5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction. |
| | Programming | CO1. To write programs for arithmetic and logical problems |

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| | for Problem Solving Laboratory | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To write programs for conditional branching, iteration and recursion |
| | | CO4. To write programs using functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. write programs using arrays, pointers and structures. |
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| **B.Tech-II Semester** | | |
| KAS-201 | Physics | CO1. To solve the classical and wave mechanics problems |
| | | CO2. To develop the understanding of laws of thermodynamics and their application in various processes. |
| | | CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. |
| | | CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams. |
| KAS-7202 | Chemistry | CO1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. |
| | | CO2. Know the fundamental concepts of determination of structure with various techniques. |
| | | CO3. Know the fundamental concepts of chemistry applicable in industrial processes. |
| KAS-203 | Mathematiccs-II | CO1. Understand the concept of differentiation and apply for solving differential equations. |
| | | CO2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. |
| | | CO3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series. |
| | | CO4. Illustrate the working methods of complex functions and apply for finding analytic functions. |
| | | CO5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals. |
| KEE-201 | Basic Electrical Engineering | CO1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. |
| | | CO2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. |

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| | | CO3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. |
| | | CO4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. |
| | | CO5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption. |
| KCS-201 | Programming for Problem Solving | CO1. To develop simple algorithms for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To implement conditional branching, iteration and recursion. |
| | | CO4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. To use arrays, pointers and structures to develop algorithms and programs. |
| KCE-201 | Engineering Graphics & Design | CO1. Understanding of the visual aspects of engineering design |
| | | CO2. Understanding of engineering graphics standards and solid modeling |
| | | CO3. Effective communication through graphics |
| | | CO4. Applying modern engineering tools necessary for engineering practice |
| | | CO5. Appling computer-aided geometric design |
| | | CO6. Analysis of Isometric views |
| | | CO7. Creating working drawings |
| KWS-201 | Workshop Practices | CO1. Study and practice on machine tools and their operations |
| | | CO2. Practice on manufacturing of components using workshop trades including fitting,<br>carpentry, foundry and welding |
| | | CO3. Identify and apply suitable tools for machining processes including turning, facing,<br>thread cutting and tapping |
| | | CO4. Welding and soldering operations |
| | | CO5. Apply basic electrical engineering knowledge for house wiring practice |
| KAS-204 | Professional English | CO1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. |

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| | | CO2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc. |
| | | CO3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing |
| | | CO4. Students will be made to evaluate the correct & error-free writing by being wellversed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses. |
| | | CO5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence. |
| | Physics Laboratory | CO1. To determine the wavelength of sodium light by Newton‟s ring experiment |
| | | CO2. To determine the wavelength of sodium light with the help of Fresnel‟s bi-prism |
| | | CO3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil. |
| | | CO4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss. |
| | Chemistry Laboratory | CO1. Use of different analytical instruments. |
| | | CO2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water |
| | | CO3. Measure hardness of water. |
| | | CO4. Estimate the rate constant of reaction |
| | Basic Electrical Engineering Laboratory | CO1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits |
| | | CO2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits. |
| | | CO3. Perform experiment illustrating BH curve of magnetic materials. |
| | | CO4. Calculate efficiency of a single phase transformer and DC machine. |

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| | | CO5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction. |
| | Programming for Problem Solving Laboratory | CO1. To write programs for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To write programs for conditional branching, iteration and recursion |
| | | CO4. To write programs using functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. write programs using arrays, pointers and structures. |
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| COMPUTER SCIENCE & ENGINEERING | | | |
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| **COURSE OUTCOMES (COS): B.TECH. III,IV,V,VI,VII & VIII SEMESTERS** | | | |
| **Session 2019-20** | | | |
| **Code** | **Course Name** | **Course Outcomes** | |
| **1. B.Tech. III Semester** | | | |
| **KAS302** | **Maths IV** | **CO1** | The students will be able to learn the idea of partial differentiation and types of partial differential equations |
| | | **CO2** | The students will be able to learn the idea of classification of second partial differential equations, wave, heat equation and transmission lines |
| | | **CO3** | The students will be able to learn the basic ideas of statistics including measures of central tendency, correlation, regression and their properties. |
| | | **CO4** | The students will be able to learn the idea s of probability and random variables and various discrete and continuous probability distributions and their properties. |
| | | **CO5** | The students will be able to learn the statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties. |
| **KVE-301** | **Universal Human Values** | **CO1** | Students who complete this course should be able to realize the importance & need of human values and value education to human being. |
| | | **CO2** | Students should be able to realize the importance of self exploration in harmony of family. |
| | | **CO3** | They should be able to understand and appreciate role of harmonious family in peaceful society. |
| | | **CO4** | Students who complete this course should be able to investigate his/her self & make it suitable to society and existence. |
| | | **CO5** | CO5.Students should be able to apply the ethical and human values in family, society, nature and professional life. |
| **KCS-301** | **Data Structure** | **CO1** | Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications. |
| | | **CO2** | Discuss the computational efficiency of the sorting and searching algorithms. |
| | | **CO3** | Implementation of Trees and Graphs and perform various operations on these data structure. |
| | | **CO4** | Understanding the concept of recursion, application of recursion and its implementation and removal of recursion. |

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| | | **CO5** | Identify the alternative implementations of data structures with respect to its performance to solve a real world problem. |
| **KCS-302** | **Computer Organization & Architecture** | **CO1** | Study of the basic structure of Buses, Processor organization and operation of a digital computer system. |
| | | **CO2** | Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floating-point arithmetic operations. |
| | | **CO3** | Implementation of control unit techniques and the concept of Pipelining |
| | | **CO4** | Understanding the hierarchical memory system, cache memories and virtual memory |
| | | **CO5** | Understanding the different ways of communicating with I/O devices and standard I/O interfaces |
| **KCS-303** | **Discrete Structures & Theory of Logic** | **CO1** | Students will be able to Write an argument using logical notation and determine if the argument is or is not valid. |
| | | **CO2** | Students will able to Understand the basic principles of sets and operations in sets. |
| | | **CO3** | Students will able to Demonstrate an understanding of relations and functions and be able to determine their properties. |
| | | **CO4** | Students will able to Demonstrate different traversal methods for trees and graphs |
| | | **CO5** | Students will able to Model problems in Computer Science using graphs and trees. |
| **KCS-351** | **Data Structure Using C lab** | **CO1** | To learn elementary data structures such as stacks, queues, linked lists, trees and graphs. Students must be able to perform operations like searching, insertion and deletion, traversing mechanism etc. on various data structures. |
| | | **CO2** | Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively. |
| | | **CO3** | Students must be able to present the experiment & its results effectively in documentation. |
| **KCS-352** | **Computer Organization Lab** | **CO1** | Students must be able to verify combinational circuits in assigned labs. |
| | | **CO2** | Students must be able to Design the concept of Multiplexers , Decoders and Flip Flops. |
| | | **CO3** | Students must be able to explain the outcomes of experiments using Logistic Simulator and effectively document them in lab files. |
| **KCS-353** | **Discrete Structures &** | **CO1** | Students must be able to analyze the various problems on their own. |

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| | **Logic Lab** | **CO2** | Students must be able to implement logics for problem solving |
| | | **CO3** | Students must be able to represent the outputs of problems and its documentation effectively. |
| **KCS-354** | **Mini Project or Internship Assessment** | **CO1** | Students must be able to demonstrate their learning effectively through presentation. |
| | | **CO2** | Students are expected to apply & demonstrate their learning through a meaningful project |
| | | **CO3** | Students must learn to demonstrate their learning & work done through effective documentation in the form of project report |
| **2. B.Tech. IV Semester** | | | |
| **KOE048** | **Electronics Engineering** | **CO1.** | Understand the concept of PN junction and special purpose diodes |
| | | **CO2.** | Study the application of conventional diode and semiconductor diode. |
| | | **CO3.** | Analyze the I-V characteristics of BJT and FET. |
| | | **CO4.** | Analyze the of Op-Amp, amplifiers, integrator, and differentiator. |
| | | **CO5.** | Understand the concept of digital storage oscilloscope and compare of DSO with analog oscilloscope. |
| **KAS301** | **Technical Communication** | **CO1.** | Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| | | **CO2.** | Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions |
| | | **CO3.** | Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | **CO4.** | Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence |
| | | **CO5.** | It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics |
| **KCS401** | **Operating Systems** | **CO1.** | Describe the fundamentals and structure of operating systems. |
| | | **CO2.** | Analyze Process Synchronization and the solution of various critical section problem using software and hardware approaches. |
| | | **CO3.** | Explain the mechanism to handle threads, process scheduling and deadlock. |

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| | | **CO4.** | Discuss the concept of memory management along with page replacement and thrashing. |
| | | **CO5.** | Classify various file system concepts and disk Scheduling. |
| **KCS402** | **Theory of Automata and Formal Languages** | **CO1.** | Students will be able to describe basic concepts of alphabets, strings, languages and should be able to understand automata, grammars and their relationships. |
| | | **CO2.** | Students should be able to design Finite Automata (FA) and to understand the equivalence of DFA and NFA and evaluate whether a given Language is regular and Able to compute the equivalent DFA with the minimum number of states. |
| | | **CO3.** | Students should be able to apply the concept of CFG and measure normal forms and ambiguity in grammar. |
| | | **CO4.** | Students should be able to create PDA by given CFL and convert CFG to PDA and vice versa. |
| | | **CO5.** | Graduate will be able to design turing machine for given language and to compare decidable and undecidable problems. |
| **KCS403** | **Microprocessor** | **CO1.** | Apply a basic concept of digital fundamental to microprocessor based computer system. |
| | | **CO2.** | Analyze a detailed software and hardware structure of the microprocessor |
| | | **CO3.** | Illustrate how the different peripherals (8085/8086) are interfaced with microprocessor |
| | | **CO4.** | Analyze the characteristics of Microprocessor |
| | | **CO5.** | Evaluate the data transfer information through serial and parallel ports |
| **KNC401** | **Computer System Security** | **CO1.** | To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats |
| | | **CO2.** | To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats |
| | | **CO3.** | To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques. |
| | | **CO4.** | To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios |
| | | **CO5.** | To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques. |
| **KCS451** | **Operating Systems Lab** | **CO1.** | Students must be able to perform the experiments using C/Unix language in assigned labs. |

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| | | **CO2.** | Students must be able to understand the logic behind different programs & demonstrate the outcomes effectively using C/Unix during viva. |
| | | **CO3.** | Students must be able to explain the outcomes of experiments using C/Unix and effectively document them in lab files. |
| **KCS452** | **Microprocessor Lab** | **CO1.** | Students must be able to perform the experiments by his own |
| | | **CO2.** | Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively. |
| | | **CO3.** | Students must be able to present the experiment & its results effectively in documentation. |
| **KCS453** | **Python Language Programming Lab** | **CO1.** | Students must be able to perform the experiments by his own |
| | | **CO2.** | Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively. |
| | | **CO3.** | Students must be able to present the experiment & its results effectively in documentation. |
| **3. B.Tech. V Semester** | | | |
| **RCS-501** | **Database Management System** | **CO1.** | Be able to understand the fundamentals of basics of DBMS. |
| | | **CO2.** | Be able to generate data modeling using entity relationship model. |
| | | **CO3.** | Be able to generate DBMS constraints, SQL & relational data model and distinguish between TRC and DRC. |
| | | **CO4.** | Be able to understand the concept of database design & compute normal form. |
| | | **CO5.** | Be able to describe the concept of transaction processing ,Concurrency Control and discuss the distributed database. |
| **RCS-502** | **Design & Analysis of Algorithms** | **CO1.** | .Students will be able to analyze performance of algorithms and estimate their worst-case and average-case behavior using asymptotic notations. |
| | | **CO2.** | Students will be able to derive and solve recurrences and also analyze sorting algorithms. |
| | | **CO3.** | Students will become familiar with advanced Data Structures like Binomial Heaps, Fibonacci Heaps, B- Tress, red black trees, tries, skip list etc. |
| | | **CO4.** | Students will learn and able to apply divide-and-conquer paradigm, greedy algorithms. |
| | | **CO5.** | Students will learn and able to apply algorithms like dynamic programming, Backtracking, Branch and Bound problems. |

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| | | **CO6** | Students will understand the concept of NP completeness, approximation algorithms, and algebraic Computation. |
| **RCS-503** | **Principle of Programming Languages** | **CO1.** | Student will be able to understand the fundamental Principles of Programming Languages and able to apply concept of various Programming Language properties. |
| | | **CO2.** | Student will be able to interpret basics of Imperative Language Concept. |
| | | **CO3.** | Student will be able to analyze and understand the concept of Object Oriented Programming. |
| | | **CO4.** | Student will be able to demonstrate and implement Functional Programming. |
| | | **CO5.** | Student will be able to analyze Logic Programming, Concurrent Programming and student will be able Manipulate and generate Lambda terms. |
| **RCS-052** | **Web Technologies** | **CO1.** | Student will be able to describe the working of application layer protocol which governs web, security, cyber law of web and learning concept of core JAVA programming. |
| | | **CO2.** | Student will be able to collect and apply basic concept of HTML, CSS, Java Script and its application. |
| | | **CO3.** | Students will be able to analyze the role of XML for the management and delivery of electronic information for given application and designing of dynamic web pages. |
| | | **CO4.** | Students will be able develop Web based applications by Servlets and JSP to have an interactive application such as Client Server Architecture. |
| | | **CO5.** | Graduates will be able to create connections between client and server by designing sockets and factory methods of InetAddress class of java. |
| **RUC501** | **Cyber Security** | **CO1.** | The student should be able to apply the basic knowledge of information systems in their design and development. |
| | | **CO2.** | The student should be able to analyze different application securities & security threats related to information systems. |
| | | **CO3.** | The student should be able to analyze and solve different problems associated with e-commerce and e-transections. |
| | | **CO4.** | The student should be able to design methods for developing secure information systems. |
| | | **CO5.** | The student should be able to design and apply different security policies & information security standards to safeguard IT assets. |
| | | **CO6** | The student should be able to analyze various IPR related issues and to apply the knowledge of IT under defined cyber laws. |

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| **RAS 501** | **Managerial Economics** | **CO1.** | The student should be able to understand the role of economics and management in engineering and decision making. |
| | | **CO2.** | The student should be familiarized with various functions of marketing and market research. |
| | | **CO3.** | The student should be able to apply law of demand and supply in solving problems. |
| | | **CO4.** | The student should be able to understand and analyze competition and market structures |
| | | **CO5.** | The student should be able to perceive the concept of price determination |
| | | **CO6.** | The student should be able to perceive the concepts of demand forecasting and various cost estimation |
| **RCS-551** | **Database Management System Lab** | **CO1** | Students must be able to perform installation of oracle and to generate SQL statements using ORACLE/MYSQL. |
| | | **CO2** | Students must be able to understand and design Entity-Relationship diagram using various case tools and Students are also expected to demonstrate their learning through mini projects. |
| | | **CO3** | Students must be able to present the experiment and its results create and demonstrate cursor, procedure, functions and triggers. |
| **RCS-552** | **Design & Analysis of Algorithm Lab** | **CO1** | Students must be able to convert algorithms into program & perform the experiments by his own |
| | | **CO2** | Students must be able to understand the logic, time & space complexity for the experiment & demonstrate the outcomes effectively during Viva |
| | | **CO3** | Students must be able to determine the running time of experiments & present the results via comparative graphs of order of growth effectively in documentation. |
| **RCS-553** | **Principle of Programming Languages Lab** | **CO1** | Students must be able to perform the experiments such as searching and sorting by his own in Meta Language. |
| | | **CO2** | Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively using Meta Language during viva. |
| | | **CO3** | Students must be able to present the experiment using Meta language & its results effectively in documentation. |
| **RCS-554** | **Web Technologies Lab** | **CO1** | Students will be able to design static and dynamic web pages by using basic concept of HTML, java script and will be able to learn transferring data from one web page to another page by using XML schema and DTD. |
| | | **CO2** | Students will be able to develop various applications using core java and advance java and will be able to learn server |

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| | | | side languages to create interactive web site and store data in database to provide security and various services. |
| | | **CO3** | Students must be able to present the experiment & its results effectively in documentation. |
| **4. B.Tech. VI Semester** | | | |
| **RAS601** | **Industrial Management** | **CO1.** | Describe- Student will learn the basic concepts of I.M and productivity |
| | | **CO2.** | Analyze - Student will be able to analyse the management functions to get the actual work in a company. |
| | | **CO3.** | Explain- Student can explain sampling , inventory models and work study. |
| | | **CO4.** | Discus-Student will be able to learn the quality of product. |
| | | **CO5.** | Classify - Student learn to manage the project implementation. |
| **RAS602** | **Industrial Sociology** | **CO1.** | The student should be able to analyze basic significance of industrial sociology |
| | | **CO2.** | The student should be able to analyze factors which maintains industrial peace |
| | | **CO3.** | The student should be able to evaluate the significance of various schemes for labour |
| | | **CO4.** | The student should be able to describe industrial policy resolution in development of industries |
| | | **CO5.** | The student should be able to review the development of industrial sociology |
| **RCS-601** | **Computer Networks** | **CO1.** | Students will be able to identify and describe various network models and LAN standards. |

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| | | **CO2.** | Students will be able to explain and apply data link layer of OSI model. |
| | | **CO3.** | Students will be able to analyze and design logical addressing and routing algorithms. |
| | | **CO4.** | Students will be able to analyze and integrate connection management and presentation layer mechanism. |
| | | **CO5.** | Students will be able to practice and analyze various application layer protocols. |
| **RCS-602** | **Compiler Design** | **CO1.** | Student will be able to understand the functionality of each phase involved in Compilation process.. |
| | | **CO2.** | Student will be able to apply the concept of the parsing techniques including Bottom-up and Top-down parsing for the given programming construct described in Context Free Grammar. |
| | | **CO3.** | Student will be able to interpret and identify the different representations of intermediate code and able to analyze and understand the concepts of storage administration for different programming environments . |
| | | **CO4.** | Student will be able to demonstrate and implement different error recovery routines to recover the errors seen at different phases of compilation. |
| | | **CO5.** | Student will be able to analyze and generate the machine code by considering all the functionalities involved in different phases of the compilation process. |
| **RCS-603** | **Computer Graphics** | **CO1.** | Understand the graphics hardware used in field of computer graphics. |
| | | **CO2.** | Understand the concept of graphics primitives such as lines and circle based on different algorithms. |
| | | **CO3.** | Apply the 2D graphics transformations, composite transformation and Clipping concepts. |

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| | | **CO4.** | Apply the concepts of and techniques used in 3D computer graphics, including viewing transformations. |
| | | **CO5.** | Perform the concept of projections, curve and hidden surfaces in real life. |
| **RCS-062** | **Neural Network** | **CO1.** | It will introduce the fundamentals of Artificial Neural Networks & learners will learn about the various learning models & rules |
| | | **CO2.** | Learners will understand the various data/input processing & normalization aspects for training ANN |
| | | **CO3.** | Learners will get the understanding of the mathematical aspects & architecture of neural models along within the principles of learning algorithms. |
| | | **CO4.** | Students will learn, design and implement the basic models feed forward & backward networks |
| | | **CO5.** | Students will be able to learn about the various applications of ANN. |
| **RCS-651** | **Computer Networks Lab** | **CO1.** | Student will be able to describe and practice to use various networking components and demonstrate different transmission media and design cables for establishing a network. |
| | | **CO2.** | Student will be able to perform and diagnose the network configuration using logical addressing. |
| | | **CO3.** | Student will able to develop and manage different types of networks using networks protocols on different layers of OSI or TCP/IP. |
| **RCS-652** | **Compiler Design Lab** | **CO1.** | Describe the functionality of lexical analysis phase involved in Compilation process and implementation of NFA from regular expression. Students must be able to perform the experiments by his own. |
| | | **CO2.** | Implement the parsing techniques including Bottom-up and Top-down parsing for the given programming construct described in Context Free Grammar. Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively. |

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| | | **CO3.** | Understand the different representations of intermediate code and generate the machine code by considering all the functionalities involved in different phases of the compilation process. Students must be able to present the experiment & its results effectively in documentation. |
| **RCS-653** | **Computer Graphics Lab** | **CO1.** | Students must be able to perform the experiments by his own. |
| | | **CO2.** | Students must be able to understand the logic behind the experiment & demonstrate the outcomes effectively. |
| | | **CO3.** | Students must be able to present the experiment & its results effectively in documentation. |
| **RCS-654** | **Data Warehousing & Data Mining Lab** | **CO1.** | Understanding the functionality of various data mining and warehousing components. |
| | | **CO2.** | Explain the analyzing of various data mining and data warehousing. |
| | | **CO3.** | Describe methodologies used in data mining and data warehousing. |
| **5. B.Tech. VII Semester** | | | |
| **ROE-074** | **Understanding the human being Comprehensively Human Aspiration audits fulfillment** | **CO1** | To help the students having the clarity about human aspirations, goal, activities and purpose of life |
| | | **CO2** | To facilitate the competence to understand the harmony in nature/existence and participation of human being in the nature/existence. |
| | | **CO3** | To help the students to develop the understanding of human tradition and its various components. |
| **RCS-701** | **Distributed System** | **CO1.** | Define the principles and architectural models of Distributed Systems in order to determine the global system state and identify the clock models used in distributed systems. |
| | | **CO2.** | Identify the requirements of Mutual Exclusion and describe various deadlock detection strategies. |
| | | **CO3.** | Illustrate the System models of Agreement Problems and application of these agreement protocols in real life problems like Atomic commit in DDBS. |
| | | **CO4.** | Classify the failure recovery(forward/backward) in concurrent systems and formulating algorithms for achieving fault tolerance in distributed systems. |

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| | | **CO5.** | Compare various methods used for attaining concurrency control in distributed transactions and resolving the distributed deadlocks in transactions. |
| **RCS-702** | **Artificial Intelligence** | **CO1.** | Understanding the fundamental aspects of AI, Intelligent agents in AI |
| | | **CO2.** | Study of various search strategies in AI and its area of applications |
| | | **CO3.** | Study of methods for Knowledge Representation & Reasoning in AI |
| | | **CO4.** | Understanding the Machine learning concepts & its fundamental algorithms. |
| | | **CO5.** | Study of pattern recognition techniques & its role in AI |
| **RCS-751** | **Distributed System Lab** | **CO1** | Students must be able to perform the various experiments using C or Java language in assigned labs. |
| | | **CO2** | Students must be able to understand the logic behind different programs & demonstrate the outcomes effecctively during viva. |
| | | **CO3** | Students must be able to explain the outcomes of experiments and effectively document them in lab files. |
| **RCS-752** | **Artificial Intelligence lab** | **CO1** | Students must be able to perform the various experiments using Prolog language in assigned labs. |
| | | **CO2** | Students must be able to understand the logic behind different programs & demonstrate the outcomes effectively during viva. |
| | | **CO3** | Students must be able to explain the outcomes of experiments and effectively document them in lab files. |
| **RCS-753** | **Industrial Training** | **CO1** | Students must be able to demonstrate their learning effectively through presentation. |
| | | **CO2** | Students are expected to apply & demonstrate their learning through a meaningful project. |
| | | **CO3** | Students must learn to demonstrate their learning & work done through effective documentation in the form of project report. |
| **RCS-071** | **Application of Soft Computing** | **CO1.** | Understand the concepts and architecture of Neural Networks. |
| | | **CO2.** | Understand Back Propagation Neural Network Architectures and Algorithms |
| | | **CO3.** | Apply the concepts of fuzzy sets theory operations and properties. |

