DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING:

Programme outcomes (POs):

PO1 : **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2 :**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3 :**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4 :**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5 :**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6 :**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal & cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7 :**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8 :**Ethics:** Apply ethical principles and commit to professional ethics & responsibilities and norms of the engineering practice.
PO9 :**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
PO10 :**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11 :**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12 :**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent & life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs):

PSO 1: Demonstrate the principles, architectures, and Organization of computers, embedded systems, and computer networks.
PSO 2: To develop software applications using advanced technologies to cater to the growing needs of the Industry.

Ballari Institute of Technology & Management ,Ballari	
Department of Computer Science and Engg.	
Course Outcomes 2014-2018	
10MAT31	**Engineering mathematics -III**
CO-1	apply Fourier series and Fourier transforms in formulations and solving different engineering problems.
CO-2	demonstrate the skills in forming partial differential equations and solving heat, wave and Laplace equation also using numerical methods.
CO-3	apply curve fitting to the raw data in to the curve of best fit
CO-4	apply the graphical and simplex method to solve the LPP.
CO-5	write programs using numerical techniques and apply Z-transforms to solve Engineering problems.
10CS32	**Electronic Circuits**
CO-1	Plot the operating point by considering the DC values of current and voltage.
CO-2	Categorize the BJTs, MOSFETs, and CMOS and get their current values and characteristic curve for D-MOSFETs and E-MOSFETs.
CO-3	Discuss the important characteristics of the CE amplifier, including classes of the operation, types of coupling, and frequency ranges along with their application circuits.
CO-4	Analyze the feedback amplifiers with their advantages and effect of negative feedback, the optoelectronic devices in the application based on the requirement.
CO-5	Identify the waveform conversion circuits and waveform generation circuits , Difference between the Ideal Op-Amp and Practical Op-Amp.
10CS33	**LOGIC DESIGN**
CO-1	Explain the basic gates and SOP and POS simplifications.
CO-2	Analyze the working of Multiplexers and Demultiplexers.
CO-3	Solve problems of PAL,PLA.models and FF, Registers, Counters.
CO-4	Design Synchronous/ Asynchronous Sequential Circuit & Design of D/A and A/D Converter..
10CS34	**Discrete Mathematical Structures**
CO-1	Define the terminologies of sets, functions, relations, logic
CO-2	Apply the concepts of set theory.
CO-3	Construct proofs using propositional logic, predicate logic
CO-4	Solve problems on functions, relations, groups, modular arithmetic
CO-5	Prove properties of integers using mathematical induction, direct, indirect proofs.
10CS35	**DATA STRUCTURES WITH C**
CO-1	Ability to understand the concepts of pointers, dynamic memory allocation and Abstract Data Type to write efficient programs.
CO-2	Ability to Understand, evaluate the performance of programs and use of asymptotic notations to measure the performance
CO-3	Identify and analyze various linear and non linear data structures like Stack, queue, linked list, graph and trees.
CO-4	Ability to understand and analyze the limitations, applications of Data structures
CO-5	Ability to Write efficient programs using appropriate data structures to solve the problems and analyze their efficiency.
10CS36	**OOPs with C++**
CO-1	Distinguish between top-down and bottom-up programming approach and apply bottom-up approach to solve real world problems
CO-2	Ability to Define the features of Object and Classes, data members and member functions. Apply it to the real world problems.
CO-3	Demonstrate concepts such as Encapsulation, Inheritance, Polymorphism, constructors and destructors using suitable programs.
CO-4	Interpret the difference between Static Vs Dynamic binding, Function overloading and Operator overloading. Apply both techniques to solve
CO-5	Analyze Class access specifies – public, private, protected and Virtual Base Classes / functions, Which is related to reusability.
10CSL37	**DATA STRUCTURES WITH C/C++ LAB**
CO-1	**Identify the appropriate data structures for solution of any given problem.**
CO-2	**Design various data structure with their basic operations.**
CO-3	**Design and apply the concept of object oriented programming.**
CO-4	**Implement varoius data structure in c++.**
10CSL38	**Electronic Circuits and Logic Design Lab**
CO-1	**Analyse** and **describe** the working of basic electronic circuits and Logic Circuits
CO-2	**Design** and **demonstrate** the working of various analog circuits like clipper, Mosfet, Schmitt trigger, Opamp and 555 timer
CO-3	**solve** problems using Boolean laws, K-Maps and **implement** various Combinational circuits.
CO-4	**Design** and **implement** synchronous and asynchronous counters .
10MAT41	**Engineering mathematics -IV**
CO-1	Apply various numerical methods to solve first order sequential equations.
CO-2	Employ Bessel's and Legender's equations to find the series solutions.
CO-3	Apply Cauchy Reimann equations to find the analyticity of a function to determine the poles and residues.
CO-4	To solve probabilistic problems of repeated nature and find the probability of Joint probability distribution.
CO-5	To test the samples and use the knowledge of Markov chains in attempting engineering problems for feasible random events.
10CS42	**Graph Theory**