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| | | **CO4.** | Understand and Apply Fuzzy Membership and fuzzy Rules in fuzzy controllers and its industrial applications. |
| | | **CO5.** | Understand the basic concepts and apply working principles of Genetic Algorithm |
| **RCS-077** | **Agile Software Development** | **CO1.** | Student will be able to understand the fundamentals of Agile Software Development. |
| | | **CO2.** | Student will be able to apply different Agile processes like Scrum, Extreme Programming. |
| | | **CO3.** | Student will be able to analyze the agility and knowledge management concept. |
| | | **CO4.** | Student will be able to understand agility and requirement engineering. |
| | | **CO5.** | Student will be able to understand agility and quality assurance. |
| **RCS-754** | **Project** | **CO1** | Students are able to work effectively in teams to accomplish a common goal. |
| | | **CO2** | Students are able to develop the ability to communicate effectively with a wide range of audience. |
| | | **CO3** | Students acquire the knowledge to undertake technical, research tasks and ethical response responsibilities to develop a software or hardware product. |
| | | **CO4** | Students apply the knowledge for developing a business plan for an entrepreneurial venture and its implementation ,develop the ability of self-learning and apply it in life- long learning. |
| **6. B.Tech. VIII Semester** | | | |
| **RCS082** | **Image Processing** | **CO1.** | Student will be able to apply principles of image formation and analyze image enhancement in frequency domain. |
| | | **CO2.** | Student will be able to identify & apply filters in spatial domain for image enhancements. |
| | | **CO3.** | Student will be able to interpret various noise models and propose appropriate restoration techniques. |
| | | **CO4.** | Student will be able to analyze morphological image processing. |
| | | **CO5.** | Student will be able to demonstrate various segmentation processes and devise novel approach for segmentation. |
| **RCS087** | **Data Compression** | **CO1.** | Students will be able to understand the basics of data compression and learn to solve the problems associated with different source coding techniques. |

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| | | **CO2.** | Students will be able to apply the compression techniques to compress the different raw data and summarize the concepts associated with text, image and audio compression. |
| | | **CO3.** | Students will be able to learn different data compression principles and algorithms like LZ77&78,LZW,BWT,CALIC,MTF etc. |
| | | **CO4.** | Students will be able to evaluate the quantization problem and to classify different types of quantization. |
| | | **CO5.** | Students will be able to identify and apply the operation of vector quantizer. |
| **ROE081** | **Digital & Social Media Marketing** | **CO1.** | To help students understand digital marketing practices, inclination of digital consumers and role of content marketing |
| | | **CO2.** | To provide understanding of the concept of E-commerce and developing marketing strategies in the virtual world. |
| | | **CO3.** | To impart learning on various digital channels and how to acquire and engage consumers online. |
| | | **CO4.** | To provide insights on building organizational competency by way of digital marketing practices and cost considerations |
| | | **CO5.** | To develop understanding of the latest digital practices for marketing and promotion. |
| **RCS851** | **Seminar** | **CO1.** | Students must be able to demonstrate their learning effectively through presentation. |
| | | **CO2.** | Students are expected to apply & demonstrate their learning through a meaningful project |
| | | **CO3.** | Students must learn to demonstrate their learning & work done through effective documentation in the form of project report |
| **RCS852** | **Project** | **CO1.** | Proposed work must demonstrate originality, utility & some novelness in their work. |
| | | **CO2.** | Students must be able to understand, work & apply the various phases of project development. |
| | | **CO3.** | Students must be able to present their proposed work & its results effectively through documentation. |
| | | **CO4.** | Students are expected to demonstrate meaningful results and research orientation. |
| | | **CO5.** | Students are also expected to improve their results through continuous process of evaluation & presentations |

| INFORMATION TECHNOLOGY | | |
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| **Course Outcomes (COs): B.Tech. I,II III,IV,V,VI,VII & VIII Semester** | | |
| **Session:2019-20** | | |
| **Code** | **Course Name** | **Course Outcomes** |
| **B.Tech-IT I Semester** | | |
| KAS-101 | Physics | CO1. To solve the classical and wave mechanics problems |
| | | CO2. To develop the understanding of laws of thermodynamics and their application in various processes. |
| | | CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. |
| | | CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams. |
| KAS-103 | Mathematics-I | CO1. To Remember the concept of matrices and apply for solving linear simultaneous equations |
| | | CO2. To Understand the concept of limit, continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems. |
| | | CO3. To Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians. |
| | | CO4. To Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity. |
| | | CO5. To Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals. |
| KEE-101 | Basic Electrical Engineering | CO1. Tto Apply the concepts of KVL/KCL and network theorems in solving DC circuits. |
| | | CO2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. |
| | | CO3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. |
| | | CO4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. |
| | | CO5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption. |

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| KCE-101 | Engineering Graphics & Design | CO1. Understanding of the visual aspects of engineering design |
| | | CO2. Understanding of engineering graphics standards and solid modeling |
| | | CO3. Effective communication through graphics |
| | | CO4. Applying modern engineering tools necessary for engineering practice |
| | | CO5. Appling computer-aided geometric design |
| | | CO6. Analysis of Isometric views |
| | | CO7. Creating working drawings |
| KAS-102 | Chemistry | CO1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. |
| | | CO2. Know the fundamental concepts of determination of structure with various techniques. |
| | | CO3. Know the fundamental concepts of chemistry applicable in industrial processes. |
| KCS-101 | Programming for Problem Solving | CO1. To develop simple algorithms for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To implement conditional branching, iteration and recursion. |
| | | CO4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. To use arrays, pointers and structures to develop algorithms and programs. |
| KWS-101 | Workshop Practices | CO1. Study and practice on machine tools and their operations |
| | | CO2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding |
| | | CO3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping |
| | | CO4. Welding and soldering operations |
| | | CO5. Apply basic electrical engineering knowledge for house wiring practice |
| | Physics Laboratory | CO1. To determine the wavelength of sodium light by Newton‟s ring experiment |
| | | CO2. To determine the wavelength of sodium light with the help of Fresnel‟s bi-prism |
| | | CO3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil. |
| | | CO4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss. |

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| | Chemistry Laboratory | CO1. Use of different analytical instruments. |
| | | CO2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water |
| | | CO3. Measure hardness of water. |
| | | CO4. Estimate the rate constant of reaction |
| | Basic Electrical Engineering Laboratory | CO1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits |
| | | CO2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits. |
| | | CO3. Perform experiment illustrating BH curve of magnetic materials. |
| | | CO4. Calculate efficiency of a single phase transformer and DC machine. |
| | | CO5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction. |
| | Programming for Problem Solving Laboratory | CO1. To write programs for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To write programs for conditional branching, iteration and recursion |
| | | CO4. To write programs using functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. write programs using arrays, pointers and structures. |
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| **B.Tech-IT II Semester** | | |
| KAS-201 | Physics | CO1. To solve the classical and wave mechanics problems |
| | | CO2. To develop the understanding of laws of thermodynamics and their application in various processes. |
| | | CO3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory. |
| | | CO4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams. |
| KAS-202 | Chemistry | CO1. Get an understanding of the theoretical principles understanding molecular structure, bonding and properties. |
| | | CO2. Know the fundamental concepts of determination of structure with various techniques. |

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| | | CO3. Know the fundamental concepts of chemistry applicable in industrial processes. |
| KAS-203 | Mathematiccs-II | CO1. Understand the concept of differentiation and apply for solving differential equations. |
| | | CO2. Remember the concept of definite integral and apply for evaluating surface areas and volumes. |
| | | CO3. Understand the concept of convergence of sequence and series. Also evaluate Fourier series. |
| | | CO4. Illustrate the working methods of complex functions and apply for finding analytic functions. |
| | | CO5. Apply the complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals. |
| KEE-201 | Basic Electrical Engineering | CO1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits. |
| | | CO2. Analyze the steady state behavior of single phase and three phase AC electrical circuits. |
| | | CO3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer. |
| | | CO4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications. |
| | | CO5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption. |
| KCS-201 | Programming for Problem Solving | CO1. To develop simple algorithms for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To implement conditional branching, iteration and recursion. |
| | | CO4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. To use arrays, pointers and structures to develop algorithms and programs. |
| KCE-201 | Engineering Graphics & Design | CO1. Understanding of the visual aspects of engineering design |
| | | CO2. Understanding of engineering graphics standards and solid modeling |
| | | CO3. Effective communication through graphics |
| | | CO4. Applying modern engineering tools necessary for engineering practice |

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| | | CO5. Appling computer-aided geometric design |
| | | CO6. Analysis of Isometric views |
| | | CO7. Creating working drawings |
| KWS-201 | Workshop Practices | CO1. Study and practice on machine tools and their operations |
| | | CO2. Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding |
| | | CO3. Identify and apply suitable tools for machining processes including turning, facing, thread cutting and tapping |
| | | CO4. Welding and soldering operations |
| | | CO5. Apply basic electrical engineering knowledge for house wiring practice |
| KAS-204 | Professional English | CO1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking. |
| | | CO2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc. |
| | | CO3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing |
| | | CO4. Students will be made to evaluate the correct & error-free writing by being wellversed in rules of English grammar & cultivate relevant technical style of communication & presentation at their work place & also for academic uses. |
| | | CO5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence. |
| | Physics Laboratory | CO1. To determine the wavelength of sodium light by Newton‟s ring experiment |
| | | CO2. To determine the wavelength of sodium light with the help of Fresnel‟s bi-prism |
| | | CO3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil. |
| | | CO4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss. |
| | Chemistry | CO1. Use of different analytical instruments. |

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| | Laboratory | CO2. Measure molecular/system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water |
| | | CO3. Measure hardness of water. |
| | | CO4. Estimate the rate constant of reaction |
| | Basic Electrical Engineering Laboratory | CO1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits |
| | | CO2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits. |
| | | CO3. Perform experiment illustrating BH curve of magnetic materials. |
| | | CO4. Calculate efficiency of a single phase transformer and DC machine. |
| | | CO5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction. |
| | Programming for Problem Solving Laboratory | CO1. To write programs for arithmetic and logical problems |
| | | CO2. To translate the algorithms to programs & execution (in C language). |
| | | CO3. To write programs for conditional branching, iteration and recursion |
| | | CO4. To write programs using functions and synthesize a complete program using divide and conquer approach. |
| | | CO5. write programs using arrays, pointers and structures. |
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| **B.Tech-IT III Semester** | | |
| KCS 301 | DATA STRUCTURE | CO 1 Describe how arrays, linked lists, stacks, queues, trees, and graphs are represented in memory, used by the algorithms and their common applications |
| | | CO 2 Discuss the computational efficiency of the sorting and searching algorithms. |
| | | CO 3 Implementation of Trees and Graphs and perform various operations on the data structure |
| | | CO 4 Understanding the concept of recursion, application of recursion and its implementation and removal of recursion. |
| | | CO 5 Identify the alternative implementations of data structures with respect to its performance to solve a real world problem. |
| KCS302 | Computer Organization and | CO 1 Study of the basic structure and operation of a digital computer system. |

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| | Architecture | CO 2 Analysis of the design of arithmetic & logic unit and understanding of the fixed point and floatingpoint arithmetic operations. |
| | | CO 3 Implementation of control unit techniques and the concept of Pipelining. |
| | | CO 4 Understanding the hierarchical memory system, cache memories and virtual memory. |
| | | CO 5 Understanding the different ways of communicating with I/O devices and standard I/O interfaces. |
| KCS 303 | Discrete Structures & Theory of Logic | CO 1 Write an argument using logical notation and determine if the argument is or is not valid. |
| | | CO 2 Understand the basic principles of sets and operations in sets. |
| | | CO 3 Demonstrate an understanding of relations and functions and be able to determine their properties |
| | | CO 4 Demonstrate different traversal methods for trees and graphs. |
| | | CO 5 Model problems in Computer Science using graphs and trees. |
| KNC301 | COMPUTER SYSTEM SECURITY | CO 1 To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats |
| | | CO 2 To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats |
| | | CO 3 To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques. |
| | | CO 4 To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios |
| | | CO 5 To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques. |
| KNC302 | PYTHON PROGRAMMING | CO 1 To read and write simple Python programs. |
| | | CO 2 To develop Python programs with conditionals and loops. |
| | | CO 3 To define Python functions and to use Python data structures –- lists, tuples, dictionaries. |
| | | CO 4 To do input/output with files in Python. |
| | | CO 5 To do searching ,sorting and merging in Python. |
| KAS302 | Mathematics-IV | CO1. Remember the concept of partial differential equation and to solve partial differential equations |
| | | CO2. Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations |
| | | CO3. Understand the concept of correlation, moments, |

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| | | skewness and kurtosis and curve fitting |
| | | CO4. Remember the concept of probability to evaluate probability distributions |
| | | CO5. Apply the concept of hypothesis testing and statistical quality control to create control charts |
| KAS 301 | Technical Communication | CO 1 Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| | | CO 2 Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. |
| | | CO 3 Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | CO 4 Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. |
| | | CO 5 It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
| KOE-034 | Sensor & Instrumentation | CO1. Apply the use of sensors for measurement of displacement, force and pressure. |
| | | CO2. Employ commonly used sensors in industry for measurement of temperature,position, accelerometer, vibration sensor, flow and level. |
| | | CO3. Demonstrate the use of virtual instrumentation in automation industries. |
| | | CO4. Identify and use data acquisition methods. |
| | | CO5. Comprehend intelligent instrumentation in industrial automation. |
| KVE301 | Universal Human Values and Professional Ethics | CO 1 Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society mitigate such threats |
| | | CO 2 Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body |
| | | CO 3 Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society |
| | | CO 4 Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature |

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| | | CO 5 Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |
| KCS-351 | Data STRUCTURE Lab | CO1: nterpret and compute asymptotic notations of an algorithm to analyze the consumption of resources (time/space). |
| | | CO2: Exemplify and implement stack, queue and list ADT, tree and graph to manage the memory using static and dynamic allocations. |
| | | CO3: Implement binary search tree to design applications like expression trees. |
| | | CO4: Identify, model, solve and develop code for real life problems like shortest path and MST using graph theory. |
| | | CO4: Develop and compare the comparison-based search algorithms and sorting Algorithms. |
| | | CO5: Identify appropriate data structure and algorithm for a given contextual problem and develop in C. |
| KCS-352 | Computer Organization Lab | CO1: Define, Apply and Design basic digital circuits |
| | | CO2: Discuss, Design and Calculate 8 bits I/O, ALU and RTL |
| | | CO3: Explain, apply and design the concept of control unit and memory unit |
| | | CO4: C187Define and design algorithm using simulators |
| KCS-353 | Discrete Structures & Theory of Logic Lab | CO1: Students would be having understanding of working with a mathematical tool Maple |
| | | CO2: Students would be able to perform programs of recursion, combinatorics and counting |
| | | CO3: Students would be able to perform programs of set theroy, set operations and probability |
| | | CO4: Student would be able to implement classical mathematical problme like Birthday paradox based on pigeonhole principle. |
| KCS-354 | Mini Project | Students will be able to identify and present the objective and the work done during training |
| | | Students will be able to apply the learned concept through design,analysis and development of mini project |
| | | Students will be able to design and implementation of mini project during their training. |
| | | Students will be able to discuss the result/output and prepare a mini project report |
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| **B.Tech-IT IV Semester** | | |
| KCS 401 | Operating systems | CO 1 Understand the structure and functions of OS. |
| | | CO 2 Learn about Processes, Threads and Scheduling algorithms. |

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| | | CO 3 Understand the principles of concurrency and Deadlocks |
| | | CO 4 Learn various memory management scheme. |
| | | CO 5 Study I/O management and File systems. |
| KCS 402 | Theory of Automata and Formal Languages | CO 1 Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars |
| | | CO 2 Analyse and design, Turing machines, formal languages, and grammars. |
| | | CO 3 Demonstrate the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving. |
| | | CO 4 Prove the basic results of the Theory of Computation. |
| | | CO 5 State and explain the relevance of the Church-Turing thesis. |
| KIT 401 | Web Designing | CO 1 Understand principle of Web page design and about types of websites. |
| | | CO 2 Visualize and Recognize the basic concept of HTML and application in web designing. |
| | | CO 3 Recognize and apply the elements of Creating Style Sheet ( CSS). |
| | | CO 4 Understanding the basic concept of Java Script and its application. |
| | | CO 5 Introduce basics concept of Web Hosting and apply the concept of SEO. |
| KVE401 | Universal Human Values and Professional Ethics | CO 1 Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society mitigate such threats |
| | | CO 2 Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body |
| | | CO 3 Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society |
| | | CO 4 Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature |
| | | CO 5 Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |
| KNC 402 | PYTHON PROGRAMMING | CO 1 To read and write simple Python programs. |
| | | CO 2 To develop Python programs with conditionals and loops. |
| | | CO 3 To define Python functions and to use Python data |

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| | | structures –- lists, tuples, dictionaries. |
| | | CO 4 To do input/output with files in Python. |
| | | CO 5 To do searching ,sorting and merging in Python. |
| KAS 404 | Mathematics | CO 1 Understand the concept of Fourier Transform and Z-Transform to apply for solving with the help of transform problems. |
| | | CO 2 Remember the concept of Probability to evaluate Probability distribution. |
| | | CO 3 To analyze the concept of numerical techniques to evaluate the zero's of the function interpolation |
| | | CO 4 Apply the concept of hypothesis to evaluate various hypothesis testing. |
| | | CO 5 Remember the concept of design and statistical quality control to create control charts. |
| KAS 401 | Technical Communication | CO 1 Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| | | CO 2 Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. |
| | | CO 3 Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | CO 4 Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. |
| | | CO 5 It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
| KAS402 | Mathematics-IV | CO1. Remember the concept of partial differential equation and to solve partial differential equations |
| | | CO2. Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations |
| | | CO3. Understand the concept of correlation, moments, skewness and kurtosis and curve fitting |
| | | CO4. Remember the concept of probability to evaluate probability distributions |
| | | CO5. Apply the concept of hypothesis testing and statistical quality control to create control charts |
| KOE- | Sensor & | CO1. Apply the use of sensors for measurement of |

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| 044 | Instrumentation | displacement, force and pressure. |
| | | CO2. Employ commonly used sensors in industry for measurement of temperature,position, accelerometer, vibration sensor, flow and level. |
| | | CO3. Demonstrate the use of virtual instrumentation in automation industries. |
| | | CO4. Identify and use data acquisition methods. |
| | | CO5. Comprehend intelligent instrumentation in industrial automation. |
| KNC301 | COMPUTER SYSTEM SECURITY | CO 1 To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats |
| | | CO 2 To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats |
| | | CO 3 To discover and explain mobile software bugs posing cyber security threats, explain and recreate exploits, and to explain mitigation techniques. |
| | | CO 4 To articulate the urgent need for cyber security in critical computer systems, networks, and world wide web, and to explain various threat scenarios |
| | | CO 5 To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques. |
| KNC302 | PYTHON PROGRAMMING | CO 1 To read and write simple Python programs. |
| | | CO 2 To develop Python programs with conditionals and loops. |
| | | CO 3 To define Python functions and to use Python data structures –- lists, tuples, dictionaries. |
| | | CO 4 To do input/output with files in Python. |
| | | CO 5 To do searching ,sorting and merging in Python. |
| KCS-451 | Operating systems Lab | CO1: Students will be able to design and interpret various CPU scheduling algorithm. |
| | | CO2: Students will be able to design, develop and implement programs for deadlock handling.. |
| | | CO3: Students will be able to apply and analyze different page replacement algorithms. |
| | | CO4: Students will be able to develop and compare various disk scheduling algorithms |
| KIT-451 | Web Designing Lab | CO1: Understand fundamentals of web development |
| | | CO2: Understand, analyze and apply the role of scripts/languages like HTML, DHTML, CSS |
| | | CO3: Understand, analyze and design the role of JavaScript for dynamic web pages. |
| KCS-453 | Python Language Prograaming Lab | CO1: Students will be able to describe the numbers, math functions, strings, list, tuples and dictionaries in python |

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| | | Students wil be able to acquire the skills to apply different decision making statements and functions in python |
| | | CO2: Students will be able to interpret object oriented programming in python |
| | | CO3: Students will be able to develop skill to understand and summarize different file handling operations |
| | | CO4:Students will be able to demonstrate the ability to design GUI applications in python and evaluate different database operations |
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| **B.Tech-IT V Semester** | | |
| RAS-501 | Managerial Economics | CO1. Students will be able to understand the basis of theory of economics with various techniques and applications of Managerial Economics. |
| | | CO2. Students will be able to analyze the several types of Market Structure and its multiple features of price determination. |
| | | CO3. Students will be able to apply the concept of forecasting using its various performance parameters to estimate the cost. |
| | | CO5. Students will be able to remember economic analysis using estimation of cost/revenue in the decision making process to justify or reject alternatives projects. |
| RAS-502 | Industrial Sociology | CO1. Students will be able to understand the basics of sociology and learn to solve the problems associated with social issues and their development. |
| | | CO2. Students will be able to learn techniques by various case study in terms of pre machine age to machine age. |
| | | CO3. Students will be able to learn different mechanism used at the time of pre industrialisation to industrialisation time. |
| | | CO4. Students will be able to understand the problem associated with society and social aspects in the development of society. |
| | | CO5. Students will be able to understand how the marxist cope with rural people in terms of getting work in the industry. |
| RUC-501 | Cyber Security | CO1. Student will be able to describe the basics of information systems. |
| | | CO2. Student will be able to understand Application security & Security Threats. |
| | | CO3. Student will be able to gain knowledge about Secure Information Systems development. |
| | | CO4. Student will be able to demostrate and create knowledge about Security Policies & Information Security Standards. |
| RCS- | Database | CO1. Students should be able to understand the fundamentals of |

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| 501 | Management Systems | basics of DBMS. |
| | | CO2. Students should be able able to generate data modeling using entity relationship model. |
| | | CO3. Students should be able to Analyze DBMS constraints, SQL & relational data model and distinguish between TRC and DRC. |
| | | CO4. Students should be able to understand the concept of database design & compute normal form. |
| | | CO5. Students should be able to describe the concept of transaction processing and discuss the distributed database. |
| | | CO6. Students should be able to explain the concurrency control techniques and demonstrate ORACLE. |
| RCS-502 | Design and Analysis of Algorithms | CO1. Students will be able to analyse performance of algorithms and estimate their worst-case and average-case behaviour using asymptotic notations. |
| | | CO2. Students will be able to derive and solve recurrences and also analyze sorting algorithms. |
| | | CO3. Students will become familiar with advanced Data Structures like Binomial Heaps, Fibonacci Heaps, B- Tress, red black trees, tries, skip list etc. |
| | | CO4. Students will learn and able to apply divide-and-conquer paradigm, greedy algorithms. |
| | | CO5. Students will learn and able to apply algorithms like dynamic programming, Backtracking, Branch and Bound problems. |
| | | CO6. Students will understand the concept of NP completeness, approximation algorithms, and algebraic Computation. |
| RCS-503 | Principles of Programming Languages | CO1. Student will be able to remember the basic fundamental Principles of Programming Languages. |
| | | CO2. Student will be able to apply & understand concept of various Programming Language properties. |
| | | CO3. Student will be able to analyze and interpret basics of Imperative Language Concept and Object Oriented Programming. |
| | | CO4. Student's ability to analyze, demonstrate, implement and understand the concept of Functional, Logic and Concurrent Programming. |
| | | CO5. Student will be able to Manipulate and generate Lambda terms, check and assign types to Lambda terms. |
| RCS-551 | Database Management Systems Lab | CO1. Student should be able to state installation of Oracle |
| | | CO2. Student should be to design Entity- Relationship Diagram using various case tools |
| | | CO3. Student should be able to generate SQL statements using |

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| | | ORACLE/ MYSQL |
| | | CO4. Student should be able to solve normalization in oracle |
| | | CO5. Student should be able to create and demonstrate cursor, procedure, functions, packages and triggers |
| RCS-552 | Design and Analysis of Algorithms Lab | CO1. Students will be able to Describe the use of asymptotic notations to analyze the behaviour and performance of algorithms. |
| | | CO2. Students will be able to analyze and compare various sorting algorithms likeQuick sort, Mere sort, Heap sort etc. |
| | | CO3. Students will understand the concept of advanced Data Structures like Binomial Heaps, Fibonacci Heaps, red black trees etc. |
| | | CO4. Students will learn to apply different algorithm design techniques like divide and conquer, greedy methods, dynamic programming, Backtracking, and Branch and Bound problems. |
| | | CO5. Students will be able to understand Theory of NP Completeness, and basics of nondeterministic algorithms to solve complex Problems. |
| RCS-553 | Principles of Programming Languages Lab | CO1. Students will be able to Apply and Understand basics of Meta Language. |
| | | CO2. Students will be able to imlement Searching and Sorting using Meta Language. |
| | | CO3. Students will be able to Creatively implement the concept of Dictionary using Meta Language. |
| | | CO4. Students will be able to Define and Design algorithms using Meta Language. |
| RIT-554 | Object Oriented Techniques Lab | CO1. Apply object oriented principles in software design process. |
| | | CO2. Develop C++ programs for real applications using C++ constructors and libraries. |
| | | CO3. Understand and apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems using C++ language. |
| | | CO4. Implement blue prints in C++. |
| RIT-E13 | Object Oriented Techniques | CO1. Apply Object concepts with various diagrams. |
| | | CO2. Create and apply class model, state model and interaction model for any system. |
| | | CO3. Analyze the application domain and prepare models from different view points. |
| | | CO4. Apply the re-engineering in the applications. |
| | | CO5. Use the concepts of Object Oriented design in implementing design. |
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| **B.Tech-IT VI Semester** | | |

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| RAS-601 | Industrial Management | CO1. Students will be able to Understand the concept, development, application and scope of Industrial Management and the impact of engineering solutions in a global and multidisciplinary scenario. |
| | | CO2. Students will be able to Analyze different types of production systems, Inventory Management, Supply Chain Management, TQM and Industrial Ownership by conducting experiments and interpretation of data. |
| | | CO3. Students will be able to Describe process charts, Flow diagrams, deterministic models , control charts etc |
| | | CO4. Students will be able to Design, develop, implement and improve integrated systems that include people, materials, information, equipment and energy using realistic constraints such as economic, environmental, social, political, ethical, health, safety, manufacturability and sustainability. |
| | | CO5. Students will be able to Evaluate Productivity Index, EOQ , Inventory costs etc. |
| | | CO6. Students will be able to Remember the basic concepts of Time and Motion study, Production Planning and Understand the Fayol Principle of Management, Management Functions and Project Management |
| RAS-602 | Cyber Security | CO1. Student will be able to describe the basics of information systems. |
| | | CO2. Student will be able to understand Application security & Security Threats. |
| | | CO3. Student will be able to gain knowledge about Secure Information Systems development. |
| | | CO4. Student will be able to demostrate and create knowledge about Security Policies & Information Security Standards. |
| RUC-601 | Industrial Sociology | CO1. Student will be able to describe the basics of information systems. |
| | | CO2. Student will be able to understand Application security & Security Threats. |
| | | CO3. Student will be able to gain knowledge and understanding of E-commerce and Electronic Payment System. |
| | | CO4. Student will be able to gain knowledge about Secure Information Systems development. |
| | | CO5. Student will be able to demostrate and create knowledge about Security Policies & Information Security Standards. |
| RCS-601 | Computer Networks | CO1. Students will be able to identify and describe various network models and LAN standards. |
| | | CO2. Students will be able to explain and apply data link layer of OSI model |
| | | CO3. Students will be able to analyze and design logical |

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| | | addressing and routing algorithms. |
| | | CO4. Students will be able to analyze and integrate connection management and presentation layer mechanism. |
| | | CO5. Students will be able to practice and analyze various application layer protocols. |
| RCS-602 | Compiler Design | CO1. Students will be able to understand the functionality of each phase involved in Compilation process. |
| | | CO2. Students will be able to design & apply the parsing techniques including Bottom-up and Top-down parsing for the given programming construct described in Context Free Grammar. |
| | | CO3. Students will be able to Identify and apply the different representations of intermediate code. |
| | | CO4. Students will be able to understand the concepts of storage administration for different programming environments. |
| | | CO5. Students will be able to apply different error recovery routines to recover the errors seen at different phases of compilation. |
| | | CO6. Students will be able to analyze and create the machine code by considering all the functionalities involved in different phases of the compilation process. |
| RIT-601 | Web Technology | CO1.Apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web. |
| | | CO2. Understand, analyze and apply the role of mark up languages like HTML, DHTML, and XML in the workings of the web and web applications. |
| | | CO3. Use web application development software tools i.e. XML, Apache Tomcat etc. and identifies the environments currently available on the market to design web sites. |
| | | CO4.Understand, analyze and build dynamic web pages using client side programming JavaScript and also develop the web application using servlet and JSP. |
| | | CO5. Understand the impact of web designing by database connectivity with JDBC in the current market place where everyone use to prefer electronic medium for shopping, commerce, fund transfer and even social life also. |
| RCS-651 | Computer Networks Lab | CO1. Student will be able to describe and practice to use various networking components and demonstrate different transmission media and design cables for establishing a network. |

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| | | CO2. Student will be able to perform and diagnose the network configuration using logical addressing. |
| | | CO3. Student will able to develop and manage different types of networks. |
| | | CO4. Students will be able to apply and analyze various networks protocols on different layers of OSI or TCP/IP. |
| RCS-652 | Compiler Design Lab | CO1. Students will be able to Describe the functionality of lexical analysis phase involved in Compilation process. |
| | | CO2. Students will be able to Implement NFA from regular expression. |
| | | CO3. Students will be able to Implement the parsing techniques including Bottom-up and Top-down parsing for the given programming construct described in Context Free Grammar. |
| | | CO4. Students will be able to Understand the different representations of intermediate code. |
| | | CO5. Students will be able to Generate the machine code by considering all the functionalities involved in different phases of the compilation process. |
| RIT-651 | Web Technology Lab | CO1. Understand fundamentals of web development and Java, including defining classes,<br>invoking methods, using class libraries, Applet, AWT. |
| | | CO2. Understand, analyze and apply the role of scripts/languages like HTML, DHTML, CSS, XML, DOM, and SAX to solve real world problems. |
| | | CO3. Understand, analyze and design the role of JavaScript for dynamic web pages. |
| | | CO4. Design and deploy different components using EJB, and database tables using JDBC and produce various results based on given query. |
| | | CO 5. Design and deploy a server-side java application called Servlet & JSP tools to catch form data sent from client, process it and store it on database. |
| RCS-654 | Data Warehousing & Data Mining Lab | CO1. Student should be able to Design & Create Data Warehouse using any RDBMS System like Oracle/MySQL |
| | | CO2. Student should be able to perform multi dimensional queries OLAP operations |
| | | CO3. Student should be able to pre processing of data / data preparation for Data Mining |
| | | CO4. Student should be able to perform the operation of Association Rule (APRIORI Algorithm) |
| | | CO5.Student should be able to implement the algorithms to Classification, Decision Three, Clustering, Regression Analysis, ANN based analysis. |

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| RIT-E22 | Data Warehousing & Data Mining | CO1. Student should be able to understand the difference between OLTP and OLAP systems and data warehouses. |
| | | CO2. Student should be able create and evaluate the dominant data warehousing architectures and their support for quality attribute. |
| | | CO3. Student should be able to understand the concept of data mining and apply its functionality for data processing, data cleaning, data reduction, and analysis. |
| | | CO4. Student should be able to understand the concepts of data generalization, mining class comparison, association rules etc. |
| | | CO5. Student should be able to understand the concept of classification, prediction and cluster analysis. |
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| **B.Tech-IT VII Semester** | | |
| RIT-701 | Cryptography & Network Security | CO1. Student will be able to understand the types of attacks, Encryption Techniques, Block Ciphers & Data Encryption standard |
| | | CO2. Student will be able to apply knowledge of elementary Discrete Maths, Advanced Encryption Standard, Rivest Shamir Adleman, CRT |
| | | CO3. Student will be able to define and calculate Message Authentication, Secure Hash Algorithm, Digital signatures & Birthday attack |
| | | CO4. Students will be able to describe Pretty Good Privacy, Symmetric key Distribution, Key mgmt, Diffie Hellman Key Exchange |
| | | CO5. Students will able to evaluate IP Security, security payload, secure socket layer & system security |
| ROE-074 | Understanding the human being Comprehensively Human Aspiration audits fulfilment | CO1. Students will be able to apply the fundamental aspects of AI, Intelligent agents in field of AI |
| | | CO2. Students will be able to apply and analyze various search strategies in AI and its area of applications |
| | | CO3. Students will be able to discuss and create the methods for Knowledge Representation & Reasoning in AI |
| | | CO4. Students will be able to demonstrate the Machine learning concepts & its fundamental algorithms |
| | | CO5. Students will be able to analyse and apply the pattern recognition techniques & its role in AI |
| RCS-071 | Applications of Soft Computing | CO1: Student should be able to understand the concept of Neural Network and Artificial Neural Network. They should be able to create and evaluate the various architecture of ANN and different learning techniques. |

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| | | CO2: Student should be able to understand the architecture and meaning of Back Propagation Network. |
| | | CO3: Student should be able to understand the basic concept of Fuzzy Logic, fuzzy vs crisp data, and fuzzy to crisp data conversion. |
| | | CO4: Student should be able to apply the concept of Fuzzyfication and De-fuzzyfication, and creating fuzzy logic based industrial applications. |
| | | CO5: Student should be able to understand the basic concept of Genetic Algorithm, genetic representation of a problem, genetic operators, and applying it in various optimization problems. |
| | | CO6: Student should be able to create a model of fusion of Fuzzy and Neural Network processes for industrial applications. |
| RCS-077 | Agile Software Development | Student will be able to understand the fundamentals of Agile Software Development. |
| | | Student will be able to apply different Agile processes like Scrum, Extreme Programming. |
| | | Student will be able to analyze the agility and knowledge management concept. |
| | | Student will be able to understand agility and requirement engineering. |
| | | Student will be able to understand agility and quality assurance. |
| RIT751 | Cryptography & Network Security Lab | CO1. Student will be able to understand and Implement Encryption Techniques & Data Encryption standard |
| | | CO2. Student will be able to apply knowledge of elementary Discrete Maths, Advanced Encryption Standard, RSA |
| | | CO3. Student will be able to define and calculate Message Authentication, Secure Hash Algorithm |
| | | CO4. Students will be able to implement Symmetric key Distribution, Key mgmt, Diffie Hellman Key Exchange |
| | | CO5. Students will be able to implement IDS |
| RCS752 | Artificial Intelligence Lab | CO1: Students will be able to learn different logic programming languages. |
| | | CO2: Students will be able to apply and analyze various problem solving techniques on artificial intelligent problems. |
| | | CO3: Students will be able to acquire skill to identify the given problem and design the rule based systems. |
| | | CO4: Students will be able to develop better understanding to represent various real life problem domains using logic based techniques and use this to perform inference or planning. |
| | | CO5: Students will be able to understand the working knowledge in Lisp and demonstrate that for solving the artificial intelligent problems |

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| RIT-753 | Industrial Training | CO1. Students are expected to present the objective and the work done during training |
| | | CO2. Students are expected to apply the learned concept through design,analysis and development of mini project |
| | | CO3. Students are expected to present overall working and implementation of mini project during their presentation |
| | | CO4. Students are expected to present the result/output and prepare a mini project report |
| RIT754 | Project | CO1. To identify a real world problem in a clear and concise manner demonstrating a sound technical knowledge in form of synopsis covering problem understanding, project objectives, expected features and results. |
| | | CO2. To identify and summarize an appropriate list of literature review, analyse previous researchers' work and relate them to current project. |
| | | CO3. To understand how to collect primary data from the field according to the requirements, analyse the collected data in form of tables, bar chats, pie charts, etc. and create a paper model for the project. |
| | | CO4.To undertake problem identification, formulation and design engineering solutions to complex problems utilising a systems approach. |
| | | CO5. To validate the results with defined project objectives through standard or benchmark procedures. |
| | | CO6. To present the project outlining the approach and expected results using good oral and written presentation skills thereby producing a written project report that record and compile work done throughout the project. |
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| **B.Tech-IT VIII Semester** | | |
| ROE-083 | Machine Learning | CO1: Gain knowledge about basic concepts of Machine Learning |
| | | CO2: Identify machine learning techniques suitable for a given problem |
| | | CO3: Solve the problems using various machine learning techniques |
| | | CO4: Apply Dimensionality reduction techniques. |
| | | CO5: Design application using machine learning techniques. |
| RCS-082 | Image Processing | CO1: Student will be able to outline and define the principles of image formation and explain image enhancement in frequency domain. |
| | | CO2: Student will be able to interpret & apply filters in spatial domain for image enhancements. |

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| | | CO3: Student will be able to analyze various noise models and apply appropriate restoration techniques. |
| | | CO4: Student will be able to illustrate various segmentation processes and evaluate novel approach for segmentation. |
| | | CO5: Student will be able to identify and define various image compression techniques and analyze and apply appropriate compression techniques. |
| RCS-087 | Data Compression | CO1. Understanding the basics of data compression and learn to solve the problems associated with different source coding techniques. |
| | | CO2. Implement the compression techniques to compress the different raw data and summerize the concepts associated with text, image and audio compression. |
| | | CO3. Learn dfifferent data compression principles and alogrithms. |
| | | CO4. Understanding the quantization problem and learn different types of quantization. |
| | | CO5. Understanding the operation of scalar and vector quantizer. |
| RIT-851 | Seminar | CO1. Student will be able to Identify, understand, discuss and solve current, real-world issues. |
| | | CO2. Student will be able to collaborate with others as they work on intellectual projects. |
| | | CO3. Student will be able to speak and debate with an appreciation for complex social, cultural and technical sensibilities. |
| | | CO4. Student will be able to increase self-motivation, personal responsibility, and understanding of his or her role in being an informed participant in the educational and organizational process. |
| | | Co5. Student will be able to construct a paper consistent with expectations of the discipline, including an appropriate organization, style, voice, and tone. |
| RIT-852 | Project | CO1. To identify a real world problem in a clear and concise manner demonstrating a sound technical knowledge in form of synopsis covering problem understanding, project objectives, expected features and results. |
| | | CO2. To identify and summarize an appropriate list of literature review, analyse previous researchers' work and relate them to current project. |
| | | CO3. To understand how to collect primary data from the field according to the requirements, analyse the collected data in form of tables, bar chats, pie charts, etc. and create a paper model for the project. |

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| | | CO4.To undertake problem identification, formulation and design engineering solutions to complex problems utilising a systems approach. |
| | | CO5. To validate the results with defined project objectives through standard or benchmark procedures. |
| | | CO6. To present the project outlining the approach and expected results using good oral and written presentation skills thereby producing a written project report that record and compile work done throughout the project. |

## Department of Electronics and Communication Engineering

| Course Outcomes (COs): B.Tech. III,IV,V,VI,VII & VIII semesters: EC | | |
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| **Course Outcomes 2019-20** | | |
| **Code** | **Course Name** | **Course Outcomes** |
| **B.Tech (ECE) 3rd Semester** | | |
| (KAS-302) | Maths-IV | CO1. Remember the concept of partial differential equation and to solve partial differential equations |
| | | CO2. Analyze the concept of partial differential equations to evaluate the problems concerned with partial differential equations |
| | | CO3. Understand the concept of correlation, moments, skewness and kurtosis and curve fitting |
| | | CO4. Remember the concept of probability to evaluate probability distributions |
| | | CO5. Apply the concept of hypothesis testing and statistical quality control to create control charts |
| (KAS 301) | Technical Communication | CO1. Students will be enabled to understand the nature and objective of Technical |
| | | CO2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. |
| | | CO3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | CO4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. |
| | | CO5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
| (KEC-301) | Electronics Devices | CO1. Understand the principles of semiconductor Physics. |
| | | CO2. Understand and utilize the mathematical models of semiconductor junctions. |
| | | CO3. Understand carrier transport in semiconductors and design resistors. |
| | | CO4. Utilize the mathematical models of MOS transistors for circuits and systems. |
| | | CO5. Analyse and find application of special purpose diodes. |

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| (KEC-302) | Digital System Design | CO1. Design and analyze combinational logic circuits. |
| | | CO2. Design and analyze modular combinational circuits with MUX / DEMUX, Decoder & Encoder |
| | | CO3. Design & analyze synchronous sequential logic circuits |
| | | CO4. Analyze various logic families. |
| | | CO5. Design ADC and DAC and implement in amplifier, integrator, etc. |
| (KEC 303) | Network Analysis & Synthesis | CO1. Understand basics electrical circuits with nodal and mesh analysis. |
| | | CO2. Appreciate electrical network theorems. |
| | | CO3. Apply Laplace transform for steady state and transient analysis. |
| | | CO4. Determine different network functions. |
| | | CO5. Appreciate the frequency domain techniques. |
| (KEC351) | Electronic Devices Lab | CO1. Understand working of basic electronics lab equipment. |
| | | CO2. Understand working of PN junction diode and its applications. |
| | | CO3. Understand characteristics of Zener diode. |
| | | CO4. Design a voltage regulator using Zener diode. |
| | | CO5. Understand working of BJT, FET, MOSFET and apply the concept in designing of amplifiers. |
| (KEC352) | Digital System Design Lab | CO1. Design and analyze combinational logic circuits. |
| | | CO2. Design & analyze modular combinational circuits with MUX/DEMUX, decoder, encoder. |
| | | CO3. Design & analyze synchronous sequential logic circuits. |
| | | CO4. Design & build mini project using digital ICs. |
| (KEC353) | Network Analysis and Synthesis Lab | CO1. Understand basics of electrical circuits with nodal and mesh analysis. |
| | | CO2. Appreciate electrical network theorems. |
| | | CO3. Analyse RLC circuits. |
| | | CO4. Determine the stability of an electrical circuit. |
| | | CO5. Design network filters. |
| **B.Tech (ECE) 4th Semester** | | |
| (KOE-044) | Sensor and Instrumentation | CO1. Apply the use of sensors for measurement of displacement, force and pressure. |
| | | CO2. Employ commonly used sensors in industry for measurement of temperature, position, accelerometer, vibration sensor, flow and level. |
| | | CO3.Demonstrate the use of virtual instrumentation in automation industries. |
| | | CO4. Identify and use data acquisition methods. |
| | | CO5.Comprehend intelligent instrumentation in industrial automation. |
| (KVE-401) | Universal Human Values and | CO1. Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the |

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| | Professional Ethics | meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society |
| | | CO2. Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body. |
| | | CO3. Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society |
| | | CO4. Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. |
| | | CO5. Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |
| (KEC401) | Communication Engineering | CO1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth. |
| | | CO2. Analyze the behavior of a communication system in presence of noise. |
| | | CO3. Investigate pulsed modulation system and analyze their system performance. |
| | | CO4. Investigate various multiplexing techniques. |
| | | CO5. Analyze different digital modulation schemes and compute the bit error performance. |
| (KEC-402) | Analog Circuits | CO1. Understand the characteristics of diodes and transistors. |
| | | CO2. Design and analyze various rectifier and amplifier circuits. |
| | | CO3. Design sinusoidal and non-sinusoidal oscillators. |
| | | CO4. Understand the functioning of OP-AMP and design OP-AMP based circuits. |
| | | CO5. Design LPF, HPF, BPF, BSF. |
| (KEC-403) | Signal System | CO1. Analyze different types of signals. |
| | | CO2. Analyze linear shift-invariant (LSI) systems. |
| | | CO3. Represent continuous and discrete systems in time and frequency domain using Fourier series and transform. |
| | | CO4. Analyze discrete time signals in z-domain. |
| | | CO5. Study sampling and reconstruction of a signal. |
| (KEC451) | Communication Engineering Lab | CO1. Analyze and compare different analog modulation schemes for their modulation factor and power. |
| | | CO2. Study pulse amplitude modulation. |
| | | CO3. Analyze different digital modulation schemes and can compute the bit error performance. |
| | | CO4. Study and simulate the Phase shift keying |
| | | CO5. Design a front end BPSK modulator and demodulator. |
| (KEC- | Analog Circuit | CO1. Understand the characteristics of transistors. |

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| 452) | Lab | CO2. Design and analyze various configurations of amplifier circuits. |
| | | CO3. Design sinusoidal and non-sinusoidal oscillators. |
| | | CO4. Understand the functioning of OP-AMP and design OP-AMP based circuits. |
| | | CO5. Design ADC and DAC. |
| (KEC-453) | Signal System Lab | CO1. Understand the basics operation of MATLAB. |
| | | CO2. Analysis the time domain and frequency domain signals. |
| | | CO3. Implement the concept of Fourier series and Fourier transforms. |
| | | CO4. Find the stability of system using pole-zero diagrams and bode diagram. |
| | | CO5. Design frequency response of the system. |
| **B.Tech (ECE) 5th Semester** | | |
| (REC-501) | Integrated Circuits | CO1. Describe the basic concepts of various current mirror circuits and analyze the internal circuitry of IC 741. |
| | | CO2. Design various circuits involving linear applications of op-amp. |
| | | CO3. Realize of various digital circuits and systems using CMOS logic family. |
| | | CO4. Implement different nonlinear applications of op-amp. |
| | | CO5. Recall the functional description of 555 timer, PLL, A/D, D/A circuits. |
| | | CO6. Analyze and validate the Integrated circuit design based on applications of IC-741, IC-555, PLL and CMOS logic. |
| (REC-502) | Principles of Communication | CO1.Describe communication system and various modulation techniques involved in the transfer of information in the field of communication. |
| | | CO2. Differentiate the various modulated carrier transmission on the basis of amplitude, frequency and phase. |
| | | CO3. Explain the various bandpass, baseband transmissions using pulse shape formats and their use as carrier modulation. |
| | | CO4. Appraise the concept of advance baseband transmission with useful encoding formats and noise issues in digital transmission. |
| | | CO5. Analyze noise and evaluate its effect on different communication system |
| | | CO6. Apply principles of communication in advance information transmission. |

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| (REC-503) | Digital Signal Processing | CO1. Realize the digital system. |
| | | CO2. Design infinite impulse response filter. |
| | | CO3. Design finite impulse response filter. |
| | | CO4. Study discrete Fourier transform and fast Fourier transform. |
| | | CO5. Understand multi-rate digital signal processing. |
| | | CO6. Students should be able to describe the advancement of digital signal processing. |
| (REC 051) | Antenna & Wave Propagation | CO1. Illustrate the basic Antenna concepts and parameters, radio communication link characteristics, oscillating dipoles and SNR. |
| | | CO2. Explain the concept of Isotropic and Non-Isotropic point sources, pattern multiplication and Arrays of Antennas. |
| | | CO3. Analyze and compute fields generated by various dipole antennas and their radiation resistances, Radiated and received power. |
| | | CO4. Differentiate between various types of antennas based on their radiation patterns, structural design and characteristic properties and evaluate their performance and applications in practical scenario. |
| | | CO5. Recall the concepts of wave propagation, wave characteristics, structural details of ionosphere, use of different frequencies for different types of communication processes. |
| (REC 052) | Computer Architecture and Organization | CO1. Analyze various design methodologies. |
| | | CO2. Understand CPU organization fundamentals. |
| | | CO3. Apply various types of arithmetic, required for data path design. |
| | | CO4. Design various control units. |
| | | CO5. Understand memory and system organization. |
| | | CO6. Design and organize the architecture of processor-based designs through continuous evolution. |
| (RAS-502) | Sociology | CO1. Comprehend the basic scope of industrial Sociology, Social organization, scientific management and human relation in industry. |
| | | CO2. Explain the early industrialization, Types of productive systems, characteristics, causes, consequences of Industrialization as well as obstacles to limit industrialization. |
| | | CO3. Evaluate extent of industrialization in India, various industrial policies, and analyze technological and scientific developments. |
| | | CO4. Discuss diverse and contemporary issues related to industries such as grievance handling strikes and lock outs, Mechanism for handling disputes such as worker participation, work committee, collective bargaining. |
| | | CO5. Remember Industrial agreements, code of discipline, labour court and industrial tribunals. |
| | | CO6. Visualize the various Models of industrialization, environmental and Cultural issues, consumer society and sociological concerns related with industrialization. |
| (RAS-501) | Managerial | CO1. Understand the basis of theory of economics with various techniques and applications of Managerial Economics. |