CO-1	define regular graphs and path, Euler graphs, Hamilton graphs
CO-2	differentiate between Euler graphs, Hamilton graphs
CO-3	construct a tree & prove the theorems on tree.
CO-4	construct minimal spanning tree.
CO-5	solve problems on permutations and combinations , find rooks polynomials for the given figure.
10CS43	**Design and Analysis of Algorithms**
CO-1	Ability to Understand, Analyze the performance of recursive and non recursive algorithms and use of asymptotic notations to measure the
CO-2	Identify and analyze various algorithm design techniques
CO-3	Understand and evaluate algorithms using various algorithm design techniques
CO-4	Solve problems by applying appropriate algorithm design techniques and analyze the efficiency of various algorithms including parallel
CO-5	Ability to understand the limitations of Algorithm power and identify algorithm design techniques to cope up with the limitations.
10CS44	**Unix and Shell Programming**
CO-1	Explain the architecture and sailent features of UNIX Operating System
CO-2	Interpret UNIX commands, shell basics and shell environment
CO-3	Design and develop shell programs using loops, control statements, regular expressions and UNIX Commands
CO-4	Create UNIX file I/O and Processes
CO-5	Design and develop Perl Script
10CS45	**MICROPROCESSORS**
CO-1	Explain the overview of microprocessors, microcomputer block diagram and real mode operation
CO-2	Explain protected mode of operation, 8086 register organization, memory segmentation
CO-3	Design propgrams using 8086 instruction set and assembler directives
CO-4	Design memory, I/O interfaces with 8086 and address decoding
CO-5	Apply 8255 and 8254 PPI to interface I/O devices like timer, DAC, Stepper motor etc and also learn 8259 interrupt controller
10CS46	**Computer Organization**
CO-1	Analyse the computer system components and machine instructions.
CO-2	Explain implementation of I/O control and data transfer using interrupt
CO-3	Describe the principles of memory management
CO-4	Solve the arithmetic problems and demonstrate the Instruction execution concept. .
10CSL47	**Design and Analysis of Algorithms LAB**
CO-1	Demonstrate algorithms using appropriate design techniques
CO-2	Choose the appropriate algorithm design technique to solve given problem
CO-3	Apply algorithm design techniques to solve real world problem
CO-4	Analyze the performance of algorithms
CO-5	Apply the concept of parallel programming
10CSL48	**Microprocessor LAB**
CO-1	Demonstrate the working of 8086 instruction set
CO-2	Develop ALP program to solve problems using 8086 instruction set .
CO-3	Demonstrate the working of 8255 interface
CO-4	Develop ALP programs to interface 8255 PPI.
10IS51	**SOFTWARE ENGINEERING**
CO-1	Define software engineering and Terminologies related to it alongwith ethical responsibilities of Software Engineer
CO-2	Identify the different process activities and analyse the different software process models
CO-3	Apply the methods of Requirement elicitation
CO-4	Design software and apply strategies of Project management
CO-5	Apply Rapid software development methods and decide on appropriate software architecture and Testing
10CS52	**SYSTEM SOFTWARE**
CO-1	Distinguish architecture of SIC and SIC/XE machine.
CO-2	Write the object code for SIC and SIC/XE machine programs
CO-3	List loaders types and Explain the relocation.
CO-4	Imagine editing process and Write the debugging functions and capabilities of a text editor.
CO-5	Apply regular expressions and develop programs using LEX and YACC tools.
PSO-1	Demonstrate the principles, architectures and Organization of computers, embedded systems and computer networks
PSO-2	To develop software applications using advanced technologies to cater the growing needs of Industry
10CS53	**Operating Systems**
CO-1	To illustrate the role and responsibilities of OS in the computer system.
CO-2	To explain how the OS deals with process management and process synchronization.
CO-3	To analyze memory management techniques and deadlocks.
CO-4	To Describe secondary storage, file concepts & its implementation.
CO-5	To apply the knowledge about OS, for the Linux operating system case study.
10CS54	**Database Management Systems**
CO-1	Able to understand the basics concepts and understand the application of database systems