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| | Economics | CO2. Apply the concept of supply and forecasting using its various performance parameters to estimate the cost. |
| | | CO3.Remember economic analysis using estimation of cost/revenue in the decision making process to justify or reject alternatives projects. |
| | | CO4. Analyze the several types of Market Structure and its multiple features of price determination. |
| | | CO5.Understand the nature and characteristics of Indian economy for business context |
| | | CO6. Understand the basic concept behind Inflation, types and causes and phases of business cycle for taking investment decision to boosting economy |
| (REC-551) | Integrated Circuit Lab | CO1.Implement various op-amp based Integrated circuits. |
| | | CO2. Analyze the design of various IC Circuits like filters, amplifiers and converters |
| | | CO3. Implement integrated circuits using EDA tools. |
| | | CO4. Design circuits using IC 555. |
| | | CO5. Evaluate various input-output parameters and compare various circuit implementations |
| (REC-552) | Communicatio n System Lab-I | CO1. Describe concept of Amplitude modulation and Demodulation along with DSB/SSB techniques. |
| | | CO2. Analyze the concept of Frequency modulation and demodulation using PLL 565. |
| | | CO3. Examine Sensitivity, Selectivity and Fidelity characteristics of Superheterodyne receivers. |
| | | CO4. Demonstrate the operation of different types of pulse modulation and demodulation techniques such as PAM, PWM, PPM, Delta Modulation etc. |
| | | CO5. Illustrate the need for modulation and design linear and nonlinear modulato rs, demodulators and FM Radio Receivers. |
| (REC-553) | Digital Signal Processing Lab | CO1. Study DSP processor, MATLAB and code composer studio |
| | | CO2. Program for generation of basic signals, DFT, IDFT and FFT |
| | | CO3. Verify Balckman and Hamming window technique |
| | | CO4.Verify circular and linear convolution by code composer studio |
| | | CO5. Implement Butterworth analog low pass filter, tone generation and floating-point arithmetic. |
| (REC-554) | CAD of Electronics Lab-I | CO1. Design the CMOS based circuits for low power circuits. |
| | | CO2. Explain BJT and CMOS technology. |
| | | CO3. Analyze the performance of BJT and CMOS inverters characteristics. |
| | | CO4. Acquire knowledge of various MOS based amplifier circuits its analysis. |
| | | CO5. Model and analyze various circuits with the help of modern CAD tools. |

| DEPARTMENT:BIO-TECHNOLOGY | | |
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| **Session :2019-2020** | | |
| **Code** | **Course Name** | **Course Outcome** |
| **B.Tech-BT III Semester** | | |
| KOE-035 | Basic Data Structure and Algorithms | CO1. The student should be able to understand and analyze the time and space complexity of an algorithm |
| | | CO2. The student should be able to understand and implement fundamental algorithms (including sorting algorithms, graph algorithms, and dynamic programming). |
| | | CO3. The student should be able to discuss various algorithm design techniques for developing algorithms. |
| | | CO4. The student should be able to discuss various searching, sorting and graph traversal algorithms. |
| | | CO5. The student should be able to understand operation on Queue, Priority Queue, D-Queue. |
| KAS-301 | Technical Communication | CO1. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| | | CO2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions |
| | | CO3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | CO4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence |
| | | CO5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics |
| KBT-351 | Techniques in Biotechnology Lab | CO1. The student should be able to understand precesion , accuracy and spectroscopy |
| | | CO2. The student should be able to understand and use microscopy and paper chromatography |
| | | CO3. The student should be able to understand and perform SDS-PAGE and agarose gel electrophoresis |
| | | CO4. The student should be able to understand membrane sepration techniques |
| | | CO5. The student should be able to liquid-liquid sepration experiments |

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| | | CO6. The student should be able to column chmrotagraphy |
| KBT-301 | Techniques in Biotechnology | CO1. The student should be able to describe Light microscopy-its types, TEM, SEM and Atomic force microscopy. |
| | | CO2. The student should be able to analyze the Principle, Operations and types of Chromatography. |
| | | CO3. The student should be able to explain the theory of Electrophoresis, its types and Western Blotting. |
| | | CO4. The student should be able to elucidate the General principles of electromagnetic radiation, Types of spectra , UV-VIS spectrophotometer, Atomic absorption and Atomic emission spectroscopy and X-Ray spectroscopy. |
| | | CO5. The student should be able to describe NMR, ESR, Circular dichroism (CD) principles, Basics of IR and X-Ray diffraction analysis. |
| | | CO6. The student should be able to analyze the bioprinting and biosensor processes |
| KBT-352 | Microbiology & Immunology Lab | CO1. Students should be able to apply the principle and application of the equipment and tools used in microbiology laboratory. |
| | | CO2. Students should be able to perform various pure culture techniques used for the isolation and purification of microorganisms. |
| | | CO3. Students should be able to perform the simple and differential staining for the microscopic identification of microorganism. |
| | | CO4. Students should be able to identify the type of blood group using the standard kit method. |
| | | CO5. Students will be able to apply the principles and perform the procedure of immunodiffusion. |
| | | CO6. Students should be able to measure the concentration of antigen or antibody in serum sample by using immunological assays. |
| KBT-302 | Microbiology & Immunology | CO1. Student should be able to describe the process of isolation, identification of microorganisms and their preservation, physical and chemical control methods for sterilization. |
| | | CO2. Student should be able to explain about the bacterial genetic recombination, bacterial photosynthesis and nitrogen fixation, Virus structure and its reproduction cycle |
| | | CO3. Student should be able to describe the immunity and its types, major cells and organs of the immune system, different types of antigens & antibodies, production of monoclonal antibody. |

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| | | CO4. Student should be able to describe the structure and function of MHC molecules and its role in process of antigen presentation, cytokines and complement system, ELISA, RIA, Western blotting. |
| | | CO5. Student should be able to describe the role of microorganism in waste water management, bioremediation and in causing various pathogenic diseases. |
| | | CO6. Student should be able to summarize the mechanism of immunity against the infectious diseases, vaccines, hypersensitivity and immunotherapy. |
| KBT-353 | Biochemistry Lab | CO1. The student should be able to perform quantitative and qualitative analysis of biomolecules. |
| | | CO2.The student should be able to do the calculations associated with practical work like dilutions, unit conversions and solutions of different concentrations. |
| | | CO3. The student should be able to perform the separation of solutes using chromatographic techniques. |
| | | CO4. The student should be able to perform molecular analysis of DNA using agarose gel electrophoresis. |
| | | CO5. The student should be able to design, execute and analyse a biochemistry experiment and make its report. |
| | | CO6. The student should be able to perform experiment using safe and good laboratory processes individually or as a team. |
| KBT-303 | Biochemistry | CO1. The student should be able to relate the importance of water in biological system and to describe the role of biological buffer. |
| | | CO2. The student should be able to describe structure & function of major biomolecules found in cells, that make them indispensible for life. |
| | | CO3. The student should be able to explain energy generation through carbohydrate metabolism and related diseases. |
| | | CO4. The student should be able to describe energy generation through lipid metabolism and related diseases. |
| | | CO5. The student should be able to explain the metabolic pathways of amino acids and proteins and related diseases. |
| | | CO6. The student should be able to discuss the role of nucleic acids in various metabolic activities and disorders. |
| **B.Tech-BT IV Semester** | | |
| KBT-401 | Bioprocess Engineering-I | CO1. The student should be able to calculate the rate of heat transfer in conduction, convection and radiation through different surfaces |
| | | CO2. The student should be able to design and analyze the performance of heat exchangers and evaporators. |

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| | | CO3. The student should be able to identify and analyse the mechanism of diffusional mass transfer. |
| | | CO4. The student should be able to understand the basic fluid properties, flow forces, and flow regime |
| | | CO5. The student should be able to understand the basic concepts of manometer, venturimeter, orificemeter |
| | | CO6. The student should be able to undersatnd the working of reciprocal and cetrifugal pumps |
| KBT-451 | Bioprocess Engineering-I Lab | CO1. The student should be able to perform an experiment to calculate the thermal conductivity metal rod |
| | | CO2. The student should be able to perform an experiment of heat exchangers to understand the concept of heat transfer |
| | | CO3. The student should be able to perform an experiment dealing thermal conductivity of insulating powder |
| | | CO4. The student should be able to perform an experiment using venturimeter and manometer to understand the pressure drop concept in pipes |
| | | CO5. The student should be able to understand an experimental approach for the calculation of surface tension of fluids |
| | | CO6. The student should be able to undersatnd velosity profile of fluid through Pitot Tube |
| KBT-402 | Genetics & Molecular Biology | CO1. The student should be able to discuss the basics of heredity and variation. |
| | | CO2. The student should be able to illustrate the organization of genome. |
| | | CO3. The student should be able to describe the linkage, recombination and two-point and three-point test crosses. |
| | | CO4. The student should be able to analyze the mechanism of DNA replication, transcription and translation processes taking place in eukaryotes and prokaryotes. |
| | | CO5. The student should be able to distinguish the various checkpoints in cell cycle which prevent cancer and understand its regulation along with apoptosis. |
| | | CO6. The student should be able to illustrate the Gene cloning and r-DNA technology alongwith its industrial applications. |
| KBT-452 | Genetics & Molecular Biology Lab | CO1. The student should be able to understand basic genetics principles and real life implementation |

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| | | CO2. The student should be able to comprehend DNA and its components |
| | | CO3. The student should be able to coorelate with genomic composition in an organism |
| | | CO4. The student should be able to undestand isolation of DNA and its visualization |
| | | CO5. The student should be able to perform and manage DNA experiments |
| | | CO6. The student should be able to design experiments related to DNA |
| KBT-403 | Enzyme Engineering | CO1. The student should be able to describe structure, function, activity and kinetics of enzymes. |
| | | CO2. The student should be able to describe the various factors and modes of enzyme inhibition and regulation and incorporate them in industrial applications. |
| | | CO3. The student should be able to summarize processes involved in extraction and purification of enzymes and develop enzyme assays for research and industry. |
| | | CO4. The student should be able to describe and apply enzymes immobilization techniques. |
| | | CO5. The student should be able to discuss and assemble biosensors important to industries, healthcare and environment. |
| | | CO6. The student should be able to discuss and design different types of bioreactors using immobilized enzymes. |
| KBT-453 | Enzyme Engineering Lab | CO1. The student should be able to extract enzyme from plant and microbial source |
| | | CO2. The student should be able to perform partial purification methods and quantification of enzyme |
| | | CO3. The student should be able to demonstrate effect of temperature on enzyme activity |
| | | CO4. The student should be able to demonstrate effect of pH and time on enzyme activity |
| | | CO5. The student should be able to demonstrate effect of substrate and enzyme concentration on enzyme activity |
| | | CO6. The student should be able to describe methods of immobilization of enzymes |
| KAS-404 | Elementary Mathematics-III | CO1. The student should be able to understand the concept of Fourier Transform and Z- Transform to apply for solving with the help of transform problems. |

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| | | CO2. The student should be able to remember the concept of Probability to evaluate Probability distribution. |
| | | CO3. The student should be able to analyze the concept of numerical techniques to evaluate the zero's of the function interpolation |
| | | CO4. The student should be able to apply the concept of hypothesis to evaluate various hypothesis testing. |
| | | CO5. The student should be able to remember the concept of design and statistical quality control to create control charts. |
| KVE-401 | Universal Human Values | CO1. Student should be able to understand basic human aspirations, right understanding, happiness and prosperity and hormony etc. |
| | | CO2. Students should be able to understand basic guidelines, content and process for value education, co-existence nad hormony between self and body |
| | | CO3. Students should be able to understand harmony in the Family and Society- Harmony in Human Human Relationship. |
| | | CO4. Student should be able to develop understanding harmony in the Nature and Existence. |
| | | CO5. Student should be able to understand holistic perception of harmony at all levels of existence. |
| | | CO6. Students should be able to understand Implications of the holistic understanding of harmony on Professional Ethics |
| **B.Tech-BT V Semester** | | |
| RBT-502 | Fermentation Biotechnology | CO1. The student should be able to evaluate the various concepts and process technologies of fermentation. |
| | | CO2. The student should be able to use different raw materials and industrial waste for microorganism in industrial scale production. |
| | | CO3. The student should be able to evaluate the need of regulatory system in the microorganism. |
| | | CO4. The student should be able to apply various strain construction and improvement technologies on microorganism. |
| | | CO5. The student should be able to apply various concepts of the scale up and scale down criteria of fermentation process. |

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| | | CO6. The student should be able to use technologies effectively for the production of primary and secondary metabolites |
| RBT-552 | Fermentation Biotechnology Lab | CO1. The student should be able to use various techniques for isolation and identification of different microorganisms from fermenting fruits, cereals and milk. |
| | | CO2. The student should be able to apply production technology for enzymes production resulting from submerged and solid state fermentation process. |
| | | CO3. The student should be able to apply production technology for alcohol production using different raw materials. |
| | | CO4. The student should be able to use techniques for production of secondary metabolites e.g. penicillin. |
| | | CO5. The student should be able to apply various concept for upstream and downstream processing for the production of Citric acid. |
| | | CO6. The student should be able to apply the various concepts for developing computational Design of some Fermentative Processes. |
| RBT-503 | Bioinformatics-I | CO1. The student should be able to interpret the concept of sequence similarity, sequence pattern, profiles and domains |
| | | CO2. The student should be able to collect sequence and structure data, store, retrieve and analyse data from the primary and secondary bioinformatics databases |
| | | CO3. The student should be able to interpret and apply the algorithm behind sequence alignment and scoring matrics |
| | | CO4. The student should be able to classify the organisms based on their sequences and find phylogeny |
| | | CO5. The student should be able to predict and visualize the structure of protein using various available prediction tools |
| | | CO6. The student should be able to apply the basic knowledge of bioinformatics in drug discovery |
| RBT-554 | Nano Biotechnology Lab | CO1. Students should be able to explain and demonstrate the basics of nanoscience, nanobiotechnology and its techniques. |
| | | CO2. Students should be able to synthesise of metal nanoparticles by chemical process. |
| | | CO3. Students should be able to perform the biological synthesis of metal nanoparticles. |
| | | CO4. Students should be able to estimate the toxicity, antibacterial property of metal nanoparticles. |
| | | CO5. Students should be able to synthesize the carbon nanotubes from carbon source |

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| | | CO6. Students should be able explain the nano characterization tools and techniques |
| RBT-052 | Nano Biotechnology | CO1. The student should be able to Explain and demonstrate the basics of nanoscience, nanobiotechnology and its techniques. |
| | | CO2. The student should be able to Understand the synthesise of metal nanoparticles by chemical process. |
| | | CO3. The student should be able to Perform the biological synthesis of metal nanoparticles. |
| | | CO4. The student should be able to Estimate the toxicity, antibacterial property of metal nanoparticles. |
| | | CO5. The student should be able to Understand the synthesize the carbon nanotubes from carbon source |
| | | CO6. The student should be able to Explain the nano characterization tools and techniques |
| RBT-501 | Genetic Engineering | CO1. The student should be able to appraise the appropriate use of host and vector for gene cloning |
| | | CO2. The student should be able to comprehend process of recombinant protein expression from chimeric vector |
| | | CO3. The student should be able to identify appropriate method for DNA delivery into the host |
| | | CO4. The student should be able to analyze use of gene library for screening of desired gene sequence/protein |
| | | CO5. The student should be able to grasp cloning process of whole organism and its application |
| | | CO6. The student should be able to appriase ehtical issues related to gene/organism cloning |
| RBT054 | Metabolic Engineering | CO1. The student should be able to appreciate and analyze various metabolic processes in a cell and their regulation |
| | | CO2. The student should be able to appraise role of intermediates in metabolic processes and interpret energy molecules in cell survival and understand electron exchange processes in a cell for energy generation |
| | | CO3. The student should be able to assemble and appreciate molecules/intermediates connecting various metabolic processes in a cell |
| | | CO4. The student should be able to recognize and associate metabolic pathways with various disease states |
| | | CO5. The student should be able to illustrate industrial methods used for production of metabolites (primary/secondary metabolites) within cell/organisms |

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| | | CO6. The student should eb able to use various DNA or Protein manipulating techniques for producing desired or better metablites which are important for society |
| RBT-551 | Genetic Engineering Lab | CO1. The student should be able to develop ability to isolate DNA from various living sources |
| | | CO2. The student should be able to perform DNA/protein visualization experiments |
| | | CO3. The student should be able to analyze and perform restriction mapping from any DNA sample |
| | | CO4. The student should be able to independently handle simple DNA related experiments |
| | | CO5. The student should be able to resolve DNA/RNA related experimental issues, analyze results and communicate his analysis |
| | | CO6. The student should be able to work in team and collate efforts of each member into experimental observation |
| RAS-502 | Sociology | CO1. The student should be able to analyze basic significance of industrial sociology |
| | | CO2. The student should be able to analyze factors which maintains industrial peace |
| | | CO3. The student should be able to evaluate the significance of various schemes for labour |
| | | CO4. The student should be able to review various primitive working system |
| | | CO5. The student should be able to describe industrial policy resolution in development of industries |
| | | CO6. The student should be able to review the development of industrial sociology |
| RAS-501 | Managerial Economics | CO1. The student should be able to understand the role of economics and management in engineering and decision making. |
| | | CO2. The student should be familiarized with various functions of marketing and market research. |
| | | CO3. The student should be able to apply law of demand and supply in solving problems. |
| | | CO4. The student should be able to understand and analyze competition and market structures |
| | | CO5. The student should be able to perceive the concept of price determination |

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| | | CO6. The student should be able to perceive the concepts of demand forecasting and various cost estimation |
| RBT-553 | Bioinformatics-I Lab | CO1. The student should be able to retrieve the sequences and structure of proteins and nucleotides from biological databases |
| | | CO2. The student should be able to predict the secondary structure of proteins |
| | | CO3. The student should be able to predict the secondary structure of proteins |
| | | CO4. The student should be able to visualize the macromolecules using various visualization tools |
| | | CO5. The student should be able to perform sequence and structure alignment using online available tools |
| | | CO6. The student should be able to predict the homology model of any protein sequence |
| **B.Tech-BT VI Semester** | | |
| RBT - 601 | Bioprocess Engineering | CO1. The student should be able to work with the most common equipments, materials and design different methods for microbial production processes. |
| | | CO2. The student should be able to apply the knowledge of microbial growth, cultivation and sterilization in different bioprocessing. |
| | | CO3. The student should be able to measure different Stoichiometric coefficients for microbial growth and product formation. |
| | | CO4. The student should be able to design and operate various bioreactors used for the fermentation process. |
| | | CO5. The student should be able to use the knowledge of different types of mass transfer specifically oxygen transport mechanism in bioreactors for the calculation of oxygen demand. |
| | | CO6. The student should be able to plan and execute different strategies for bioprocess control and automation. |
| RBT-651 | Bioprocess Engineering Lab | CO1. The student should be able to analyze the behavior of microorganisms and calculate their growth rate and rate of product formation. |
| | | CO2. The student should be able to analyze the growth pattern of microorganisms when provided with different concentration of nutrients. |
| | | CO3. The student should be able to estimate the effect of various physical, chemical or environmental factors on the growth of microorganisms. |

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| | | CO4. The student should be able to create a sterilized environment and estimate the effect of sterilization on microbial growth. |
| | | CO5. The student should be able to analyze and utilize various processes involved in the production of different bio products. |
| | | CO6. The student should be able to apply various computational approaches for the design of different fermentative processes. |
| RBT-602 | Plant Biotechnology | CO1. Student shall be able to describe historical development in plant tissue culture, laboratoratory organization and basic principle of plant Biotechnology |
| | | CO2. Students shall be able to perfom media preparation and sterilization for tissue culture and role of physical and chemical factors that inflluence the tissue culture practices |
| | | CO3. Students shall be able to understand explant selection, sterilization and other tissue culture techniques. |
| | | CO4. Student shall be able to perfom culturing, subculturing growth measuremant and acclamatization of tissue cultured plants. |
| | | CO5. Student shall be able to illustrate the organogesnesis and micropropagation using various explant sourse |
| | | CO6. Students shall be able to describe application of plant biotechnology for transgenic production, industrial application and cryopresevation |
| RBT-652 | Plant Biotechnology Lab | CO1. The student should be able to apply knowledge and working of different instrument and laboratory organization of plant biotechnology experiments |
| | | CO2. The student should be able to perform media preparation and sterilization techniques for plant tissue culture practices. |
| | | CO3. The student should be able to perform explant selection, sterilization and stock preparation. |
| | | CO4. The student should be able to perform culturing, subculturing and effect of physical and chemical factors sffecting growth of tissues |
| | | CO5. The student should be able to isolate some proteins from plant sources. |
| | | CO6. The student should be able to perform extraction of DNA/RNA from plants and its estimation |
| RBT-653 | Bioinformatics- II Lab | CO1. Students should be able to use the primary bioinformatics databases and input sequences. |
| | | CO2. Students should be able to predict the function of proteins from their sequence and structure. |

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| | | CO3. Students should be able to classify the species using phylogenetic analysis tools and find the evolutionary relationship. |
| | | CO4. Students should be able to evaluate various tools and software available online for predicting protein function, ORF, Sequence analysis. |
| | | CO5. Students should be able to construct primers for the given DNA sequence and restriction maps for various vectors used in genetic engineering. |
| | | CO6. Students should be able to generate 2D QSAR model of legend descriptor data using web based tools. |
| RBT-603 | Bioinformatics- II | CO1. The students should be able to analyze and identify genes, ORFs in DNA sequences, compare sequences and analyze microarray data. |
| | | CO2. Students should be able to apply various machine learning algorithms to solve biological problems related to the knowledge of protein structures and function. |
| | | CO3. Students should be able to apply the structure based drug design tools for specific drug targets and compare various docking software. |
| | | CO4. Students should be able to predict RNA structure based on self-complementary regions, minimum free energy methods, sequence co-variance method and other methods. |
| | | CO5. Students should be able to use computational techniques to a variety of problems in the field of molecular modeling and identify interactions between ligands and their host molecules, especially proteins having their 3D structures. |
| | | CO6. Students should be able to apply the use of various simulation techniques used in biotechnology. |
| RBT-063 | Food Biotechnology | CO1. The student should be able to demonstrate new and unknown facts and developments in the field of food science and incorporate them into and thereby expand upon already existing knowledge. |
| | | CO2. The student should be able to elaborate the importance of microorganisms in foods, food spoilage and preservation and apply this knowledge in industrial application of food biotechnology. |
| | | CO3. The student should be able to describe the principles and current practices of processing techniques and the effects of processing parameters on product quality. |
| | | CO4. The student should be able to identify the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods. |

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| | | CO5. The student should be able to apply microbiological and molecular biological techniques in food testing. |
| | | CO6. The student should be able to explain and use the principles that make a food product safe for consumption. |
| RBT-654 | Food Biotechnology Lab | CO1. Students should be able to use various techniques for isolation and characterization of food fermenting organism from different sources. |
| | | CO2. Students should be able to apply different technology for estimation of different acids and mycotoxins in different samples. |
| | | CO3. Students should be able to use microscopic examination of Food/Milk by breed method. |
| | | CO4. Students should be able to use techniques for quality characterization of pasteurized milk and to judge efficiency of pasteurization of milk by Phosphatase test. |
| | | CO5. Students should be able to estimatimate the lactose from milk and detect microbial count in Milk by SPC method. |
| | | CO6. Students should be able to apply to determine the Minimum Inhibitory Concentration (MIC) of Antibiotic. |
| RBT-061 | Animal Biotechnology | CO1. The student should be able to visualize the basics of animal cell culture technology with reference to the physicochemical properties. |
| | | CO2. The student should be able to analyze the strategies for over-production and processing of chosen proteins as well as the characterization and maintenance of cell line. |
| | | CO3. The student should be able to enumerate the applications of animal cell culture for in vitro testing of drugs and toxicity of environmental pollutants. |
| | | CO4. The student should be able to enlist and describe the cell culture products. |
| | | CO5. The student should be able to classify the cell culture reactors and review the scale-up in monolayer and suspension cultures. |
| | | CO6. The student should be able to illustrate the processes of in-vitro fertilization, embryo transfer and biotechnology in fertility control. |
| RUC-601 | Cyber Security | CO1. The student should be able to apply the basic knowledge of information systems in their design and development. |
| | | CO2. The student should be able to analyse different application securities & security threats related to information systems. |

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| | | CO3. The student should be able to analyse and solve different problems associated with e-commerce and e-transections. |
| | | CO4. The student should be able to design methods for developing secure information systems. |
| | | CO5. The student should be able to design and apply different security policies & information security standards to safeguard IT assets. |
| | | Students should be able toThe student should be able to analyse various IPR related issues and to apply the knowledge of IT under defined cyber laws. |
| RAS-601 | Industrial Management | CO1. Students should be able to describe different business efficiency techniques |
| | | CO2. Students should be able to tell how management is important for industries |
| | | CO3. Student should be able to recognize the significance of quality in industrial processes and products |
| | | CO4. Student should be able to explain relation between different factors necessary for inventory control |
| | | CO5. Development of ability to estimate industrial productivity |
| | | CO6. Students should be able to tell how diferent industrial charts and diagram are important |
| **B.Tech-BT VII Semester** | | |
| ROE-074 | Understanding the human being Comprehensively Human Aspiration audits fulfilment | CO1. The student should be able to understand clarity about human aspirations, goal, activities and purpose of life. |
| | | CO2. The student should be able to facilitate the competence to understand the harmony in nature/existence and participation of human being in the nature/existence. |
| | | CO3. The student should be able to develop the understanding of human tradition and its various components. |
| | | CO4. The student should be able to undersyand relationship of every unit of nature and existence |
| | | CO5. The student should be able to understancd professional competence and its importnace in his professional life |
| | | CO6. The student should be able to understand the importance of family, society and nature and living accordingly in hormony |
| RBT-702 | Bioseperation and Down Stream Processing | CO1. Students should be able to evaluate the fundamentals of downstream processing for biochemical product recovery, process economics, process synthesis and simulation. |

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| | | CO2. Students should be able to apply different techniques used in cell disruption and removal of insolubles in DSP. |
| | | CO3. Students should be able to use different techniques for product isolation or recovery. |
| | | CO4. Students should be able to understand the principles, working and applications of different purification techniques used in DSP. |
| | | CO5. Students should be able to use different product polissing techniques like dying and crystallization. |
| | | CO6. Students should be able to apply different techniques for the DSP of some primary and secondary products. |
| RBT-071 | Genomics and Proteomics | CO1. The student should be able to recognize and realize various DNA sequencing technologies and recent advances of high throughput genomic sequencing |
| | | CO2. The student should be able to perceive different methods for functional genomic analysis |
| | | CO3. The student should be able to visualize through examples about genomics technologies used to improve our understanding of biological systems |
| | | CO4. The student should be able to use classical genetic approaches to understanding protein structure and function with recent proteomic approaches |
| | | CO5. The student should be able to implement proteomic approaches and techniques used to investigate protein structure and function |
| | | CO6. The student should be able to analyze specific proteomics techniques to understand biological systems |
| RBT-072 | Quality Control and Regulatory Affairs | CO1. Students should be able to explain the concepts of GLP,GMP and Good laboratory Pracices |
| | | CO2. Students should be able to explain annual product quality review, parametric release and audits of quality control |
| | | CO3. Students should be able to undersatnd importnace of good documentation practices, RCA, CAPA, OOS, OOT and concept of pharmacovigilance |
| | | CO4. Students should be able to understand Concepts and management of contract manufacturing guidelines, BABE studies & Statistical Quality control |
| | | CO5. Students should be able to understand scope and importance of IPR, Concept of trade mark, copyright and patents |

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| | | CO6. Students should be able explain Quality Strategy for Indian Industry and concept of product registration guidelines |
| RBT-752 | Bioseperation and DSP Lab | CO1. The student should be able to use various techniques for harvesting and disruption of the microbial cells. |
| | | CO2. The student should be able to use different techniques for Product isolation. |
| | | CO3. The student should be able to purification Protein by precipitation and solvent extraction methods. |
| | | CO4. The student should be able to use separate techniques like chromatography & electrophoresis. |
| | | CO5. The student should be able to estimate the protein, DNA and carbohydrates. |
| | | CO6. The student should be able to use various techniques for packaging and labelling of recombinant biopharmaceutical products. |
| RBT-701 | Environmental Biotechnology | CO1. The student should be able to analyze reasons behind various forms of environmental pollutions and provide solutions to minimize or mitigate them. |
| | | CO2. The student should be able to explain the microbial processes and growth requirements underlying the aerobic and anaerobic digestion. |
| | | CO3. The student should be able to discuss the importance of microbial diversity in environmental systems and their exploitation in building waste water treatment systems. |
| | | CO4. The student should be able to describe biotechnological solutions to convert waste into utilizable products. |
| | | CO5. The student should be able to evaluate the potential for biodegradation of organic pollutants, taking microbial and physical/chemical environments, as well as the chemical structure of the compound itself, into consideration |
| | | CO6. The student should be able to discuss the minimal national standards for waste disposal and the social, economic and environmental aspects of waste management. |
| RBT-751 | Environmental Biotechnology Lab | CO1. The student should be able to describe the working of equipments used in environmental biotechnology lab. |
| | | CO2. The student should be able to perform statistical analysis in the water quality testing |
| | | CO3. The student should be able to prepare various solutions and chemical reagents. |
| | | CO4. The student should be able to perform experiment to evaluate various parameters that affect the water quality |

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| | | CO5. The student should be able to apply general chemical techniques to evaluate microbial contamination of water |
| | | CO6. The student should be able to apply general microbiological techniques to evaluate microbial contaminant in water |
| RBT-075 | Biosafety,Bioethics,IPR & Patents | CO1. The student should be able to describe various forms of IPR and method of their registration |
| | | CO2. The student should be able to state Indian Patent Law and International conventions and treaties |
| | | CO3. The student should be able to debate legal, socio-economic and ethical issues of biotechnology |
| | | CO4. The student should be able to apply rules governing manufacture, use/import/export and storage of hazardous microorganisms/ genetically engineered organisms or cells |
| | | CO5. The student should be able to demonstrate biosafety issues and practices in biotechnology |
| | | CO6. The student should be able to develop good lab practices, risk assessment and management |
| **B.Tech-BT VIII Semester** | | |
| RBT-081 | Experimental Biotechnology | CO1. The student should be able to understand the basic concepts of Spectroscopy like UV-Vis, Fluorescence, CD, and IR spectroscopy |
| | | CO2. The student should be able to understand the experimental protocols for the estimation of Protiens and DNA |
| | | CO3. The student should be able to understand the mathematical concepts of buffer and experimental approach of Electrophoresis |
| | | CO4. The student should be able to understand the basics of chromatographic techniques, their principles and oparating procedure |
| | | CO5. The student should be able to understand the basic concepts and experimental approach of immunological assays |
| | | CO6. The student should be able to undersatnd the basic concepts of microscopic techniques and molecular clonning |
| RBT-082 | Tissue Engineering | CO1. The student should be able to explain about tissue organization, cell division, cellular fate processes and its coordination. |
| | | CO2. The student should be able describe the cell matrix interactions and measurement of cell characteristics. |
| | | CO3. The student should be able to tell about the cell and tissue culture, preservation and cell separation. |

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| | | CO4. The student should be able to explain the importance of biomaterials, growth factors in tissue engineering. |
| | | CO5. The student should be able to describe gene therapy and use of bioreactors for tissue engineering. |
| | | CO6. The student should be able to tell the in-vivo cell and tissue engineering case studies of different types of tissues. |
| RBT-086 | Integrated Waste Mahnagement for Smart Cities | CO1. The student should be able to outline sources, types and composition of Municipal solid waste (MSW). |
| | | CO2. The student should be able to explain Swachh Bharat Mission, Smart Cities Program and the issues and legislation related to MSW management |
| | | CO3. The student should be able to describe the appropriate method for solid waste collection, transportation, Segregation and processing. |
| | | CO4. The student should be able to describe the disposal treatments of solid waste and energy generation from it. |
| | | CO5. The student should be able to explain construction and demolition waste sources, types and its management |
| | | CO6. The student should be able to explain E-waste management and its legislation guidelines |
| RBT-087 | Industrial Biotechnology | CO1. The student should be able to evaluate the various concepts of engineering calculation and Data analysis. |
| | | CO2. The student should be able to use different types of reactors and their operation control. |
| | | CO3. The student should be able to apply various information for the designing of a bioreactor. |
| | | CO4. The student should be able to evaluate the various concepts of reactor engineering and kinetics of single and multiple reactor system. |
| | | CO5. The student should be able to use different production technologies for the production of cell mass and some primary metabolites. |
| | | CO6. The student should be able to use different applications of bioconversion like transformation of sterols and non-steroidal compounds. |
| ROE-082 | Entrepreneuraship Development | CO1. The student should be able to identify and analyze the opportunities for entrepreneurship and innovation in various sectors. |
| | | CO2. The student should be able to apply the principles of Project management including the idea generation, project identification, project formulation, project design and network analysis, project report, project appraisal. |

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| | | CO3. The student should be able to evaluate and analyse the financials of a business or enterprise. |
| | | CO4. The student should be able to describe the funding opportunities and other financial alternatives available for business. |
| | | CO5. The student should be able to explain the steps for setting up Small, Medium & Large scale industry. |
| | | CO6. The student should be able to describe the incentives, subsidies and export possibilities available for biotech business. |

| **DEPARTMENT:CIVIL ENGINEERING** | | |
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| **Session:2019-2020** | | |
| **Code** | **Course Name** | **course outcome** |
| 3rd SEMESTER | | |
| KCE351 | Building Planning & Drawing Lab | 1. Get an Introduction to the tools and commands of drafting software. .<br>2. Work in layers, blocks, x-ref, drawing layout and print setup.<br>3. Work on 3D drafting and rendering<br>4. Do the Planning and drafting of elevation and cross section of door and window, Dog legged and open well staircase, Residential building of 1 room set (plan and section) and 3 room residential building with staircase.<br>5. Prepare the details and general arrangement drawing of 4 room duplex house including planning and drafting. |
| KCE352 | Surveying and Geomatics Lab | 1. CO1 Able to measure difference in elevation, length, calculate the area of a land and prepare the map.<br>2. CO2 Gain basic understanding of the principle of chain survey, 8 compass survey and plane table survey.<br>3. CO3 Able to prepare field book for planning and construction of any engineering project.<br>4. CO4 Able to take and analyze field data and prepare detailed topography map |
| KCE302 | Surveying and Geomatics | 1. Describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.<br>2. Calculate, design and layout horizontal and vertical curves.<br>3. Operate a total station and GPS to measure distance, angles, and to calculate differences in |

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| | | elevation. Reduce data for application in a geographic information system.<br>4. Relate and apply principles of photogrammetry for surveying.<br>5. 5. Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems. |
| KCE301 | Engg. Mechanics | 1. Use scalar and vector analytical techniques for analyzing forces in statically determinate structures<br>2. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.<br>3. Apply basic knowledge of mathematics and physics to solve real-world problems.<br>4. Understand basic dynamics concepts – force, momentum, work and energy;<br>5. Understand and be able to apply Newton's laws of motion; |
| KCE303 | Fluid Mechanics | 1. Understand the broad principles of fluid statics, kinematics and dynamics<br>2. Understand definitions of the basic terms used in fluid mechanics<br>3. Understand classifications of fluid flow<br>4. Apply the continuity, momentum and energy principles<br>5. Apply dimensional analysis |
| KCE353 | Fluid Mechanics Lab | 1. Measure the properties of fluids<br>2. Compare the actual discharge with theoretical discharge through pipes and notch and weirs.<br>3. Validate the Bernoulli's theorem and Darcy's law.<br>4. Measure the loss of fluid flow energy in pipe chain.<br>5. Measure the efficiency of turbines on different loads.<br>6. Measure the performance of the pump on different loads. |

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| KAS301 | Technical Communication | 1. Students will be enabled to understand the nature and objective of Technical<br>2. Communication relevant for the work place as Engineers.<br>3. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.<br>4. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.<br>5. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.<br>6. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
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| 4th SEMESTER | | |
| KCE-404 | Hydraulic and hydraulic machine | 1. Apply their knowledge of fluid mechanics in addressing problems in open channels.<br>2. To know the different types of flows and channels.<br>3. Solve problems in uniform, gradually and rapidly varied flows in steady state conditions.<br>4. To understand the performance of turbines and pumps.<br>5. Have knowledge in hydraulic machineries like pumps and turbines |
| KCE453 | Hydraulics & Hydraulic Machine Lab | 1. To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows.<br>2. To explain the standard measurement techniques of fluid mechanics and their applications.<br>3. To illustrate the students with the components and working principles of Pumps.<br>4. To illustrate the students with the components and working principles of of Turbines, Pumps, and other |

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| | | miscellaneous hydraulics machines.<br>5. To analyze the laboratory measurements and to document the results in an appropriate format. |
| KCE-401 | Material testing & construction practices | 1. Identify various building materials and to understand their basic properties.<br>2. Understand the use of non-conventional civil engineering materials.<br>3. Study suitable type of flooring and roofing in the construction process.<br>4. Characterize the concept of plastering, pointing and various other building services.<br>5. Exemplify the various fire protection, sound and thermal insulation techniques, maintenance and repair of buildings. |
| KCE451 | Material Testing Lab | 1. Develop knowledge of material science and behaviour of various building materials used in construction.<br>2. Identify the construction materials required for the assigned work.<br>3. Provide procedural knowledge of the simple testing methods of cement, lime and concrete etc.<br>4. Identify, formulate and solve engineering problems of structural elements subjected to flexure.<br>5. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials. |
| KCE452 | Solid Mechanics Lab | 1. CO1 Analyze and correlate stress, strain |

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| | | and elastic deformation of an engineering material.<br>2. CO2 Predict the engineering property and behavior of material under different loading and support conditions under static loading conditions.<br>3. CO3 Analyze and predict the engineering property and behavior of material under impact loading conditions<br>4. CO4 Analyze and correlate the elastic constants and deformation under flexural loading and torsion. |
| KAS403 | Maths III | 1. The students will learn the idea of Laplace transform of functions and their application<br>2. The students will learn the idea of Fourier transform of functions and their applications<br>3. The students will learn the basic ideas of logic and Group and uses.<br>4. The students will learn the idea s of sets, relation, function and counting techniques.<br>5. The students will learn the idea of lattices, Boolean algebra, Tables and Karnaugh maps. |
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| KCE402 | Introduction to Solid Mechanics | 1. Describe the concepts and principles of stresses and strains<br>2. Analyze solid mechanics problems using classical methods and energy methods<br>3. Analyze structural members subjected to combined stresses<br>4. Calculate the deflections at any point on a beam subjected to a combination of loads<br>5. Understand the behaviour of columns, springs and cylinders against loads. |
| KNC402 | Python Programming | |
| 5th SEMESTER | | |
| RCE501 | Geotechnical Engineering | 1. To provide a coherent development to the students for the courses in sector of Geotechnical Engineering & Soil Improvement Techniques etc.<br>2. To present the foundations of many basic |

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| | | Engineering tools and concepts related to Geotechnical Engineering.<br>3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering<br>4. To involve the application of scientific and technical principles of planning, analysis, design of foundation along with soil improvement techniques.<br>5. The students will gain an experience in the implementation of Geotechnical Engineering on engineering concepts which are applied in field Geotechnical Engineering. |
| RCE551 | Geotechnical Lab | 1. Determine index properties of soils<br>2. Classify soils<br>3. Determine engineering properties of soils<br>4. Apply the concept of MDD and OMC to control compaction in the field.<br>5. Analyze various soil parameters and prepare soil report.<br>6. Apply standard penetration test results for determination of soil characteristic. |
| RCE552 | CAD LAB 1 | 1. Understand computer aided drafting and different coordinate system<br>2. Drawing of Regular shapes using Editor Mode and Exercise on Draw tools and Modify tools<br>3. Drawing of building components like walls, lintels, Doors, and Windows. Using CAD software<br>4. Drawing a plan of Building and dimensioning.<br>5. Developing a 3-D plan from a given 2-D plan<br>6. Developing sections and elevations for given<br>a) Single storied buildings b) multi storied buildings |
| RCE502 | Design of Structure-1 | 1. CO1 Explain the design philosophies of working stress method and limit state method for reinforced concrete structures.<br>2. CO2 Apply the principles and current Codal practices in designing the reinforced concrete elements beam, slab, column, footing and stair using limit state method.<br>3. CO3 Design the reinforced concrete beams as per limit state method.<br>4. CO4 Design the reinforced concrete slabs using limit state method.<br>5. CO5 Design the reinforced concrete column and |

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| | | footing as per limit state method.<br>6. CO6 Follow current practices in detailing the reinforced concrete |
| RCE554 | Concrete Lab | 1. Outline the importance of testing of cement and its properties<br>2. Assess the different properties of aggregate<br>3. Summarize the concept of workability and testing of concrete<br>4. Describe the preparation of green concrete<br>5. Describe the properties of hardened concrete |
| RCE503 | Quantity Estimation and Management | 1.Learn estimation of quantities of buildings by different methods<br>2. Analyse rates as per specifications of works<br>3. Apply network techniques of CPM and PERT<br>4. Understand the practical aspect of construction equipment management including earth moving, hauling and conveying equipment<br>5. Learn the project cost control, budgeting and cost planning<br>6. Understand the present economic studies and method of analysis including discounted cash flow and break even cost analysis |
| RCE052 | Concrete Technology | 1. CO-1 Understand the properties of constituent material of concrete.<br>2. CO-2 Apply admixtures to enhance the properties of concrete.<br>3. CO-3 Evaluate the strength and durability parameters of concrete.<br>4. CO-4 Design the concrete mix for various strengths using difference methods.<br>5. CO-5 Use advanced concrete types in construction industry. |
| RCE553 | Construction Management LAB | 1. Develop the basic knowledge of building planning as per building bye-laws and understand the concept of Floor area ratio.<br>2. Analyze the fire safety issues involved at the time of planning of a building.<br>3. Understand the working principal and effectiveness of different construction equipments.<br>4. Plan and Schedule a civil engineering project by using techniques like CPM, PERT<br>5. Understand the roles and responsibilities of engineer, contractors and owners.<br>6. Learn about the technical details of different types of contracts associated with a civil |

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| | | engineering project as well as steps of tendering and arbitration process. |
| RAS501 | Managerial Economics | 1. Students will be able to understand the roles of managers in firms and also analyze the demand conditions and assess the position of a company.<br>2. Students will be able to understanding the concepts, importance and applications of different forecasting techniques.<br>3. Student will be able to understanding cost function and the difference between short-run and long-run cost function. Student will be able to evaluate the profit of a firm, carry out the break even analysis and employ this tool to make production decision.<br>4. Students will be able to design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.<br>5. Students will be able to understand recession and expansion of economic activity through business cycle. Students will be able to understand the roles of monetary policy and fiscal policy, over time on GDP, Inflation and Interest Rates. |
| RAS502 | Sociology | 1. Students should be able to understand the dynamics of groups at work place<br>2. Student should know the growth of industrialisation in India and its effects on productivity<br>3. Students should be able to understand different industrial policies.<br>4. Student can understand the impact of indiscipline in the organisation and methods to cope up.<br>5. Student Should be able to understand the models of industrialization, Cuftural issues, consumer society and concern |
| CE 6TH SEM | | |
| RCE651 | CAD LAB-2 | 1. Working on Environmental Engineering software for Analysis and Design of water & wastewater treatment and distribution systems<br>2. Working on Transportation Engineering software like MAX ROAD/ |

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| | | Surveying Software.<br>3. Working on GIS software (ARC GIS / ENVI / GEPSY) |
| RCE-601 | Design of Structure-II | 1. CO1 Apply the knowledge of IS code of practice for the design of different steel structural elements<br>2. CO2 Analyze the behavior of riveted, bolted and welded connections and design different types of connections under axial as well as eccentric loadings<br>3. CO3 Design tension and compression members using simple and built-up sections<br>4. CO4 Design slab base and gusseted base for compression members under bi-axial bending<br>5. CO5 Calculate shape factor and plastic moment capacity of different types of flexural members<br>6. CO6 Analyze the behavior of laterally supported and unsupported beams and design those using simple and built-up sections and design of beam-column connections |
| RCE 654 | STRUCTURAL DETAILING LAB | |
| RCE-603 | Transportation Engineering | 1. Understand the role of Transportation Engineering and History of Transportation Development<br>2. Understand the geometric design of Highways<br>3. Understand Traffic Characteristic, analysis factors affecting traffic design and Traffic Signal Design<br>4. Application of different Highway materials and their selection in highway for any specific location<br>5. Apply different highway construction methods for appropriate site conditions |
| RCE-602 | Environmental Engineering | 1. Student will able to discuss about importance of water and its quality analysis.<br>2. Analyze various physic-chemical and biological parameters of water in case of quality requirements.<br>3. At the end of the course student will be able to assess complete water quality assessment for EIA and domestic supplies.<br>4. At the end of the course student will suggest various types of treatment methods required to purify raw water with different contaminants. |
| RCE652 | Environmental Engineering LAB | 1. CO1 Build knowledge about the crystal structure and classification of materials.<br>2. CO2 Understand methods of determining |

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| | | mechanical properties and their suitability for applications.<br>3. CO3 Classify cast irons and study their applications.<br>4. CO4 Interpret the phase diagrams of materials.<br>5. CO5 Select suitable heat-treatment process to achieve desired properties of metals and alloys.<br>6. CO6 Appraise the applications of advanced materials technology in their daily life |
| RCE061 | FOUNDATION ENGG. | 1. CO-1 Understand various methods of Soil Exploration and its importance.<br>2. CO-2 Analyze bearing capacity and settlement of soil for shallow foundation.<br>3. CO-3 Design the various types of shallow foundation and understand the basics of deep foundation.<br>4. CO-4 Understand the characteristics of well foundations and retaining wall.<br>5. CO-5 Understand the concept of soil reinforcement. |
| RCE653 | Transportation Engineering Lab | 1. To Determine the Crushing Value, Impact Value, Flakiness Index and Elongation Index, Los Angeles Abrasion Value and Stripping Value of Coarse Aggregates.<br>2. To determine the penetration Value, Softening Point, Ductility Value of Bitumen.<br>3. To determine the Softening Point of Bituminous material.<br>4. To determine the Ductility Value of Bituminous material.<br>5. To determine the Flash and Fire Point of Bituminous material.<br>6. To determine the Stripping Value of Bituminous material. |
| RAS601 | INDUSTRIAL MANAGEMENT | 1. Students will be able to understand the importance of management in industry along with the concept of productivity and various production systems.<br>2. Students will come across the functions of management and popular principles of management which have been developed at various point of times.<br>3. Students will come to know the right way of doing a particular job through techniques of work study and method study along with tools of inventory control.<br>4. Students will be able to know about quality, various approaches of quality control along |

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| | | with the concept of total quality management.<br>5. Students will apply project network techniques like CPM & PERT. |
| RUC601 | CYBER SECURITY | CO1: Understand the principle concepts, development and security of Information System.<br>CO2: Gain familiarity with various security threats, security technology, E-commerce and cryptography.<br>CO3: Demonstrate the knowledge of Application Development Security and Security Architecture and design issues.<br>CO4: Develop an understanding of security policies (such as authentication, integrity and confidentiality).<br>CO5: Learn about ISO, IT Act and Cyber Laws in India |
| 7th SEMESTER | | |
| RCE702 | Water Resourse Engineering | 1. Various components of hydrologic cycle that affect the movement of water in the earth.<br>2. Various Stream flow measurements technique<br>3. the basic requirements of irrigation and various irrigation techniques, requirements of the crops<br>4. Distribution systems for canal irrigation and the basics of design of unlined and lined irrigation canals design<br>5. Basic components of river Training works. |
| RCE074 | River Engg. | 1. CO-1 Explain river morphology and its classification.<br>2. CO-2 Explain hydraulic geometry and behavior of river.<br>3. CO-3 Explain socio-cultural influences and ethics of stream restorations.<br>4. CO-4 Analyze flow and sediment transport in rivers and channels.<br>5. CO-5 Design guide band, embankments and flood protection systems. |
| RCE701 | Design of Structure-III | 1. Learn the design philosophies of steel structures<br>2. Design riveted, bolted, pinned and welded connections for steel structures.<br>3. Design of tension steel members.<br>4. Design of compression steel members<br>5. Design of various types of steel beams and plate girders. |