CO-2	Able to construct an entity Relationship model form specification and to transform to retional model
CO-3	able to contstruct SQL queries to perform CRUD operations on database.
CO-4	Understand and apply database normalization principles
CO-5	understand principles of database transaction management, database recovery,security
10CS55	**COMPUTER NETWORK -1**
CO-1	Define data communication, protocols, networks and layered architecture like OSI & TCP/IP.
CO-2	Explain Analog and Digital signals, Transmission impairment performance, conversion of Digital to Digital,Analog to Digital and Digital to
CO-3	Apply error detection and correction methods like block coding, leaner coding, CRC, checksum.
CO-4	Explain multiple accesses like random access, controlled access and IEEE standards,framing, flow and error control, different data link
CO-5	Adapt wireless technologies like, Bluetooth, IEEE 802.11, & Cellular telephony and Understand IPV4, IPV6 addresses, Internetworking basics,
10CS56	**Formal Languages & Automata Theory**
CO-1	Understand the concepts of Finite Automata and design it for given language
CO-2	Explain Regular Expression and design it for a given language
CO-3	Design CFG, various types of derivations for a given language & Grammar
CO-4	Explain PDA and design it for a given language
CO-5	Explain properties of CFLges and design Turing Machine for given language
10CSL57	**Database Applications Lab**
CO-1	Analyze the Data Base Concepts using Data Definition Language(DDL),Data Manipulation Language(DML)Data Control Language(DCL)
CO-2	Analyze key dependencies for the relational schema and create table using key constraints.
CO-3	Design suitable queries using SQL for retrieving data from the database.
CO-4	Design suitable front end with the help of visual basics(VB) and show suitable reports for different data bases.
PSO-1	Understand the principles, architecture and organization of computers, embedded systems and computer networks
PSO-2	To develop software applications using advanced technologies to cater the growing needs of industry
10CSL58	**System Software and Operating System Laboratory**
CO-1	Interpret the basic features of regular expression for search application.
CO-2	Extend the lexical features to recognize grammar using different productions.
CO-3	Demonstrate the importance of commands in writing shell scripts
CO-4	Illustrate process creation, termination & file concepts in C with LINUX environment
CO-5	Implement process scheduling algorithms, parallel processing & deadlock avoidance concepts.
PSO1	Understand the principles of archtecture and organization of computers, embedded systems and computer networks
PSO2	To develop software application using advanced technoloiges to cater the growing needs of industry
10AL61	**M&E**
CO-1	Define the basic functions of management & importance of planning.
CO-2	Analyze the staffing activities & directing in an organization.
CO-3	Develop the entrepreneurship skills in industries.
CO-4	Evaluate the different financial institutions support towards small scale industry.
CO-5	Formulation of project report.
10CS62	**UNIX SYSTEM PROGRAMMING**
CO-1	Ability to understand the ANSI C Standard, ANSI/ISO C++ Standards, POSIX Standards, FIPS Standard, X/Open Standards available in
CO-2	Comprehend with File Types, UNIX and POSIX File System, UNIX Kernel Support for Files available in UNIX System.
CO-3	Analyze the working of APIs by using suitable programs.
CO-4	Understand the Environment of a process and its operations by using APIs.
CO-5	Ability to use Signals APIs to interrupt the process and IPCs using suitable programs.
10CS63	**Compiler Design**
CO-1	Identify,analyze and generate tokens present in the source program
CO-2	Design top down and bottom up parsing algorithms and apply them to construct parsing table and parse the given input string
CO-3	Design Intermediate code from a given C language code.
CO-4	Explain Runtime memory management technique.
CO-5	Design basic blocks and flow graph from a given intermediate code.
10CS64	**Computer Networks-II**
CO-1	Illustrate Packet Switching Networks, Mobile Adhoc Networks and Wireless Sensor Networks.
CO-2	Explain the architecture of TCP/IP and protocols associated with TCP/IP.
CO-3	Define QoS, VPNs, Tunneling, Overlay networks and Multimedia Networking.
CO-4	Analyse the Network Applications and Network management of Computer Networks.
CO-5	Discuss the security issues in Computer Networks.
10CS65	**COMPUTER GRAPHICS & VISUALIZATION**
CO-1	Explain the major application areas of computer graphics.
CO-2	Describe the operation of graphics hardware systems.
CO-3	implement standard graphics primitives using OpenGL.
CO-4	Apply geometrical transformations on 2D and 3D primitives.
CO-5	Distinguish between Parallel-projection and Perspective-projection
10CS661	**Operations Research**
CO-1	Define terminologies associated with Linear Programming Problem, Non Linear Programming Problem, Game theory..
CO-2	Explain the concepts of Operation Research, Linear Programming Problem, and Transportation Problem.
CO-3	Apply simplex and graphical methods to solve Linear Programming Problems.
CO-4	Apply methods of Transportation Models and game theory.
CO-5	Outline the metaheuristics approaches, decision analysis