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| RCE751 | Non Destructive Testing Laboratory | 1. Be able to List and define different defects that occur in welding shown through Non-Destructive Examination/Destructive Testing.<br>2. Be able to identify the types of equipment used for each Non-Destructive and Destructive Examination.<br>3. Be able to explain the purpose of the Equipment, Application, and standard techniques required to perform major non-destructive and destructive examinations of welds.<br>4. Be able to go to specific Code, Standard, or Specification related to each testing method.<br>5. Have the knowledge and essential skills to identify strengths and weaknesses in materials used in fabrication |
| CE 8TH SEM | | |
| RCE084 | Solid Waste Management | 1. To characterize the waste & apply the knowledge of municipal solid waste management for handling them.<br>2. To apply the knowledge of mathematics, science & engineering for developing waste collection systems.<br>3. To design composting systems and operate aerobic & anaerobic composting systems.<br>4. Develop an awareness of utilisation of waste materials as novel innovaztive materilas for use in concrete.<br>5. To manage construction & operation of landfill facilities , energy recovery systems. |
| RCE-085 | Engineering Hydrology and Groundwater Improvement | 1. Understand the basic concept of hydrological cycle and its various phases.<br>2. Understand the concept of runoff and apply the knowledge to construct the hydrograph.<br>3. Apply the various methods to assess the flood.<br>4. Assess the quality of various forms of water and their aquifer properties.<br>5. Understand the well hydraulics and apply ground water modelling techniques |
| ROE082 | Open Elective Course -2 (Entrepreneurship Development) | 1. Understanding the human being Comprehensively Human Aspiration audits fulfilment.<br>2. Student will be able to appreciate the essential complementarily between 'values' and 'skills' to ensure sustained happiness and prosperity.<br>3. Student will be able to develop a holistic perspective towards 'life' and 'profession' as well as towards happiness and prosperity based on correct understading of the Human reality and the rest of the |

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| | | Existence.<br>4. Student will be able to relate plausible implications of holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior in family as well as in society and mutually enriching interaction with Nature.<br>5. Student will be able to understand Implications of the holistic understanding of harmony on Professional Ethics.<br>6. Student will be able to understand the need of Value Education as well as its learning process. |

| DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGUNEERING | | |
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| SESSION:2019-2020 | | |
| CODE | COURSE NAME | COURSE OUTCOMES |
| B.TECH 3RD SEMESTER | | |
| KAS302 | MATHEMATICS-IV | **CO1:** The idea of partial differentiation and types of partial differential equations<br>**CO2:** The idea of classification of second partial differential equations, wave , heat equation and transmission lines<br>**CO3:** The basic ideas of statistics including measures of central tendency, correlation, regression and their properties.<br>**CO4:** The idea s of probability and random variables and various discrete and continuous probability distributions and their properties.<br>**CO5:** The statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties. |
| KAS301 | Technical Communication | **CO1:** Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers.<br>**CO2:** Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions.<br>**CO3:** Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience.<br>**CO4:** Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence.<br>**CO5:** It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
| KEE301 | Electromagnetic Field | **CO1:** Apply vector calculus to understand the behaviour of |

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| | Theory | static electric fields in standard configurations.<br>**CO2:** Apply vector calculus to understand the behaviour of static magnetic fields in standard configurations.<br>**CO3:** Describe and analyze electromagnetic wave propagation in free-space.<br>**CO4:** Describe and analyze transmission lines.<br>**CO5:** Work in a small team using a cooperative learning rule.<br>**CO6:** Communicate electromagnetic concepts both orally and in writing. |
| KEE302 | ELECTRICAL MEASUREMENTS & INSTRUMENTATION | **CO1:** Evaluate errors in measurement as well as identify and use different types of instruments for the measurement of voltage, current, power and energy.<br>**CO2:** Display the knowledge of measurement of electrical quantities resistance, inductance and capacitance with the help of bridges.<br>**CO3:** Demonstrate the working of instrument transformers as well as calculate the errors in current and potential transformers.<br>**CO4:** Manifest the working of electronic instruments like voltmeter, multi-meter, frequency meter and CRO.<br>**CO5:** Display the knowledge of transducers, their classifications and their applications for the measurement of physical quantities like motion, force, pressure, temperature, flow and liquid level. |
| KEE303 | BASIC SIGNALS AND SYSTEMS | **CO1:** Represent the various types of signals & systems and can perform mathematical operations on them.<br>**CO2:** Analyze the response of LTI system to Fourier series and Fourier transform and to evaluate their applications to network analysis.<br>**CO3:** Analyze the properties of continuous time signals and system using Laplace transform and determine the response of linear system to known inputs.<br>**CO4:** Implement the concepts of Z transform to solve complex engineering problems using difference equations.<br>**CO5:** Develop and analyze the concept of state-space models for SISO & MIMO system. |
| KNC301 | COMPUTER SYSTEM SECURITY | **CO1:** To discover software bugs that pose cyber security threats and to explain how to fix the bugs to mitigate such threats<br>**CO2:** To discover cyber attack scenarios to web browsers and web servers and to explain how to mitigate such threats<br>**CO3:** To discover and explain mobile software bugs posing cyber security threats explain and recreate exploits, and to explain mitigation techniques.<br>**CO4:** To articulate the urgent need for cyber security in |

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| | | critical computer systems, networks, and world wide web, and to explain various threat scenarios<br>**CO5:** To articulate the well known cyber attack incidents, explain the attack scenarios, and explain mitigation techniques. |
| KEE351 | ANALOG ELECTRONICS LAB | **CO1:** Understand the characteristics and applications of the Semiconductor devices.<br>**CO2:** Draw the characteristics of BJT, FET and MOSFET.<br>**CO3:** Understand the parameters of Operational Amplifier and instrumentation Amplifier with their applications.<br>**CO4:** Understand the V-I characteristics of Power devices like SCR, TRIAC. |
| KEE352 | ELECTRICAL MEASUREMENTS AND INSTRUMENTATION LAB | **CO1:** Understand the importance of calibration of measuring instruments.<br>**CO2:** Demonstrate the construction and working of different measuring instruments.<br>**CO3:** Demonstrate the construction and working of different AC and DC bridges, along with their applications.<br>**CO4:** Ability to measure electrical engineering parameters like voltage, current, power & phase difference in industry as well as in power generation, transmission and distribution sectors. |
| KEE353 | ELECTRICAL WORKSHOP | **CO1:** Perform various types of Electrical connections.<br>**CO2:** Develop small circuits on PCB<br>**CO3:** Differentiate between various electrical wires, cables and accessories.<br>**CO4:** Demonstrate the layout of electrical substation & various safety measures. |
| B.TECH 4$^{TH}$ SEMESTER | | |
| KOE048 | Electronics Engineering | **CO1:** Understand the concept of PN junction and special purpose diodes.<br>**CO2:** Study the application of conventional diode and semiconductor diode.<br>**CO3**: Analyse the I-V characteristics of BJT and FET.<br>**CO4:** Analyze the of Op-Amp, amplifiers, integrator, and differentiator.<br>**CO5:** Understand the concept of digital storage oscilloscope and compare of DSO with analog Oscilloscope. |
| KVE401 | Universal Human Values and Professional Ethics | **CO1:** Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society |

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| | | **CO2:** Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body.<br>**CO3:** Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society<br>**CO4:** Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature.<br>**CO5:** Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |
| KEE401 | Digital Electronics | **CO1:** To familiarize students with the understanding of number representation and conversion between different representation in digital electronic circuits.<br>**CO2:** To familiarize students with the process to analyze logic and implement logical operations using combinational logic circuits.<br>**CO3:** To understand concepts of sequential circuits and to analyze sequential systems in terms of state machines.<br>**CO4:** To familiarize students with the Design procedure of Synchronous & Asynchronous Sequential Circuits.<br>**CO5:** To understand characteristics of memory and their classification.<br>**CO6:** To understand concept of Programmable Devices, PLA, PAL, CPLD and FPGA. |
| KEE402 | Electrical Machines-I | **CO1:** Analyze the various principles & concepts involved in Electromechanical Energy conversion.<br>**CO2:** Demonstrate the constructional details of DC machines as well as transformers, and principle of operation of brushless DC motor, Stepper and DC Servo motors.<br>**CO3:** Evaluate the performance and characteristics of DC Machine as motor and as well as generator.<br>**CO4:** Evaluate the performance of transformers, individually and in parallel operation.<br>**CO5:** Demonstrate and perform various connections of three phase transformers. |
| KEE403 | NETWORK ANALYSIS AND SYNTHESIS | **CO1:** Apply the knowledge of basic circuital law, nodal and mesh methods of circuit analysis and simplify the network using Graph Theory approach.<br>**CO2:** Analyze the AC and DC circuits using Kirchhoff's law and Network simplification theorems.<br>**CO3:** Analyze steady-state responses and transient response of DC and AC circuits using classical and Laplace |

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| | | transform methods.<br>**CO4:** Demonstrate the concept of complex frequency and analyze the structure and function of one and two port network. Also evaluate and analysis two-port network parameters.<br>**CO5:** Synthesize one port network and analyze different filters. |
| KNC402 | PYTHON PROGRAMMING | **CO1:** To read and write simple Python programs.<br>**CO2:** To develop Python programs with conditionals and loops.<br>**CO3:** To define Python functions and to use Python data structures –- lists, tuples, dictionaries<br>**CO4:** To do input/output with files in Python<br>**CO5:** To do searching ,sorting and merging in Python |
| KEE451 | CIRCUIT SIMULATION LAB | **CO1:** Apply the knowledge of basic circuital law, nodal and mesh analysis for given circuit.<br>**CO2:** Analysis of the AC and DC circuits using simulation techniques.<br>**CO3:** Analysis of transient response of AC circuits.<br>**CO4:** Evaluation and analysis of two-port network parameters.<br>**CO5:** Estimation of parameters of different filters. |
| KEE452 | ELECTRICAL MACHINES-I LAB | **CO1:** Analyze and conduct basic tests on DC Machines and single-phase Transformer.<br>**CO2:** Obtain the performance indices using standard analytical as well as graphical methods.<br>**CO3:** Determine the magnetization, Load and speed-torque characteristics of DC Machines.<br>**CO4:** Demonstrate procedures and analysis techniques to perform electromagnetic and electromechanical tests on electrical machines. |
| KEE453 | Digital Electronics Lab | **CO1:** Understanding of Digital Binary System and implementation of Gates.<br>**CO2:** Design the Sequential circuits with the help of combinational circuits and feedback element.<br>**CO3:** Design data selector circuits with the help of universal Gates.<br>**CO4:** Design the counters with the help of sequential circuit and basic Gates.<br>**CO5:** Implement the projects using the digital ICs and electronics components. |
| B.TECH 5th SEMESTER | | |
| RAS501 | MANAGERIAL ECONOMICS | **CO1:** List the different goals and constraints that firms face.<br>**CO2:** Understand the different costs of production and how they affect short and long run decisions. |

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| | | **CO3:** Understand the four basic market models of perfect competition, monopoly, monopolistic competition, and oligopoly and how price and quantity are determined in each model.<br>**CO4:** Derive the equilibrium conditions for cost minimization and profit maximization.<br>**CO5:** Understand the different costs of production and how they affect short and long run decisions.<br>**CO6:** Understand why there is a role for the government to play in market economies. |
| RAS502 | SOCIOLOGY | **CO1:** Students should be able to comprehend the basic scope of industrial Sociology, Social organization, scientific management and human relation in industry.<br>**CO2:** Students should be able to explain the early industrialization, Types of productive systems, characteristics, causes, consequences of Industrialization as well as obstacles to limit industrialization.<br>**CO3:** Students should be able to evaluate extent of industrialization in India, various industrial policies, and analyze technological and scientific developments.<br>**CO4:** Students should be able to discuss diverse and contemporary issues related to industries such as grievance handling strikes and lock outs, Mechanism for handling disputes such as worker participation, work committee, collective bargaining.<br>**CO5:** Students should be able to remember Industrial agreements, code of discipline, labour court and industrial tribunals.<br>**CO6:** Students should be able to visualize the various Models of industrialization, environmental and Cultural issues, consumer society and sociological concerns related with industrialization. |
| REE501 | ELECTRICAL MACHINES –II | **CO1:** Demonstrate the constructional details and principle of operation of three phase Induction and Synchronous Machines.<br>**CO2:** Analyze the performance of the three phase Induction and Synchronous Machines using the phasor diagrams and equivalent circuits.<br>**CO3:** Select appropriate three phase AC machine for any application and appraise its significance.<br>**CO4:** Start and observe the various characteristics of three phase Induction & Synchronous Machines<br>**CO5:** Explain the principle of operation and performance of Single-Phase Induction Motor & Universal Motor. |
| REE502 | POWER TRANSMISSION & DISTIBUTION | **CO1:** To be able to understand various elements of power system.<br>**CO2:** To be able to understand various types of supply system, types of conductors and insulators used in |

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| | | transmission system.<br>**CO3:** To be able to understand transmission line performance and its mechanical design.<br>**CO4:** To be able to understand various phenomenon like Corona, interference and importance of neutral grounding and its types.<br>**CO5:** To be able to understand the difference between HVDC and HVAC Transmission line.<br>**CO6:** To be able to understand the impact of power solutions on the society and will be aware of contemporary issues. |
| REE503 | CONTROL SYSTEM | **CO1:** Obtain transfer functions to predict the correct operation of open loop and closed loop control systems and identify the basic elements, structures and the characteristics of feedback control systems.<br>**CO2:** Measure and evaluate the performance of basic control systems in time domain. Design specification for different control action.<br>**CO3:** Analyze the stability of linear time-invariant systems in time domain using Routh Hurwitz criterion and root locus technique.<br>**CO4:** Determine the stability of linear time-invariant systems in frequency domain using Nyquist criterion and Bode plot.<br>**CO5:** Design different type of compensators to achieve the desired performance of control System by root locus and Bode plot method. Develop and analyze the intermediate states of the system using state space analysis. |
| REE052 | Principles of Communication | **CO1**: Students will be able to apply the basic fundamental of signals analysis used in various field of Engineering.<br>**CO2:** Students will be able to explain how signals are transmitted and its reception take place in communication engineering with good quality.<br>**CO3:** Students will be able to Sketch the spectrum of different signals used in multidisciplinary field of engineering.<br>**CO4:** Students will be able to understand various techniques for better communication in multidiscipline field of engineering and it will motivate to work with multidiscipline team member.<br>**CO5:** Students will be able to understand the need of communication engineering in the field of research, and higher level engineering solutions in global and economical context. |
| REE551 | ELECTRICAL MACHINES –II LAB | **CO1:** Perform various tests and demonstrate the various characteristics of three phase induction motor.<br>**CO2:** Demonstrate the working of three phase synchronous |

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| | | machine under different operating conditions<br>**CO3:** Evaluate the performance of single-phase induction motor under different operating conditions.<br>**CO4:** Develop simulation models for Electrical Machines. |
| REE553 | CONTROL SYSTEM LAB | **CO1:** Determine the characteristics of control system components like ac servo motor, synchro, potentiometer, servo voltage stabilizer and use them in error detector mode.<br>**CO2:** Compare the performance of control systems by applying different controllers /compensators.<br>**CO3:** Analyze the behavior of dc motor in open loop and closed loop conditions at various loads & determine the response of 1st& 2nd order systems for various values of constant K.<br>**CO4:** Apply different stability methods of time & frequency domain in control systems using software & examine their stability.<br>**CO5:** Convert the transfer function into state space & vice versa & obtain the time domain response of a second order system for step input and their performance parameters using software. |
| REE554 | SOFTWARE BASED POWER SYSTEM LAB | **CO1:** Develop Proper mathematical models for analysis of a selected problem like load flow study or fault analysis.<br>**CO2:** Prepare the practical input data required for load flow or fault calculations.<br>**CO3:** Select and identify the most appropriate algorithm for load–flow and short circuit studies.<br>**CO4:** Develop power system software for static power system studies. |
| B.TECH 6th SEMESTER | | |
| RAS601 | INDUSTRIAL MANAGEMENT | **CO1:** Understand the concept, development, application and scope of Industrial Management and the impact of engineering solutions in a global and multidisciplinary scenario.<br>**CO2:** Analyze different types of production systems, Inventory Management, Supply Chain Management, TQM and Industrial Ownership by conducting experiments and interpretation of data.<br>**CO3:** Describe process charts, Flow diagrams, deterministic models, control charts etc.<br>**CO4:** Design, develop, implement and improve integrated systems that include people, materials, information, equipment and energy using realistic constraints such as economic, environmental, social, political, ethical, health, safety, manufacturability and sustainability.<br>**CO5:** Evaluate Productivity Index, EOQ , Inventory costs |

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| | | etc.<br>**CO6:** Remember the basic concepts of Time and Motion study, Production Planning and Understand the Fayol Principle of Management, Management Functions and Project Management |
| RUC601 | CYBER SECURITY | **CO1:** Understand the principle concepts, development and security of Information System.<br>**CO2:** Gain familiarity with various security threats, security technology, E-commerce and cryptography.<br>**CO3:** Demonstrate the knowledge of Application Development Security and Security Architecture and design issues.<br>**CO4:** Develop an understanding of security policies (such as authentication, integrity and confidentiality).<br>**CO5:** Learn about ISO, IT Act and Cyber Laws in India |
| REE601 | POWER ELECTRONICS | **CO1:** Identify and describe the characteristics of various power electronic devices.<br>**CO2:** Explain the basic principle of operation of step-up/down Choppers.<br>**CO3:** Describe and analyze the performance of single/three-phase controlled converters and effect of source impedance.<br>**CO4:** Understand the concept of AC Voltage controllers, cyclo converters and their applications to real world.<br>**CO5:** Understand the concept of single/three-phase bridge inverters and various techniques to reduce harmonics. |
| REE602 | MICROPROCESSOR | **CO1:** Comprehend the concept of digital computer, various types of addressing modes and timing circuitry to microprocessor.<br>**CO2:** Understand the internal architecture, working principle and programming concept of 8085 microprocessor.<br>**CO3:** Understand the internal architecture, working principle and programming concept of 8086 microprocessor.<br>**CO4:** Design assembly language program to the microprocessor I/O ports in order to interface the processor to external devices.<br>**CO5:** Apply the concept of digital computer to enhance the social life as well as service in India. |
| REE603 | POWER SYSTEM ANALYSIS | **CO1:** Students will be able to Identify power system components on one line diagram of power system and its representation in per unit system.<br>**CO2:** Students will be able to understand Positive Sequence, Negative & Zero sequence system and fault analysis. |

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| | | **CO3:** Students will be able to design Power System solution based on the problem requirements & realistic constraints.<br>**CO4:** Students will be able to apply the load flow application to various power system problems like minimization of transmission line losses, minimization of the total fuel cost etc.,<br>**CO5:** Students will be able to understand that in real world, How to control the Power system. How much power should be allowed in Transmission lines, so that system should not be out of synchronism? In real world, How the Reactive Power and voltage can be controlled? |
| REE064 | Special Electrical Machines | **CO1:** Maintain different types induction machines for different applications<br>**CO2:** Maintain different types synchronous machines for different applications<br>**CO3:** Maintain different types of fractional horsepower motors<br>**CO4:** Maintain various types of Small specialized electric machines. |
| REE661 | POWER ELECTRONICS LAB | **CO1:** Correlate theoretical and practical analysis of various converters<br>**CO2:** Analyze the characteristics of MOSFET, IGBT, SCR and SCR.<br>**CO3:** Design firing circuits for Thyristors<br>**CO4:** Construct power semiconductor circuits for industrial applications<br>**CO5:** Analyze the operation of motors on various power converters.<br>**CO6:** Analyze the working of various converters through MATLAB simulation. |
| REE662 | MICROPROCESSOR LAB | **CO1:** Study of microprocessor system.<br>**CO2:** Development of flow chart for understanding the data flow.<br>**CO3:** Learning assembly language to program microprocessor based system.<br>**CO4:** Interfacing different peripheral devices with the microprocessor.<br>**CO5:** Building logic for microprocessor based system. |
| REE664 | ELECTRICAL DESIGN & FABRICATION LAB | **CO1:** Understand the PCB design and Fabrication process and able to understand the design of power supply.<br>**CO2:** Understand the Filter, controller design and Fabrication process and its application in various electrical & electronics circuits.<br>**CO3:** Understand the Design & Fabrication of Microcontroller based digital energy meters / sensors. |

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| | | **CO4:** Understand the design & Fabrication of Power amplifier.<br>**CO5:** Understand the Measurement of electrical parameters of AC & DC machine. |
| B.TECH 7th SEMESTER | | |
| ROE074 | Understanding the human being Comprehensively Human Aspiration audits fulfillment | **CO1:** The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.<br>**CO2:** It is free from any dogma or set of do's and don'ts related to values.<br>**CO3:** It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated and encouraged to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation.<br>**CO4:** This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student leading to continuous self-evolution.<br>**CO5:** This self-exploration also enables them to critically evaluate their pre- conditionings and present beliefs. |
| REE071 | Utilization of Electrical Energy & Electric Traction | **CO1:** To understand the operating principles and characteristics of traction motors with respect to speed, temperature, loading condition.<br>**CO2:** To acquaint with the different types of heating and welding techniques.<br>**CO3:** To study the basic principles of illumination and its measurement.<br>**CO4:** To understand the basic principle of electric traction including speed–time curves of different traction services.<br>**CO5:** To understand the method of calculation of various traction system for braking, acceleration and other related parameters, including demand side management**.** |
| REN075 | Telemetry & Data Transmission | **CO1:** To describe the functional blocks of data acquisition systems.<br>**CO2:** Use of different modulation and demodulation techniques used in analog communication.<br>**CO3:** Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.<br>**CO4:** Know about remote telemetry and various programmable controllers in remote telemetry.<br>**CO5:** Know about aerospace telemetry and principles of |

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| | | tele control systems. |
| REN701 | COMMUNICATION SYSTEMS | **CO1:** Students will be able to apply the basic fundamental of signals analysis used in various field of Engineering.<br>**CO2:** Students will be able to explain how signals are transmitted and its reception take place in communication engineering with good quality.<br>**CO3:** Students will be able to Sketch the spectrum of different signals used in multidisciplinary field of engineering.<br>**CO4:** Students will be able to understand various techniques for better communication in multidiscipline field of engineering and it will motivate to work with multidiscipline team member.<br>**CO5:** Students will be able to understand the need of communication engineering in the field of research, and higher-level engineering solutions in global and economical context. |
| REE702 | POWER SYSTEM PROTECTION | **CO1:** Student gain s knowledge on different Protective Equipments or Power Systems<br>**CO2:** Know about various protective systems- how it works and where it works?<br>**CO3:** Different applications o f the relays, circuit breakers, grounding for different elements of power system is also discussed in the subject.<br>**CO4:** Ability to discuss recovery and Restricting.<br>**CO5:** Ability to express Oil circuit Breaker, Air Blast circuit Breakers, SF6 Circuit Breaker.<br>**CO6:** Ability to identify DMT,IDMT type relays.<br>**CO7:** Ability to identify Rotor, Stator Faults, inter turn faults and their protection. |
| REE751 | INDUSTRIAL AUTOMATION & PLC LAB | **CO1:** Understand the hardware & software used in PLC and implementation of logic gates.<br>**CO2:** Understand & develop the ladder program for DOL starter and its application as a timer.<br>**CO3:** Understand the hardware & software platform for DCS.<br>**CO4:** Understand the Performance of Timers & Counters.<br>**CO5:** Understand the application of Up & Down Counter. |
| REE752 | POWER SYSTEM LAB | **CO1:** Analyze the performance of transmission lines and relays.<br>**CO2:** Calculate the steady-state power flow in a power system.<br>**CO3:** Analyze different types of short-circuit faults which occur in power systems.<br>**CO4:** To perform testing of transformer oil.<br>**CO5:** To evaluate sequence components of alternator. |

| B.TECH 8TH SEMESTER | | |
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| REN080 | Optical Fiber Communication | **CO1:** Students will be able to apply the basic fundamental of optical fiber in various field of Engineering.<br>**CO2:** Students will be able to explain how signals are transmitted and its reception take place in optical fiber communication system with good quality.<br>**CO3:** Students will be able to Sketch the structure of optical waveguide and use of optical sources multidisciplinary field of engineering.<br>**CO4:** Students will be able to understand various techniques for optical fiber communication in multidiscipline field of engineering and it will motivate to work with multidiscipline team member.<br>**CO5:** Students will be able to understand the need of optical fiber communication engineering in the field of research, and higher-level engineering solutions in global and economical context. |
| ROE082 | Entrepreneurship Development | **CO1:** To assess their strengths and weaknesses as entrepreneurs and identify how to strengthen their skills<br>**CO2:** Develop idea generation, creative and innovative skills.<br>**CO3:** Aware of different opportunities and successful growth stories.<br>**CO4:** Understand entrepreneurial process by way of studying different case studies and find exceptions to the process model of entrepreneurship.<br>**CO5:** Learn how to start an enterprise and design business plans those are suitable for funding by considering all dimensions of business.<br>**CO6:** Run a small enterprise with small capital for a short period and experience the science and art of doing business.<br>**CO7:** Acquire basic skills in operations, finance, marketing and human resource management. |
| REE085 | EHV AC & DC Transmission | **CO1:** To understand the basic concepts of EHV AC and HVDC transmission.<br>**CO2:** To identify the electrical requirements for HVDC lines.<br>**CO3:** To identify the components used in AC to DC conversion.<br>**CO4:** To understand the operation of HVDC conversion technology.<br>**CO5:** To understand the fundamental requirements of HVDC transmission line design.<br>**CO6:** To identify factors affecting AC-DC transmission. |

| Session:2019-2020 | | |
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| SEMESTER:3rd | | |
| **Code** | **Course Name** | **Course Objective** |
| KOE038 | Electronics Engineering | CO1. Understand the concept of PN junction and special purpose diodes |
| | | CO2. Study the application of conventional diode and semiconductor diode |
| | | CO3. Analyse the I-V characteristics of BJT and FET. |
| | | CO4. Analyse the of Op-Amp, amplifiers, integrator, and differentiator. |
| | | CO5. Understand the concept of digital storage oscilloscope and compare of DSO with analog oscilloscope. |
| KAS301 | Technical Communication | CO1. Students will be enabled to understand the nature and objective of Technical Communication relevant for the work place as Engineers. |
| | | CO2. Students will utilize the technical writing for the purposes of Technical Communication and its exposure in various dimensions. |
| | | CO3. Students would imbibe inputs by presentation skills to enhance confidence in face of diverse audience. |
| | | CO4. Technical communication skills will create a vast know-how of the application of the learning to promote their technical competence. |
| | | CO5. It would enable them to evaluate their efficacy as fluent & efficient communicators by learning the voice-dynamics. |
| KME301 | Thermodynamics | CO1 Students will be able to understand the concept of systems, surroundings and boundaries along with zeroth law of thermodynamics and first law of thermodynamics |
| | | CO2 Students will be able to understand the concept of second law of thermodynamics and deep knowledge about entropy. |
| | | CO3 Students will be able to understand the concept of Availability and Irreversibility, exergy analysis and thermodynamic relations. |
| | | CO4 Students will be able to understand the properties of steam and cycle based on power production by using the heat energy of steam. |
| | | CO5 Students will be able to understand the concept of refrigeration cycles and performance of vapour compression refrigeration cycle. |
| KME-302 | FLUID MECHANICS & FLUID MACHINES | CO1. Learn about the application of mass and momentum conservation laws for fluid flows. |
| | | CO2. Understand the importance of dimensional analysis. |
| | | CO3. Obtain the velocity and pressure variations in various types of simple flows. |
| | | CO4. Analyze the flow in water pumps and turbines. |
| | | CO5. Mathematically analyze simple flow situations. |
| | | CO6. Evaluate the performance of pumps and turbines. |
| KME 303 | Materials Engineering | CO1.Students will be able to understand basics of material structure, crystallography, imperfections and different mechanical properties with their testing. |
| | | CO2.Students should have ability to explain the failure theory, fracture, fatigue properties and NDT testing for dofferent materials. |
| | | CO3.Students should be ready to aquire the knowledge of solidification, phase & equilibrium diagram for different materials |
| | | CO4.Students will be able to understand the various heat treatment processes for ferrous and nonferrous materials and their alloys. |

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| | | CO5.Students should understand the concept of basic properties, structure & applications of farrous and nonferrous metals and their alloys. |
| KME-351 | FLUID MECHANICS LAB | CO1. Measure the properties of fluids |
| | | CO2. Compare the actual discharge with theoretical discharge through pipes and notch and weirs. |
| | | CO3. Validate the Bernoulli's theorem and Darcy's law. |
| | | CO4. Measure the loss of fluid flow energy in pipe chain. |
| | | CO5. Measure the efficiency of turbines on different loads. |
| | | CO6. Measure the performance of the pump on different loads. |
| KME 352 | Materials Testing Lab | CO1.Students will be able to analyse different types of strength testing on UTM machine. |
| | | CO2.Students should have ability to explain and analyse the Impact test on impact testing machine like Charpy, Izod or both. |
| | | CO3.Students should be ready to aquire the knowledge to measure the Hardness of given specimen using Rockwell and Vickers/Brinell testing machines. |
| | | CO4.Students will be able to understand the Spring index test on spring testing machine. |
| | | CO5.Students will be able to analyse the Fatigue test and torsion test on fatigue testing & torsion testing machine. |
| | | CO6.Students should have ability to explain the NDT testing for different materials. |
| KME353 | Computer Aided Machine Drawing-I Lab | CO1. The students will be able to understand the difference between design and drafting, views, quadrant etc. |
| | | CO2. The students will be able to understand the projection of different machine elements. |
| | | CO3. The students will be able to understand the different types of fastener and their projection. |
| | | CO4. The students will learn to draft coupling, riveting etc. |
| | | CO5. The students will be able to understand assembly of different machines' elements with assembly drawing. |
| KAS-402 | MATHS-IV | CO1. The students will be able to learn the idea of partial differentiation and types of partial differential equations |
| | | CO2. The students will be able to learn the idea of classification of second partial differential equations, wave, heat equation and transmission lines |
| | | CO3. The students will be able to learn the basic ideas of statistics including measures of central tendency, correlation, regression and their properties. |
| | | CO4. The students will be able to learn the idea s of probability and random variables and various discrete and continuous probability distributions and their properties. |
| | | CO5. The students will be able to learn the statistical methods of studying data samples, hypothesis testing and statistical quality control, control charts and their properties. |
| KVE401 | Universal Human Values | CO1. To sensitize students about the role and importance of human values and ethics in Personal, social and professional life. |
| | | CO2. To encourage students to read and realize the values of enlightened human beings. |
| | | CO3. To enable students to understand and appreciate ethical concerns relevant to modern lives. |

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| | | CO4. Students becoming responsible citizens and better professionals who practice Values and Ethics in every sphere of life. |
| KME401 | APPLIED THERMODYNAMICS | CO1 Student must be able to explain the basic cycles involved in operation of petrol and diesel engines. |
| | | CO2 Student must be able to test a actual running engine on the basis of various parameters. |
| | | CO3 Student must be able to design and analyse a thermal power plant. |
| | | CO4 Student must be able to apply the fundamentals of steam and gas nozzles in real world problems. |
| | | CO5 Student must be able to understand the basics of gas turbine and jet propulsion. |
| KME-402 | ENGINEERING MECHANICS | CO1 Students should be able to evaluate the resultant force of any coplanar force system and friction forces. |
| | | CO2 Students should be able to determine the internal forces in trusses and understand how to draw the variation of shear load and bending moment acting over entire length of different beams |
| | | CO3 Students should be able to obtain centroid and second moment of area. |
| | | CO4 Students should be able to describe the motion of a rigid body in terms of its position, velocity and acceleration and to analyze the forces causing the motion of a particle. |
| | | CO5 Students should be able to apply work, energy, impulse and momentum relationships for a particle in motion. |
| | | CO6 Students should be able to describe and find the strength of material in bending and torsion. |
| KME 403 | Manufacturing Processes | CO1.Students should be able to understand importance of the casting method, design considerations and their types, metal forming processes and their analysis & sheet metal operations like cup/deep drawing and bending. |
| | | CO2.Students should be able to understand metal cutting operation. |
| | | CO3.Students should be able to learn grinding and super finishing processes. |
| | | CO4.Students should be able to Identify the use and applications of welding equipment. |
| | | CO5.Students should be able to learn the basics of unconventional machining processes. |
| KME 451 | Applied thermodynamics Lab | CO1. Students will be able to analyse and understand the working of different types of Boiler. |
| | | CO2. Students should have ability to explain and analyse the two stroke and four stroke engine. |
| | | CO3. Students should be ready to aquire the knowledge to measure the heat balance sheet. |
| | | CO4. Students will be able to understand the steam engines. |
| | | CO5. Students will be able to analyse the gas turbine. |
| KME 452 | Manufacturing Processes Lab. | CO1. The students will understand the construction & working principle of Lathe machine and their application |
| | | CO2. The students will be able to analyse the working of milling machines & shaper machine. |
| | | CO3. The students will learn to analyse grinding machine, surface grinding machine and drilling machine. |
| | | CO4. The students can able to understand the design of different types of tool angles, tool materials, tool wear & tool life. |

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| | | CO5. The students will be able to know the design and drawing of Jigs & Fixture to hold the job on different machines. |
| | | CO6. The students will be able to know the different types of welding processes and also the latest welding (joining) process like TIG & MIG. |
| KME-453 | COMPUTER AIDED MACHINE DRAWING-II LAB | CO1. The students will understand the Conventional representation of machine components and materials. |
| | | CO2. The students can able to understand Surface Roughness and nomenclature, machining symbols, indication of surface roughness. |
| | | CO3. The students will learn Limits, Tolerance and Fits system of engineering design. |
| | | CO4. The students will be able to understand and draw Part and Assembly Drawing of various machine parts. |
| | | CO5. The students will understand Specification of Engineering materials, representation, Code designation. |
| | | CO6. The students will be able to understand design and drawing of Production Drawing system. |
| | | CO7. The students will be able to work on varrious Computer Aided Drafting software like AutoCAD, ProE etc. |
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| **Code** | **Course Name** | **Course Objective** |
| RME501 | MACHINE DESIGN - I | CO1. Student will be able to apply standards in design of machine components. |
| | | CO2. Student will be able to select different types of materials for different types of load. |
| | | CO3. Student will be able to design machine components for static load. |
| | | CO4. Student will be able to design machine components for fluctuating load. |
| | | CO5. Student will be able to design riveted joint, shaft key & coupling. |
| | | CO6. Student will be able to design mechanical spring & power screw. |
| RME-051 | I C Engine & Compressor | CO1. Students should be able to demonstrate about the basic knowledge of engine and basic working cycles. |
| | | CO2. Students will be able to understand the working and design of spark ignition engines and to understand use of Superchaging and Turbocharging. |
| | | CO3. Students will be able to understand the working and design of compression ignition engines. |
| | | CO4. Students will be able to understand the various types of cooling, lubricants, fuels and testing Performance of engines. |
| | | CO5. To understand the basic working principle of air compressor and its application. |
| RME503 | Manufacturing Science & Tech II | CO1. Student will be able to understand the mechanics of metal cutting, forces, cutting tool geometry and other realted parameters like power required, heat generation. |
| | | CO2. Student will be able to identify various machine tools like lathe, milling, drilling, shaper and planer. |
| | | CO3. Student will be able to undeerstand the various finishing processes like grinding, superfinishing and surface roughness. |
| | | CO4. Student will be able to understand the basic concenpts of metal joining processes like welding, soldering, brazing and adhessive bonding etc. |

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| | | CO5. Student will be able to understand the concepts of unconventional machining and hybrid machining, welding. |
| RME-502 | Heat and Mass Transfer | CO1 Student will be able to analyze conduction heat transfer in different heating and cooling system. |
| | | CO2 Student will be able to design fin for different application. |
| | | CO3 Student will be able develop solutions for transient heat conduction in simple geometries. |
| | | CO4 Student will be able to analyze heat transfer by convection in closed conduits and on external surfaces. . |
| | | CO5 Student will be able to calculate heat transfer by thermal radiation for practical situations. |
| | | CO6 Student will be able to analyze heat exchanger performance by using LMTD and NTU method. |
| | | CO7 Student will be able to solve mass transfer problems involving biological and environmental systems |
| RAS-502 | Sociology | CO1. Students should be able to understand the dynamics of groups at work place |
| | | CO2. Student should know the growth of industrialisation in India and its effects on productivity |
| | | CO3. Students should be able to understand different industrial policies. |
| | | CO4. Student can understand the impact of indiscipline in the organisation and methods to cope up. |
| | | CO5. Student Should be able to understand the models of industrialization, Cuftural issues, consumer society and concern |
| RAS501 | Managerial Economics | CO1. Students will be able to understand the basic principles of managerial economics and demand in firms. |
| | | CO2. Students will be able to analyze supply conditions and different forecasting techniques of the market. |
| | | CO3. Students will be able to solve economic problems by using analytical techniques including benefit-cost ratio and breakeven analysis. |
| | | CO4. Students will be able to design and analyze competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets. |
| | | CO5. Students will be able to understand recession and expansion of economic activity through business cycle. |
| RME-551 | Design and Simulation Lab I | CO1 Students will learn and understand the difference between design and drawings. And understand the use of design data book. |
| | | CO2 Students will learn and understand the drafting software like Autocad. |
| | | CO3 Students will be able to design and drawing for static load for Knuckle and cotter joints. |
| | | CO4 Students will be able to design and drawing for machine components subjected to combined steady and variable loads. |
| | | CO5 Students will be able to design of boiler riveted joint and for eccentric loading condition. |
| | | CO6 Students will be able to design and drawing of types of coupling. |
| | | CO7 Students will be able to design and drawing of screw jack . |

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| RME552 | Heat & Mass Transfer Lab | CO1 Student will be able to measure the thermal conductivity of different common metallic materials. |
| | | CO2 Student will be able to determine the thermal conductivity of insulating Asbestos powder in spherical shell. |
| | | CO3 Student will be able to determine LMTD, effectiveness, heat transfer & overall heat transfer coefficient in a heat exchanger. |
| | | CO4 Student will be able to visualise the pool boiling process and find out the heat transfer and heat transfer coefficient in a pool boiling apparatus. |
| | | CO5 Student will be able to determine the heat transfer coefficient through drop-wise and film-wise condensation apparatus. |
| | | CO6 Student will be able to study working principle of heat pipe. |
| RME553 | Manufacturing Technology-II Lab | CO1. The students will understand the construction and design of single point cutting tool. |
| | | CO2. The students will be able to calculate cutting forces to give desired shape and size of different components on lathe machine. |
| | | CO3. The students will be able to design and analyze milling and grinding operation. |
| | | CO4. The students will learn drilling operation. |
| | | CO5. The students will be able to understand the different type of welding and positions of welding. |
| | | CO6. The students will be able to understand the various unconventional manufacturing process. |
| RAS 601 | Industrial Management | CO1. Students will be able to understand the importance of management in industry along with the concept of productivity and various production systems. |
| | | CO2. Students will come across the functions of management and popular principles of management which have been developed at various point of times. |
| | | CO3. Students will come to know the right way of doing a particular job through techniques of work study and method study along with tools of inventory control. |
| | | CO4. Students will be able to know about quality, various approaches of quality control along with the concept of total quality management. |
| | | CO5. Students will apply project network techniques like CPM & PERT. |
| RUC 601 | CYBER SECURITY | CO1 Students will be able to understand information system, its types and how to develop |
| | | CO2 Students will be able to do security risk analysis for any information system. |
| | | CO3 Students will be able to explain different types of security threats in information system. |
| | | CO4 Students will have basic knowledge of Security Technology like Firewall and VPNs |
| | | CO5 Students will be able to explain different types of security threats in E-Commerce. |
| | | CO6 Students will have basic knowledge of Information Security Standards |
| RME-601 | Fluid Machinery | CO1. Students will be able to analyze the working principles of fluid machines. |
| | | CO2. Students will be able to evaluate power, efficiency and degree of reaction of reaction turbines. |

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| | | CO3. Students will be able to design and analyze different centrifugal pumps and their performance characteristics. |
| | | CO4. Students will be able to analyze functioning of different positive displacement pumps and their performance characteristics |
| | | CO5. Students will be able to demonstrate and apply the basic concept of fluid mechanics in advance machines. |
| RME 602 | TOM (Theory Of Machine) | CO1. Distinguish kinematic and kinetic motion. |
| | | CO2. Create a schematic drawing of a real-world mechanism by using vector mechanics as a tool. |
| | | CO3. Design basic cam systems and gear trains. |
| | | CO4. Use graphical and analytic methods to do motion and force analysis of a planar mechanism. |
| | | CO5. Solve balancing problem of machines by using graphical and analytical methods. |
| | | CO6. Study the governor mechanism and application of friction in brakes and dynamometer. |
| RME-603 | MACHINE DESIGN - II | CO1. Student will be able to understand different types of terminology used in gear design. |
| | | CO2. Student will be able to apply standards for gear systems. |
| | | CO3. Student will be able to explain different types of gear manufacturing methods. |
| | | CO4. Student will be able to design different types of gears on the basis of beam and wear strength. |
| | | CO5. Student will be able to design sliding contact bearing. |
| | | CO6. Student will be able to select rolling contact bearing from manufacturing catalogue. |
| | | CO7. Student will be able to design different types of IC Engine parts. |
| RME-061 | Refrigeration and Air Conditioning | CO1 Student will be able to analyze and design air refrigeration systems used in aeroplanes and aircrafts. |
| | | CO2 Student will be able to use P-h and T-S chart to solve refrigeration design problems. |
| | | CO3 Student will be able to use T-S and Psychrometric charts to solve air conditioning design problems |
| | | CO4 Student will be able to perform cooling load calculations and elementary duct design for air conditioning systems used for various applications |
| | | CO5 Student will be able to operate and analyze the refrigeration and air conditioning systems. |
| RME-062 | PRODUCTION PLANNING AND CONTROL | CO1. Student will be able to know characteristics of Manufacturing systems and Production systems. |
| | | CO2. Student will be able to understand Forecasting & Market Analysis. |
| | | CO3. Student will be able to have a clear understanding Resource Planning &Selection of material. |
| | | CO4. Student will be able to know the basics of Dispatching rules, dispatching of work card, move card, inspection card and reports. |
| | | CO5. Student will be able to understand about Elements of network and its development, CPM and PERT techniques. |

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| | | CO6. Student will be able to know various manufacturing resource planning (MRP) and enterprise resource planning (ERP). |
| RME-651 | Fluid Machinery Lab | CO1. Students will be able to perform the experiment of impact of jet on vane |
| | | CO2. Students will be able to do experimental studies of Pelton wheel |
| | | CO3. Students will be able to do experimental studies of Francis turbine |
| | | CO4. Students will be able to do experimental studies of Kaplan turbine |
| | | CO5. Students will be able to do experimental studies of centrifugal pump |
| | | CO6. Students will be able to do experimental studies of reciprocating pump |
| RME-652 | Theory of Machines Lab | CO1. Students able to know about the different between link and pairs with their applications. |
| | | CO2. Students can improve their knowledge about the mechanism, and they can understand the purpose of inversion of mechanism. |
| | | CO3. Students Gain practical working knowledge of some basic machine elements such as motors, gears, cam, and common linkages. |
| | | CO4. Students able to understand the practical application of Governor and Gyroscope. |
| | | CO5. Students able to balance the unbalance shaft with the help of static and dynamic balancing with the help of balancing apparatus. |
| | | CO6. Student will able to understand the advantages and disadvantages of vibration with the help of whirling of shaft and universal vibration apparatus. And student will able to control vibration. |
| RME-653 | Design & Simulation Lab -II | CO1. Students will learn and understand the the basics of computer language C |
| | | CO2. Students will learn and understand the the basics of computer language C++. |
| | | CO3. Students will be able to write simple computer programmes in C and C++ |
| | | CO4. Students will be able to write computer program for the design of machine components in C language |
| | | CO5. Students will be able to write computer program for the design of machine components in C++ language |
| | | CO6. Students will be able to write a computer program in C or C++ for a real life problem for the complete design of a subsystem/system. |
| | | CO7. Students will be able to validate designs of machine components by the help of computer programmes in C or C++ and do research in the orthocad field |
| RME-654 | Refrigeration & Air Conditioning lab | CO1. Understand the principles and applications of refrigeration systems. |
| | | CO2. Evaluate performance of Vapour compression refrigeration system. |
| | | CO3. Apply working principle of VAR/VCR system to solve numericals based on VCR and VAR system. |
| | | CO4. Understand basics of psychrometry, air conditioning processes and different air conditioning systems. |
| | | CO5. Analyse different psychrometric processes on general cycle air conditioning trainer. |
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| **Code** | **Course Name** | **Course Objective** |

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| ROE-074 | Understanding the human being Comprehensively Human Aspiration audits fulfilment | CO1. Student will be able to understand the need of Value Education as well as its learning process. |
| | | CO2. Student will be able to appreciate the essential complementarily between 'values' and 'skills' to ensure sustained happiness and prosperity. |
| | | CO3. Student will be able to develop a holistic perspective towards 'life' and 'profession' as well as towards happiness and prosperity based on correct understading of the Human reality and the rest of the Existence. |
| | | CO4. Student will be able to relate plausible implications of holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behavior in family as well as in society and mutually enriching interaction with Nature. |
| | | CO5. Student will be able to understand Implications of the holistic understanding of harmony on Professional Ethics. |
| | | CO6. Student will be able to understand the need of Value Education as well as its learning process. |
| RME 701 | CAD/CAM | CO1. Students will be able to demonstrate understanding of geometric transformations and modelling. |
| | | CO2. Students will be able to perform the understanding of Numerical methods and FEM. |
| | | CO3. Students will be able to reveal a basic understanding of CAD of machine elements and design of software. |
| | | CO4. Students will be able to program and operate CNC machines. |
| | | CO5. Students will be able to demonstrate the understanding of system devices used in CNC machines |
| | | CO6. Students will be able to express the understanding of CAPP and master production schedule |
| | | CO7. Students will be able to display the understanding of Robotics and its programming |
| | | CO8. Students will be able to deliver a basic understanding of RP and FMS. |
| RME 702 | AUTOMOBILE ENGG | CO1 The students will understand basic concepts of automobile engineering and general configuration of an Automobile. |
| | | CO2 The students will be able to understand the basic concepts of Transmission System. |
| | | CO3 The students will be able to understand Braking System, Chassis and Suspension System. |
| | | CO4 The students will be able to understand Electrical System, Fuel Supply System. |
| | | CO5 The students can able to understand the basic principle of Emission standards and pollution control. |
| | | CO6 At the end of the course, the student can understand the Importance of Maintenance system. |
| RME-071 | POWER PLANT ENGINEERING | CO1 Student will be able to learn about basics of power plant engineering |
| | | CO2 Student will be able to know about power plant economics |
| | | CO3 Student will be able to know about general layout, operation and maintenance of thermal power plant of thermal power plant |
| | | CO4 Student will be able to learn about performance of diesel power plant, gas turbine plant and its fuels |
| | | CO5 Student will be able to learn about nuclear reactors and hydro power |