10CSL67	CG & V LAB
CO-1	Explain the mathematical and theoretical principles of computer graphics eg: To draw basic objects like lines, triangles and polygons using
CO-2	Use matrix algebra in computer graphics and implement fundamental algorithms and transformations involved in viewing models
CO-3	Analyze and evaluate the use of computer graphics methods in practical applications of 2D & 3D
CO-4	Write basic graphics software systems for Parallel-projection and Perspective-projection models, handling of hidden surfaces and clipping in
CO-5	Design and develop a graphics application.
10CSL68	Unix System Programming and Compiler Design Laboratory
CO-1	Identity and analyze POSIX complaint configurations/limits.
CO-2	Implement Simple File Locking Operations and IPC.
CO-3	Implement and analyze POSIX APIs fork(), link(), system(), alarm() for various
CO-4	Develop and implement race condition, Zombie Process.
CO-5	Design and develop the syntax-directed definition of given grammar.
10CS71	OOMD
CO-1	Describe the concepts involved in Object-Oriented modeling and their benefits.
CO-2	Demonstrate concept of use-case model, sequence model and state chart model for a given problem
CO-3	Analyze the application Domain and Prepare models from different viewpoints.
CO-4	Translate the requirements into implementation for Object Oriented design.
CO-5	Choose an appropriate design pattern to facilitate development procedure.
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS72	EMBEDDED COMPUTING SYSTEMS
CO-1	Interpret the basic features and challenges in designing an embedded system.
CO-2	Illustrate the programmer's interface to the hardware by studying ARM instruction set.
CO-3	Extend the importance of CPU aspects such as Interrupts, MMU, CPU Performance & Power management, bus based computer systems creation
CO-4	Demonstrate the knowledge in designing Model Train Controller, Telephone answering Machine, Datacompressor, Software Modem, Elevator C
CO-5	Discuss the necessity of time critical response, IPC, power management & Optimization for processes in embedded system development
PSO-1	Demonstrate the principles, architecture and organization of computers, embedded systems and computer networks.
PSO-2	To Develop software applications using advanced technologies to cater the growing needs of industry
10CS73	Programming The Web
CO-1	Define the World Wide Web and its emphasis on the current communication trend.
CO-2	Distinguish the static web contents and dynamic web contents of world wide web.
CO-3	Analyze the internet programming for web applications.
CO-4	Design web page using the web design Methodologies.
CO-5	Develop the web applications by using set of development tools like XHTML, CSS, JavaScript, XML, PHP, PERL and Ruby Rails.
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS74	ADVANCED COMPUTER ARCHITECTURES
CO-1	Ability to Solve Simple Calculations of Power, Cost and Performance on Computer Design
CO-2	Ability to demonstrate Pipelining, Exploitation of instruction-level parallelism, branch prediction, speculation ,dynamic scheduling, instruction
CO-3	Ability to Illustrate shared memory architectures, distributed-memory architectures
CO-4	Ability to Explain cache principles, basic cache optimizations, advanced cache optimizations
CO-5	Ability to Explain Protection of virtual memory & Virtual machines
PSO-1	Demonstrate the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS753	JAVA & J2EE
CO-1	List and Explain the features Java programming Language.
CO-2	Apply applet and event handling mechanisms in application programs.
CO-3	Analyze and develop java programs using threads, Swings and JDBC Connectivity concepts.
CO-4	Design and develop distributed applications using RMI and web applications using servlets and JSP.
CO-5	Implement reusable software components using Enterprise Java Beans.
PSO-1	Demonstrate the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS765	Storage Area Network
CO-1	Illustrate the storage system environment
CO-2	Apply the replication techniques in the Storage Networks
CO-3	List the features of Intelligent Storage System
CO-4	Analyze the types of Storage Area Networks
CO5	Analyze the concepts of Storage Virtualization
PSO1	Understand the principles, architecture and organization of computers, embedded
PSO2	To develop software applications using advanced technologies to cater the growing
10CSL77	Network Programming Lab
CO-1	Design and implement Networking topologies by using Simulator (NCTUNS tool).
CO-2	Analyze the transmission of packets using LAN and Extended Service Set(ESS)
CO-3	Implement routing,congestion control and Error detection Algorithms.
CO-4	Design Client/Server Applications using Socket APIs
CO-5	Apply the fundamentals of Cryptography using RSA algorithm.
PSO-1	Demonstrate the principles, architectures and Organization of computers, embedded systems and computer networks

PSO-2	To develop software applications using advanced technologies to cater the growing needs of Industry
10CSL78	**Web Programming Lab**
CO-1	Demonstrate event handling in XHTML files using JavaScript.
CO-2	Demonstrate XML documents to display the information using style sheets.
CO-3	Develop web applications using Perl.
CO-4	Apply PHP for server side scripting, cookies
CO-5	Build rains application for querying the information from the database
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10IS81	**SOFTWARE ARCHITECTURES**
CO-1	Define Software Engineering and Terminologies related to it along with the ethical responsibilities of the software engineer.
CO-2	Identify the different process activities and analyze the different software process models
CO-3	Able to apply the methods of requirement elicitation
CO-4	Able to design software and apply strategies of project management
CO-5	Apply rapid software development methods and decide on appropriate software architecture and testing
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS82	**System Modelling and Simulation**
CO-1	Explain the basic concepts of a simulation system.
CO-2	Model different queuing systems in the context of discrete event simulation.
CO-3	Apply methods to generate random numbers and random variate.
CO-4	Explain verification and validation of simulation models.
CO-5	Analyze a system information and performance.
PSO1	Understand the principles, architecture and organization of computers, embedded
PSO2	To develop software applications using advanced technologies to cater the growing
10CS832	**Web 2.0 And R.I.A**
CO-1	Define the Rich Internet applications.
CO-2	Compare the static web contents over dynamic web contents of web 2.0.
CO-3	Analyse the internet programming for Rich internet applications by learning tools like html, JavaScript, xml, flexml and ActionScript.
CO-4	Design the web 2.0 methodologies with the end User requirements as priority.
CO-5	Develop the web applications for various community of end users by using technologies like AJAX and FLEX.
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS842	**SOFTWARE TESTING**
CO-1	Explain the importance of testing
CO-2	Derive testcases for any given problem
CO-3	Classify the problem into suitable testing model
CO-4	Apply appropriate techniques for the design of flow graphs
CO-5	Create appropriate document for the software artifacts
PSO-1	Understand the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS85	**Project Work**
CO-1	Identify the real world Computer Science Problems
CO-2	Analyze the engineering problem requirements
CO-3	Design the solution methodologies for the problem
CO-4	Apply modern engineering tools/techniques for developing a system
CO-5	Write technical project report and publish the thesis into an article
PSO-1	Demonstrate the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing
10CS86	**Seminar**
CO-1	Evaluating the knowledge of contemporary issues through literature surveys
CO-2	Ability to Prepare technical documents
CO-3	Exhibit effective presentation skills
CO-4	Ability to work in real time environment
CO-5	Ability to utilize technical resources
PSO-1	Demonstrate the principles, architecture and organization of computers, embedded
PSO-2	To develop software applications using advanced technologies to cater the growing

Principal
Ballari Institute of Technology & Management
BELLARY

DEPARTMENT OF ELECTRONICS & COMMUNICATIONS ENGINEERING:

Programme outcomes (POs):

Engineering Graduates will be able to:

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design / Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSO1: To understand the principles, processes, techniques and design aspects of electronic devices, circuits and communication systems.