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| | | CO6 Student will be able to learn about electrical system in power plant |
| RME-072 | Supply Chain Management | CO1. Students will be able to understand, design, develop and implement supply chain management concepts. |
| | | CO2. Student will be able to identify drivers and metrics in supply chain. |
| | | CO3. Student will be able to advice management on the organization of E-commerce, logistics, import taxes, risk, customs and legal aspects of global trading. |
| | | CO4. Student will be able to analyze the creation of new value in the supply chain for customers, society and the environment. |
| | | CO5. Student will be able to explain the strategic importance of logistic elements and describe how they affect supply chain management. |
| RME-075 | OPERATION RESEARCH | CO1. Student will be able to formulate linear programming problem. |
| | | CO2. Student will be able to find optimal solution of an LPP. |
| | | CO3. Student will be able to solve the problems of assignment model and Transportation model. |
| | | CO4. Student will be able to understand the concept of decision making under under certainity,uncertainty and risk. |
| | | CO5. Student will be able to apply johnson's algorithm to find the sequence of n-jobs on m-machines |
| | | CO6. Student will be able to understand various models of inventory to solve the problems. |
| RME-078 | Automation & Robotics | CO1. Students will able to learn the impact of automation and robotics technology. |
| | | CO2. Students will able to learn about the manufacturing automation & Robot time estimation in Manufacturing. |
| | | CO3. Student will able to learn about robotics; kinematic and dynamic and parts of the robot. |
| | | CO4. Students will able to learn the robotics derive & power transmission system and learn about types and functions of end effector. |
| | | CO5. Write algorithms to program and control simple mobile robots in useful engineering applications, interpret data obtained from real life problems using appropriate techniques to select suitable sensors and actuators for robots. |
| RME 751 | CAD/CAM LAB | CO1. Students will learn and understand Line Drawing or Circle Drawing algorithm though a computer program. |
| | | CO2. Students will learn and understand Geometric Transformation algorithm experiment for translation/rotation/scaling though a computer program. |
| | | CO3. Students will be able to design and drawing for machine components and validate though a computer program. |
| | | CO4. Students will be able to understand design and draw commands of 3-D Modelling Software. |
| | | CO5. Students will be able to understand FEM concept and also able to validate the concept using a program or using a FEM Package. |
| | | CO6. Students will be able to understand Numerical differentiation or numerical integration concept and write a computer program to validate it. |
| RME- | I. C. Engine and | CO1. Students will understand the power generated inside the engine and transmitted to the wheels. |

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| 752 | Automobile Lab | CO2. Students will be able to understand the design, construction and workimg of gearbox, differential of rear axle. |
| | | CO3. Students will be able to understand the design, construction and workimg of steering mechanism, braking system viz, mechanical, hydraulic disc, vacuume . |
| | | CO4. Students will learn design and working of fuel supply system, like, carburetor, fuel pumps, MPFI system. |
| | | CO5. Students will able to understand the constructional features of hatchback cars of different companies, like Maruti, Hyundai, TATA, Ford, Cheverolet. |
| | | CO6. Students will be able to understand the constructional features of Common Scooters and Motorbike, like Bajaj, LML, Honda |
| | | CO7. Visit to an automobile industry will give a general idea of autoparts manufacturing to the students. |
| ROE-082 | ENTREPRENEURSHIP DEVELOPMENT | CO1. Student will be able to know about entrepreneurship and distinguish between business and entrepreneurship |
| | | CO2. Student will be able to understand small scale industry and it's role in the growth of the country along with government policy regarding SSI |
| | | CO3. Student will be able to have a clear understanding of project identification it's feasibility cost benefit analysis and preparation of DPR. |
| | | CO4. Student will be able to know the basics of accountancy, balance sheets, economic viability , advertisement , inventory control and preparation of financial report |
| | | CO5. Student will be able to understand about project planning and it's control, risk analysis, capital expenditure and cash flow. |
| | | CO6. Student will be able to know various legal matters regarding business firm, partnership, sales, income tax and role of various national and state agencies offering financial assistance to SSIs. |
| ROE-086 | Renewable Energy | CO1 Students should be able to describe the fundamentals and main characteristics of renewable energy sources and their differences compared to fossil fuels. |
| | | CO2 Students should be able to describe the basics of solar cell ,solar power plant, solar thermal energy and applications and performance. |
| | | CO3 Students should be able to describe geothermal energy, Magneto-hydrodynamics and fuel cells and their working, performance and limitations. |
| | | CO4 Students should be able to describe Wind energy system and Bio mass system and their working, performance and limitations. |
| | | CO5 Students should be able to describe Ocean thermal energy conversion (OTEC), wave and tidal wave: Availability, theory and working principle, performance and limitations. |
| RME 080 | Non Destructive Testing | CO1. Students should be able to demonstrate the understanding of importance and application of non-destructive testing, classification of non-destructive testing and selection of non destructive testing process. |
| | | CO2. Students should be able to describe the basics of liquid penetrate inspection and magnetic particle inspection. |
| | | CO3. Students should be able to demonstrate the understanding of non-destructive testing by radiographic methods. |
| | | CO4. Students should be able to describe various advanced non-destructive testing techniques like Ultra sonic testing etc. |

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| | | CO5. Students will be able to demonstrate the understanding of fundamentals of eddy current testing. |
| | | CO6. Students will be able to apply Non Destructive Testing techniques in various applications. |
| RME-081 | Advanced Welding | CO1. Students will be able to select and operate tools and equipment to support welding and related activities. |
| | | CO2. Students will be able to perform welding processes (i.e. MMAW, MIG, TIG, SAW, LBM, EBM etc.) for various applications. |
| | | CO3. Students will be able to do repair & maintenance of welding |
| | | CO4. Students will be able to select and perform welding on various materials |
| | | CO5. Students will be able to design and inspect the weld joint – before, after and during welding |
| | | CO6. Students will be able to select and operate tools and equipment to support welding and related activities. |
| RME-085 | TOTAL QUALITY MANAGEMENT | CO1. Students will be able to understand the concept of quality and different manufacturing techniques. |
| | | CO2.Students will be able to demonstrate understanding of quality issues of all organizations, including public and service sectors. |
| | | CO3. Students will be able to set up the different techniques for controlling the variation of quality parameters. |
| | | CO4. Students will be able to demonstrate different methodologies along with relevant techniques proposed for product and process quality improvement. |
| | | CO5. Students will be able to understand the depth of the quality management philosophy. |
| | | CO6. Students will understand that the field of the quality keeps advancing and the scope of application of its philosophy expanding beyond the traditional manufacturing arena. |
| RME-086 | Gas Dynamics & Jet Propulsion | CO1. Students will be able to understand the concept of compressible flow, mass momentum and energy equation for one dimensional flow. |
| | | CO2. Students will be able to understand the concept of isentropic flow through variable area ducts and Area-Mach number relations for isentropic flow. |
| | | CO3. Students will be able to understand the concept of Non-isentropic flow in constant area ducts and isentropic and shock tables. |
| | | CO4. Students will be able to understand the concept of jet propulsion, thrust equation, thrust power and propulsive efficiency. |
| | | CO5. Students will be able to study Types of rocket engines, propellants & feeding systems, ignition and combustion. |

| **Department of MBA** | | |
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| **Session: 2019 - 2020** | | |
| **Code** | **Course Name** | **Course Outcomes** |
| **SEMESTER I** | | |

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| KMB 101 | Management Concepts & Application | CO1 | Developing understanding of managerial practices and their perspectives |
| | | CO2 | Applying planning and managerial decision making skills |
| | | CO3 | Develop analytical and problem soving skills, based on understanding of management concepts and theories |
| | | CO4 | Comprehend and practice Indian Ethos and Value Systems |
| | | CO5 | Applying value based management and ethical practices |
| KMB 102 | ManagerialEconomics | CO1 | Students will be able to remember the concepts of micro economics and also able to understand the various micro economic principles to make effective economic decisions under conditions of risk and uncertainty. |
| | | CO 2 | The students would be able to understand the law of demand & supply & their elasticities , evaluate &analyse these concepts and apply them in various changing situations in industry . Students would be able to apply various techniques to forecast demand for better utilization of resources. |
| | | CO 3 | The students would be able to understand the production concept and how the production output changes with the change in inputs and able to analyse the effect of cost to business and their relation to analyze the volatility in the business world |
| | | CO 4 | The students would be able to understand & evaluate the different market structure and their different equilibriums for industry as well as for consumers for the survival in the industry by the application of various pricing strategic |
| | | CO 5 | The students would be able to analyse the macroeconomic concepts & their relation to micro economic concept & how they affect the business & economy. |
| KMB 103 | Financial Accounting for Managers | CO1 | Understand and apply accounting concepts, principles and conventions for their routine monetary transaction. |
| | | CO2 | Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures. |
| | | CO3 | Create and Prepare financial statements in accordance with Generally Accepted Accounting Principles |
| | | CO4 | Utilize the technology (such as computers, information databases) in facilitating and enhancing accounting and financial reporting processes |
| | | CO5 | Recognize circumstances providing for increased exposure to fraud and define preventative internal control measures Employable skills |
| | | CO6 | Understand the basic concepts and importance of working capital management |
| KMB 104 | Business Statistics & Analytics | CO1 | Gaining knowledge of basic concepts/fundamentals of business statistics. |
| | | CO2 | To develop practical understanding of various statistical conceepts. |
| | | CO3 | To compute various measures of central tendeency, measures of dispersion, time series analysis, index number, correlation and regression analysis and their implication on business performance. |
| | | CO4 | Evaluating basic concepts of probability and perform probability theoretical distributions. |

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| | | CO5 | Taking managerial decision and applying the concept of business analytics. |
| KMB 105 | Organisational Behaviour | CO1 | Comprehending the nature, functioning and design of organizations as social collectives |
| | | CO2 | To evaluate the reciprocal relationship between the organizational characteristics and managerial behaviour |
| | | CO3 | Develop practical insights and problem solving capabilities for effectively managing thr Organisational processes |
| | | CO4 | Analysing the behaviour of individuals and groups in orgnaizations |
| | | CO5 | Developing conceptual understanding of change and its implementation |
| KMB 106 | Marketing Management I | CO1 | Remember and comprehend basic marketing concepts |
| | | CO2 | Understand marketing insights on application of basic marketing concepts |
| | | CO3 | Able to apply and develop marketing strategies and plans |
| | | CO4 | Understand and analyzing Business/Consumer markets |
| | | CO5 | Develop skills and ability to identify and evaluate market segments and Targeting |
| KMB 107 | Business Communication | CO1 | Apply business communication strategies and principles to prepare effective communication for domestic and international business situations |
| | | CO2 | Analyse ethical, legal, cultural and global issues affecting business communication |
| | | CO3 | Develop an understanding of appropriate organizational formats and channels used in business communication |
| | | CO4 | Gaining an understanding of emerging electronic modes of communication |
| | | CO5 | Develop effective verbal and non verbal communication skills |
| KMB 108 | Computer Application in Management | CO1 | The course aims to provide knowledge about basic components of a computer and their significance. |
| | | CO2 | To provide hands on learning of applications of MS Office and Internet in businesses. |
| | | CO3 | To provide an orientation about the increasing role of management information system in managerial decision making to gain Competitive edge in all aspects of Business. |
| | | CO4 | To understand various MIS operating in functional areas of an organization. |
| | | CO5 | To create awareness in upcoming managers, of different types of information systems in an organization so as to enable the use of computer resources efficiently, for effective decision making. |
| **SEMESTER II** | | | |
| KMB 201 | Business Environment | CO1 | Comprehend the forces that shape business and economic structure and develop strategies to cope with the same. |
| | | CO2 | Evaluate the economic & political environment dynamics to cope with the changing regulations affecting business and its profitability. |
| | | CO3 | Analyse the competitive forces in environment and accordingly devise business policies and strategies to stay in competitive position. |

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| | | CO4 | Analyse the desirability of technological advancement in the current setup and how to gain technological advancement with least cost. |
| | | CO5 | Understand the international influences on domestic business and measures to be taken for successful global business operations. |
| KMB 202 | Human Resource Management | CO1 | Synthesize the role of human resources management as it supports the success of the organization including the effective development of human capital as an agent for organizational change |
| | | CO2 | Demonstrate knowledge of laws that impact behaviour in relationships between employers and employees that ultimately impact the goals and strategies of the organization |
| | | CO3 | Understand the role of employee benefits and compensation as a critical component of employee performance, productivity and organizational effectiveness |
| | | CO4 | Show evidence of the ability to analyze, manage and problem solve to deal with challenges and complexities of the practice of collective bargaining |
| | | CO5 | Demonstrate knowledgeof practical application of training and employee development as it impacts organizational strategy and competitive advantage |
| KMB 203 | Business Research Methods | CO1 | Knowledge of concept / fundamentals for different types of research. |
| | | CO2 | Applying relevant research techniques. |
| | | CO3 | Understanding relevant scaling & measurement techniques and should use appropriate sampling techniques |
| | | CO4 | Synthesizing different techniques of coding, editing, tabulation and analysis in doing research. . |
| | | CO5 | Evaluating statistical analysis which includes various parametric test and non parametric test and ANOVA technique and prepare report. |
| KMB 204 | Financial Management & Corporate Finance | CO1 | Understand the different basic concept / fundamentals of Corporate Finance |
| | | CO2 | Understand the practical application of time value of money and evaluating long term investment decisions |
| | | CO3 | Developing analytical skills to select the best source of capital ,its structure on the basis of cost of capital |
| | | CO4 | Understand the use and application of different models for firm's optimum dividend payout. |
| | | CO5 | Understand the recent trends of primary and secondary market and developing skills for application of various financial services. |
| KMB 205 | Operations Management | CO1 | Understand the role of operation in overall business strategy of the firm - the application of OM policies and techniques to the sevice sector as well as manufacturing firms |
| | | CO2 | Understand and apply the concepts of material management, supply chain management and TQM perpectives |
| | | CO3 | Identify and evaluate the key factors and their interdependence of these key factors in the design of effective operatign systems |
| | | CO4 | Analyze / Understand the trends and challenges of operations management in the current business environment |

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| | | CO5 | Apply techniques for effective utilization of operational resources and managing th processes to produce good quality products and services at competitive prices |
| KMB 206 | Quantitative Techniques for Managers | CO1 | Understand the basic operations research concepts and terminology involved in optimization techniques |
| | | CO2 | Understand how to interpret and solve business-related problems |
| | | CO3 | Apply ceertain mathematical techniques in getting the best possible solution to a problem involving limited resources |
| | | CO4 | Apply the most widely used quantitative techniques in decision making |
| | | CO5 | Identify project goals, constraints, deliverables, performance criteria, control needs and resource requirements in order to achieve project success |
| KMB 207 | Legal Aspects of Business | CO1 | Acquire a sound understanding of the legal aspects of the laws affecting buisness. |
| | | CO2 | Apply basic knowledge to business transactions. |
| | | CO3 | Communicate effectively using standard and legal terminology |
| | | CO4 | Analyse a given business context using basic understanding of the Applicable acts and develop a suitable operational framework. |
| | | CO5 | Describe currnet Laws, rules and regulations related to settling business disputes. |
| KMB 208 | Marketing Management II | CO1 | Undertnd and analyse marketing for creating value with product and price strategy |
| | | CO2 | Develop aptitude to create and craft the brand positioning/equity by evaluating brands and identifying market segments and targets |
| | | CO3 | Understand and analyze marketing for delivering and communicating value with integrated marketing channels and promotion strategy |
| | | CO4 | Remember and comprehend advanced marketing concepts for the new realities and digital aspects of marketing |
| | | CO5 | Creating and developing marketing strategies and plans for conducting marketing responsibly for long term success |
| **SEMESTER III** | | | |
| KMB 301 | Strategic Management | CO1 | Formulate organizational vision, mission, goals and values |
| | | CO2 | Develop strategies and action plans to achieve an organization's vision, mission and goals |
| | | CO3 | Develop powers of managerial judgement, how to assess business risk and improve ability to make sound decisions and achieve effective outcomes |
| | | CO4 | Evaluate and revise programs and procedures in order to achieve organizational goals |
| | | CO5 | Consider the ethical dimensions of strategic management process |

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| KMB 302 | International Business Management | CO1 | To get an overview of the key issues and concepts of International Business |
| | | CO2 | Understand how and why the world's countries differ |
| | | CO3 | Understand the monetary framework in which international business transactions are conducted . |
| | | CO4 | Understand the role of International Organizations and Regional Trade blocks |
| | | CO5 | Implement the decisions for international operations in a superior manner |
| KMB HR 01 | Talent Management | CO1 | Knowledge of Talent Management Processes |
| | | CO2 | Understanding for analysis of the impacts of Talent managment in the organization |
| | | CO3 | Competency to implement Talent management practices |
| | | CO4 | Competency to develop leadership qualities among subordinate |
| | | CO5 | Knowledge about the reward system to support Talent management |
| KMB HR 02 | Performance & Reward Management | CO1 | knowledge of Performance management and performance appraisal |
| | | CO2 | Competency to understand the importance of performance management |
| | | CO3 | Knowledge about the Compensation and Reward systems in the organization |
| | | CO4 | Competency to implement the effective reward systems in the organization |
| | | CO5 | Ability to explain the relevance of competency mapping and understanding its linkage with career development |
| KMB HR 03 | Employee Relations & Labour Laws | CO1 | Knowledge of Industrial Relation framework . |
| | | CO2 | Competency to understand the importance of Employee Relation within the perspective of Industrial Relation |
| | | CO3 | Knowledge about relevant Laws of HR management |
| | | CO4 | Competency to interpreted and implement the Labour Laws within organization |
| | | CO5 | Competency to use Collective Bargaining and Grievance redressal Mechanism |
| KMB MK 01 | Sales & Retail Management | CO1 | Student will develop the skill in sales force management and distribution channel management |
| | | CO2 | Acquianted with better understanding of implementation of sales and channel management strategies |
| | | CO3 | Develop analytical skills for better decision alternatives in sales and channel management problems |
| KMB MK 02 | Consumer Behaviour & Marketing Management | CO1 | To understand consumer behavior and explain the consumer decision making process |
| | | CO2 | To define external and internal influences on buying behavior |
| | | CO3 | To provide an understanding of integrated marketing communications (IMC) and its influences on other marketing |

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| | | | functions and other promotional activities. |
| | | CO4 | Help to understand what advertising is and its role in advertising and brand promotion. |
| | | CO5 | Understand the importance of message design and the creativity involved in message designing. |
| KMB MK 03 | Digital & Social Media Marketing | CO1 | Develop proficiency in interpreting marketing strategies in the digital age and provide fundamental knowledge for working in an online team |
| | | CO2 | Enable them to develop various online marketing strategies for various marketing mix measures |
| | | CO3 | Guide them to use various digital marketing channels for consumer acquisition and engagement |
| | | CO4 | Help in evaluating the productivity of digital marketing channels for business success |
| | | CO5 | Prepare candidates for global exposure of digital marketing practices to make them employable in high growth industry |
| KMB FM 01 | Investment Analysis & Portfolio Management | CO1 | Understand about various investment avenues. |
| | | CO2 | Understand the value of assets and manage investment portfolio. |
| | | CO3 | Understand various models of investment & its application. |
| | | CO4 | Understand and create various investment strategies on the basis of various market conditions. |
| | | CO5 | Measure riskiness of a stock or a portfolio position. |
| KMB FM 02 | Tax Planning & Management | CO1 | Understand about various tax provisions & Tax Planning. |
| | | CO2 | Understand the scope of tax planning. |
| | | CO3 | Have knowledge about various tax dates, Rates & Forms. |
| | | CO4 | Measure corporate tax & Taxation in case of business restructuring. |
| | | CO5 | Understand how GST can be calculated & managed. |
| KMB FM 03 | Financial Market & Services | CO1 | To impart knowledge of the financial system of India, the role of important financial institutions, financial markets and financial instruments. |
| | | CO2 | Familiarizing the students with the mechanism of commercial banking, its operations, instruments regulations etc. |
| | | CO3 | Helping students in acquiring analytical skills in the money and capital market in the context of raising medium and long term funds |
| | | CO4 | Familiarizing the students with the microfinance as a growing source of financial mechanism |
| | | CO5 | Developing an appreciation among the students for the Banking services and products. |
| **SEMESTER IV** | | | |
| KMB 401 | Project Management | CO1 | Students will be able to understand the characteristics of Project and Project Management Knowledge |
| | | CO2 | The students will understand the managerial process along with tools |

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| | | | & techniques used in Project management Knowledge |
| | | CO3 | Students will understand the scheduling and monitoring process in Project. They will be able to apply PERT and CPM method for project scheduling Comprehending |
| | | CO4 | Students will understand the perspectives in which optimum decisions are to be taken in case of risks with planned activities in project. |
| KMB 402 | Entrepreneurship Development | CO1 | Developing understanding of basic concepts of entrepreneurship. |
| | | CO2 | Develop knowledge on Entrepreneurial Finance, Assistance and role of Entrepreneurial Development Agencies |
| | | CO3 | Develop understanding of converting an Idea to an opportunity and develop understanding of various funding sources |
| | | CO4 | Comprehend and develop skills to Develop a Business Plan |
| | | CO5 | Students to have a basic understanding of Launching a New Venture |
| RVE 401 | Universal Human Values & Professional Ethics | CO1 | Understand the significance of value inputs in a classroom, distinguish between values and skills, understand the need, basic guidelines, content and process of value education, explore the meaning of happiness and prosperity and do a correct appraisal of the current scenario in the society |
| | | CO2 | Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body. |
| | | CO3 | Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society |
| | | CO4 | Understand the harmony in nature and existence, and work out their mutually fulfilling participation in the nature. |
| | | CO5 | Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work. |
| KMB HR 04 | Strategic Human Resource Management | CO1 | Understanding the dimensions of strategic HRM |
| | | CO2 | Applying the learning of SHRM in organizational context |
| | | CO3 | Able to evaluate the impacts of SHRM on competitive advantages |
| | | CO4 | Desired level of expertise on organizational knowledge management through SHRM |
| | | CO5 | Understanding the International culture in SHRM |
| KMB HR 05 | International Human Resource Management | CO1 | Understanding the contexts of International HRM |
| | | CO2 | Knowledge about the HR Processes in International Context |
| | | CO3 | Able to evaluate the impacts of Globalisation on HRM |
| | | CO4 | Desired level of expertise on organizational |
| | | CO5 | Understanding the international culture |

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| KMB MK 04 | Marketing of Services | CO1 | Understand and explain the nature and objectives of Service Marketing |
| | | CO2 | Use critical analysis to percieve service shortcomings in reference to ingredients to create service excellence |
| | | CO3 | Be able to identify critical issues related to service design such as identifying and managing customer service experience, expectations, perceptions and outcomes |
| | | CO4 | Provide a theoretical and practical basis for assessing service performance using company examples |
| | | CO5 | Identify and discuss characteristics and challenges of managing service firms in modern world |
| KMB MK 05 | Marketing Analytics | CO1 | Students will develop the skills in Marketing Analytics |
| | | CO2 | Students will be acquainted with better understanding of real life marketing data and its analysis |
| | | CO3 | Students will develop analytical skill for effective marketing decision making in real life environment |
| KMB FM 04 | Working Capital Management | CO1 | Evaluate comparative working capital management policies and their impact on the firm's profitability, liquidity, risk and operating flexibility. |
| | | CO2 | Evaluate the importance of effective working capital management and its role in meeting the firm's strategic objectives and its impact in value creation. |
| | | CO3 | Investigate funds flow cycles and their impact on working capital management objectives. |
| | | CO4 | Compare and contrast the relative merits of alternative working capital policies and the likely short-term and long-term impact on the firm. |
| | | CO5 | Formulate appropriate working capital management policies to achieve corporate objectives. |
| | | CO6 | Apply corporate cash management, accounts receivable management, bank relations, and inventory management techniques to maximize the share holders' value. |
| | | CO7 | Write a plan for a balanced integration of cash, credit and other short-term topics and policies. |
| | | CO8 | Formulate and integrate an extended treatment on international working capital topics.· |
| KMB FM05 | Financial Derivatives | CO1 | Understanding how derivative securities work and how they are traded. |
| | | CO2 | Understand the principles of derivative pricing, includiing the implictions of arbitrage. |
| | | CO3 | Be able to to price forward and futures contrats using the cost of carry model. |
| | | CO4 | Be able to to price forward and futures contrats using the cost of carry model. |
| | | CO5 | Be prepared to use futures and options in financial risk management, speculation and arbitrage. |
| | | CO6 | Learn important lessons from derivatives disasters. |