PSO2: To apply, analyze and design electronic circuits, communication systems, embedded systems by using higher engineering mathematical foundations, computational principles and network modeling skills.

PSO3: To develop electronic hardware and software systems for universal requirements using sensors, embedded controllers, signal processors, analog and digitally integrated chips.

CO's Data (2017 SCHEME)

Slno	Subject code	Title	Course Outcomes
1	17MAT31	Engg. Mathematics - III	CO1: Find Fourier series of periodic functions. CO2:Evaluate Fourier transform, solve difference equations using Z-Transform. CO3:Apply statistical and numerical methods to fit the given data into appropriate curves and to solve algebraic, transcendental equations. CO4:Apply various numerical techniques to interpolate, evaluate definite integrals CO5:Use curl and divergence vector integration, to verify green's stroke's divergence theorems and to evaluate geodesics.
2	17EC32	Analog Eelectronics	CO1: Acquire knowledge of Working principle, characteristics and basic applications of BJT, construction, working principle of FET, Single stage, cascaded and feedback amplifier configurations, Frequency response characteristics of BJT and FET, Power amplifier classifications such as Class A, Class B and Voltage Regulators etc. CO2: Analyze small signal ac equivalent circuits using BJT and FET, low and high frequency response using BJT and FET, Feedback Circuits in terms of impedances and gain. CO3: Prove the performance of power amplifiers in terms of efficiency. CO4: Design oscillators with the help of feedback circuits. CO5: Interpret performance characteristics of transistors amplifiers and FETs.

3	17EC33	Digital Electronics	CO1: Apply the fundamental concepts, terminology of logic design and different Boolean postulates to solve the given problem. CO2:Apply the various simplification methods (K-map,Quin-MuClusky,MEV) to simplify the expression in a given problem. CO3:Apply the knowledge of basic combinational components to design the other combinational circuits. CO4:Analyse the concepts of sequential circuits and differentiate the types of sequential circuits. CO5:Design the various sequential circuits like registers, counters, and Mealy and Moore circuits.
4	17EC34	Network Analysis	CO1: Understand the basic concepts in analysing networks such as mesh,node,star-delta,source transformation & shifting and evaluate appropriate method to find voltage and current for any given network. CO2: State and prove network theorems such as superposition, millmans ,max power transfer…etc and demonstrate appropriate theorems to find the voltage or current in any given network. CO3: Differentiate between series and parallel resonance circuit and also demonstrate using frequency response for any circuit to find performance metrics like quality factor, bandwidth…etc. CO4: Define various 2 port network parameters Z,Y,h,T and establish relationshipbetween different parameters and formulate equations governing the behaviour of the network. CO5: List different standard inputs in analyzing the networks like step, ramp,impulse also analyze waveform synthesis using different inputs and apply the concepts of laplace transformation for a given network.

5	17EC35	Electronics Instrumentation	Co1: Describe analog instruments voltmeters and multimeters with error free readings Co2: Evaluate the functionality of digital instruments (such as DVM's, digital multi meter, digital frequency meter digital measurement of time) for measuring digital frequency, digital time, etc.. Co3: Apply the working principle of different oscilloscopes(delayed time base oscilloscope, analog ,sampling and digital storage oscilloscope) and signal generators(standard signal generators, laboratory type, square, pulse, frequency generators) for measuring amplitude, time and frequency Co4: Analyze the function of measuring instruments to calculate power, impedance, electric field strength, PH etc, and AC and DC bridges to measure resistance, capacitance and inductance Co5:Illustrate the functions of transducers (active and passive) with the help of bridge circuits
6	17EC36	Engineering Electromagnetics	CO1:Solve problems on Electric force, electric field intensity due to point, linear, volume charges by applying Coulombs Law and Guass Law CO2:Determine Energy and Potential for various charge distributions and apply continuity equation of current to calculate flow of current, total charge, charge density etc for Conductors CO3:Apply Poissons and Laplace equations for solving boundary value problems associated with electrostatics and magnetostatics. CO4:Analyze the applications of magnetostatics by applying biot-savart law, amphere's circuital law and derive the concepts of magnetic forces and materials to characterize the magnetic circuits. CO5:Analyze Maxwell’s equations for Static fields, time varying fields, EM waves in free space, conductors and Evaluate power associated with EM waves using Poynting theorem.

7	17ECL37	Analog Electronics Lab	CO1: Design and test rectifiers, clipping circuits, clamping circuits and voltage regulators for given specifications. CO2: Design and test BJT/FET amplifiers to find gain and bandwidth for given specifications. CO3: Plot the characteristics of JFET/MOSFET devices and calculate the parameters namely drain resistance, mutual conductance and amplification factor. CO4: Design oscillator circuit using BJT/FET for specific frequency. CO5: Calculate the efficiency of Class B push pull power amplifier using BJT.
8	17ECL38	Digital Electronics Lab	CO1:Demonstrate the truth table of various expressions and combinational circuits using logic gates. CO2:Design ,test and evaluate combinational circuits such as Adder,Substractor and Code converters. 3:Design, test and evaluate combinational circuits such as Decoder, Encoder and Multiplexers. CO4:Construct sequential circuits such Flip flops , Shift registers and special type shift registers. CO5:Design synchronous and asynchronous counters, MOD N counter and Sequence generator.
9	17MAT41	Engg. Mathematics - IV	CO1:Apply various numerical methods to solve first order differential equation. CO2:Employ bessel's and legendre's differential equations to find the series solution. CO3:Apply the cauchy-riemann equations to find the analyticity of a function and determine poles and residues. CO4:To solve probabilistic of repeated nature and find the probability of joint probability distribution. CO5:To set the samples and use the knowledge of markov chains in attempting engineering problems for feasible random events.

10	17EC42	Microprocessor	CO1: Explain the History of evaluation of Microprocessors, Architecture of 8086, 8088, 8087, CISC & RISC, Von-Neumann & Harvard CPU architecture CO2: Write 8086 Assembly level programs using the 8086 instruction set CO3: Write modular programs using procedures and macros. CO4: Write 8086 Stack and Interrupts programming CO5:Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors and INT 21 DOS interrupt
11	17EC43	Control Systems	CO1: Derive a mathematical model of a given system (physical, mechanical or electrical) represented through block diagram and signal flow graph CO2: Determine the behaviour of time response and steady state errors of I and II order systems for standard test input signals CO3: Analyze the stability of a system using numerical (Rouths -Harwitz criteria) and graphical (root locus)approach CO4: Evaluate and Correlate the stability of a system using time and frequency responses CO5: Model a control system in continuous and discrete time using state variable technique
12	17EC44	Singnals & Systems	CO1:Understand the mathematical description of continuous and discrete time signals and systems. CO2:Analyze the signals in time domain using convolution difference/differential equations CO3:Classify signals into different categories based on their properties. CO4:Analyze Linear Time Invariant (LTI) systems in time and transform domains. CO5:Build basics for understanding of courses such as signal processing, control system and communication.

13	17EC45	Principles of Communication Systems	CO1: Analyze and Compare modulation techniques such as AM, AM-DSBSC, SSB,VSB, FM and PM in time and Frequency domain. CO2: Demonstrate the generation and detection of AM and FM Wave. CO3:Derive functions like joint Probability, CDF, PDF, PSD,ConditionalProbability,moments,correlation for a given single or severalRandom Variables. CO4: Apply the concepts of Random Variables to Compare the performance of Analog Modulation techniques (AM, FM, DSB-SC) under a given Narrowband noisy signal environment. CO5:Realize the significance of pulse modulation Schemes (PAM, PPM, PWM) and line coding techniques with a digital communication context.
14	17EC46	Linear Integration Circuits	CO1: Acquire knowledge related to types of Opamp, basic concepts of Opamp, basic timer circuit of 555 Timer, operating principle of PLL, phase detectors/comparator, VCO and voltage regulators. CO2: Interpret the performance characteristics of practical Opamp considering various parameters like input output voltage range, CMRR, PSRR, Offset voltages and currents, Input/output Impedances, Slew rate and Frequency limitations. CO3: Solve problems related to Opamp characteristics and types of Opamp, PLL, VCO, ADC, DAC and 555 Timer. CO4: Analyze various applications of amplifier like DC and AC amplifiers, voltage and current sources, current amplifiers, instrumentation amplifiers, rectifiers, limiting circuits, clamping circuits, peak detectors, sample and hold circuits, V-I, I-V Converters, log and antilog amplifiers, multiplier and dividers, triangular/rectangular wave generators, Phase shift and Wein bridge oscillators, Differentiator and integrator, crossing detectors, inverting Schmitt trigger circuits, monostable and astable multivibrators, first and second order low pass and high pass active filters, Voltage regulators, 555 Timer as astable and monostable multivibrators, PLL, ADC and DAC. CO5: Apply the knowledge gained about amplifiers in the design of various practical circuits like DC and AC amplifiers,

			voltage and current sources, current amplifiers, instrumentation amplifiers, rectifiers, limiting circuits, clamping circuits, peak detectors, sample and hold circuits, V-I, I-V Converters, log and antilog amplifiers, multiplier and dividers, triangular/rectangular wave generators, Phase shift and Wein bridge oscillators, crossing detectors, inverting Schmitt trigger circuits, monostable and astable multivibrators, first and second order low pass and high pass active filters, Voltage regulators, 555 Timer as astable and monostable multivibrators, PLL, ADC and DAC.
15	17ECL47	Microprocessors Lab	CO1: Program a microprocessor to perform arithmetic, logical and data transfer applications CO2: Program a microprocessor to perform DOS interrupts, branch and loop operations CO3: Interface a microprocessor to various devices for simple applications. CO4: Perform string transfer, string reversing, searching a character in a string with string manipulation instructions of 8086. CO5: Utilize procedures and macros for modular programming.

16	17ECL48	Linear IC's & Communication Lab	CO1: Design Adder, Integrator, Differentiator circuits, Analog filters (2nd order LPF and HPF),OSCILLATORS (RC phase shift and Wein Bridge Oscillator), DAC and Instrumentation amplifier using op-amp µA 741 for a given design specification. CO2: Design and demonstrate the 555 timer operations in Astable & Monostable configurations to generate signals/pulses for a given requirements. CO3: Demonstrate the analog modulation schemes (AM,FM and PAM) to realize the importance of modulation in analog communication systems. CO4: Demonstrate DSBSC generation using balance modulator IC 1496/1596 and frequency synthesis using phase locked loop. CO5: Design RF mixer using BJT/FET and appreciate the role of RF mixer in Superheterodyne Receivers.
17	17ES51	Management and Entrepreneurship Development	CO1: To recall and identify the relevance of management concepts & its principles. CO2: To describe, discuss and relate management functions adopted within an organization. CO3: Realize the social responsibilities towards business and entrepreneurship CO4: To assess and modify different solution to small scale industries with the aid of financial institutions CO5: To demonstrate the Project Report, Appraisal and feasibility studies in the real world.

18	17EC52	Digital Signal Processing	CO1:Explain the frequency domain sampling and reconstruct discrete time signal. CO2:Compute DFT of a discrete time sequence using definition of DFT and properties. CO3:Evaluate Linear Convolution of Long input sequence and Impulse response using Overlap save and add methods. CO4:Develop FFT Algorithms to reduce the computation time of DFT CO5: Design Analog and Digital IIR Filters, FIR Filters using windowing techniques.Construct digital IIR and FIR filters in Direct form I, direct form II, Cascade, Parallel and Lattice Structures
19	17EC53	Verilog HDL	CO1: **Depict** the importance of HDL's and current trendsin HDL's,VLSI IC circuit design flow. CO2:**utilize** verilog constructs specified as per the IEEE 1364-2001 verilog standard to design digital circuits for the given specifications. CO3: **Differentiate** between top down and bottom -up digital design flow, Modules and Module Instances in Verilog CO4:**Verify** the functionality of verilog code for the specified digital logic circuit as per the given specifications of a combinational (or sequential) logic gate circuit by writing verilog code and test bench code for performing simulation. CO5: **Distinguish** and use constructs of three different modelling styles for writing verilog/VHDL code for the given specification.

20	17EC54	Information Theory & Coding	CO1: Examine mathematically the performance parameters of the digital communication system (information system) to solve simple engineering problems related to it. CO2: Analyze statistical modeling of independent and dependent information sources (Ex: Markov Source) for the given specifications. CO3: Apply the basic rules and properties of coding for fundamental Source coding to encode the source output by constructing r-ary codes with the help of suitable optimum source coding algorithm (Shannon's encoding algorithm, Shannon-Fano and Huffman encoding algorithm, arithmetic coding, Lempel-Ziv and Run length coding) for the given specifications. CO4: Analyze the design aspects of communication channels (Continuous and Discrete Channel Modeling) in terms of channel capacity and entropy functions. CO5: Design Channel encoder and decoder using different error control coding schemes (Block codes and Convolutional Codes) and realize the importance of Error control coding in Communication systems.

21	17EC553	Operating System	CO1: Identify goals & functions of operating system to achieve effective resource utilization. Classify Operating system into Batch processing, Multiprogramming, Time sharing, Real time and Distributed classes of operating system. CO2: Apply preemptive and non preemptive scheduling policies using Round Robin, Least completion time and First Come First Serve, Shortest request next policies. CO3: Identify advantages and disadvantages of contiguous and non contiguous memory allocation using paging and segmentation and Apply page replacement policies like least recently and first in first out. CO4: Organize file system and input output control system. Interpret file, directory and Its types and structure respectively. CO5: Analyze message passing and mailboxes with the issues of its naming and delivery of message and Deadlock detection algorithm and prevention in resource allocation.
22	17EC562	Object Oriented Programming Using C++	CO1. Understand the fundamental concepts of C++ language and write C++ Programs structure to solve the problems. CO2. Understand the functions and apply object oriented technique CLASS with array, pointers and functions to design C++ program for applications. CO3. Integrate constuctors and destructors in the CLASS and apply operator overloading with constructors and destructors to implement processes to meet the desired specification of the project. CO4. Evaluate inheritence, virtual functions and polymerphin concepts in C++ program for the design of other software tools. CO5. Understand the file concepts and integrate all files with object oriented techniques to analyse the real world problems and design the project to solve it.

23	17ECL57	DSP Lab	**CO1: Demonstrate sampling theorem and evaluate Impulse response of a given system** **CO2: Compute Linear and Circular convolution of two given sequences CO3:Evaluate Auto correlation and cross correlation of given sequences and verify their properties** **CO4: Draw Magnitude and frequency spectrum by computing N point DFT of a sequence** **CO5: Design FIR and IIR Filters. Implement FIR and IIR Filters to meet the given specifications**
24	17ECL58	HDL Lab	CO1:**Apply** the Verilog HDL/VHDL constructs to model a list of combinational and sequential digital circuits in dataflow, behavioral or gate styles and simulate the same using Xilinx/Modelsim/Altera or any EDA tool. CO2: **Write** Synthesizable Verilog/VHDL codes to describe digital circuits and program FPGA/CPLD to experience the semi-custom VLSI design flow. CO3: **Demonstrate** the use of FPGA/CPLD to interface external peripherals such as stepper motor, LCD, DC Motors and validate the designs usingappropriate apparatus(likeoscilloscope) for the given specifications. CO4:**Demonstrate** the use of Verilog HDL/VHDL constructs to generate waveforms such as sine, triangular, square for the given specifications, and validate the same by interfacing DAC to FPGA/CPLD, and displaying on an oscilloscope.
25	17EC61	Digital Communication	CO1: Associate and apply the concepts of Bandpass sampling to well specified signals and channels CO2: Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels. CO3: Analyze symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels CO4:Apply the concepts of spread spectrum modulation techniques for secure communication.

26	17EC62	ARM Microcontroller & Embedded Systems	CO1: Understand the architectural features and instruction set of 32-bit microcontroller ARM Cortex M3. CO2: Program ARM Cortex M3 using the various instructions and C language for different applications. CO3: Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system. CO4: Develop the hardware software co-design and firmware design approaches. CO5: Explain the need of real time operating system for embedded system applications.
27	17EC63	VLSI Design	CO1: Interpret and understand of MOS transistor theory, CMOS fabrication flow and technology scaling. CO2: Make use of the basic gates using the stick and layout diagrams with the knowledge of physical design aspects CO3: Identify and understanding the concept of Memory elements along with timing considerations with scaling fundamentals CO4: Demonstrate the basic knowledge of FPGA based system design and Interpret testing and testability issues in VLSI Design CO5: Analyze the CMOS subsystems and architectural issues with the design constraints

28	17EC64	Computer Communication Networks	CO1: Identify the networking components such as switches, hubs, routers etc. Explain the concepts of wireless and wired network structures. Identify the best models for media access control; calculate the performance parameters, such a delay, throughput, efficiency, shortest path, etc, associated with media access control protocols CO2: Provide efficient solutions to mitigate the issues associated with network layer and transport layer services such as flow control, addressing, congestion control, addressing, routing etc. For undergraduates, this is achieved by comparing and contrasting various features and limitations of several protocols Analyse the given real life problem in networking domain and solve that problem using analytical solutions or simulations CO3: Analyse the given real life problem in networking domain and solve that problem using analytical solutions or simulations
29	17EC653	Artificial Neural Networks	CO1: **Illustrate** the artificial neuron model and network through metaphorical biological neuron, analyze linear and non-linear separable problems using XOR problem and derive perceptron learning algorithm. CO2: **Interpret** Perceptron, Mean Squared Error and Gradient Descent algorithm Derive weight update equation for multilayer neural network using Back propagation algorithm and its practical considerations. CO3: **Analyze** the learning law in Support vector machine and the Radial bases function networks. CO4: **Demonstrate** the learning laws of self organizing feature map

30	17EC661	Data Structures Using C++	CO1. Identify the different types of datastructues ,linear and nonlinear and understand dynamic memory allocations,STL for the representation of datastructure. CO2. Demonstrate the datastructures arrays,stacks,matrix and their applications to solve problems. CO3. Analyse the queus and dictionary datastructure to implement them in applications. CO4. Analyse nonlinear datastructures,binary tress and its operations. CO5. Outline the importance of binary search ,trees with their operations and understand sorting techniques Heap datastructure.
31	17ECL67	Embedded Controller Lab	CO1: Understand the instruction set of 32-bit microcontroller ARM Cortex M3 and the software tool required for programming in Assembly and C language. CO2: Develop assembly language programs using ARM Cortex M3 for different applications CO3: Interface external devices and I/O with ARM Cortex M3 CO4:Develop C language programs and library functions for embedded system applications CO5:Develop Real Time Applications using Cortex M3
32	17ECL68	Computer Network Lab	CO1: Demonstrate the understanding of computer networking concepts through design, development and simulations CO2: Apply the knowledge acquired on the subject computer networking in solving problems such as physical layer errors, data flow problem at data link layer, congestion control at transport layer CO3: Create network scenarios using network simulators to study the behaviour of various networking protocols of TCP/IP protocol CO4: Study the performance of a Wireless Networks for different network conditions.

33	17EC71	Microwave & Antennas	CO1: Describe the use and advantages of microwave transmission CO2:Analyze various parameters related to microwave transmission lines and waveguides CO3:Identify microwave devices for several applications CO4:Analyze various antenna parameters necessary for building an RF system CO5:Recommend various antenna configurations according to the applications
34	17EC72	Digital Image Processing	CO1 : Illustrate image formation and the role of human visual system plays in perception of gray and color image data CO2 : Apply image processing enhancement techniques in both spatial and frequency(Fourier) domain CO3 : Distinguish restoration in presence of noise in doth spatial and frequency domain CO4 : Evaluate color models and morphological image processing CO5 : Analyze image segmentation, representation and boundary descriptors
35	17EC73	Power Electronics	CO1: Acquire the knowledge about structure, switching, control characteristics of various power devices and identify the various applications associated with it. CO2: Describe two transistor model of SCR and analyze various triggering circuits used for different semiconductor switches. CO3: Design and analyze various controlled rectifier circuits and learnt to select Suitable power electronic devices as per the requirements CO4: Design and analyze various ac voltage controller circuits and learnt to select Suitable power electronic devices as per the requirements. CO5: Formulate & analyze operation of dc choppers, inverters, different types of static switches and assess the performance

36	17EC743	Real Time Systems	CO1: Classify various Real time systems CO2: Explain the concepts of computer control, CO3: Explain the concepts of operating system and the suitable computer hardware requirements for real-time applications. CO4: Asses the software languages to meet Real time applications. CO5: Apply suitable methodologies to design and analyze Real-Time Systems.
37	17EC752	IOT &WSN	CO1: Identify the different IOT conceptual frameworks, architectural views and components in IOT network/M2M with respect to OSI Layers. CO2: Outline the design principles for connected devices, internet connectivity and cloud services/platform/concerns. CO3: Explore IDEs, open sources available for the analysis and development of IOT APIs and applications. CO4: Appreciate the need for privacy, security in IOT, and identify the relevant/essential issues related to IOT and WSN. CO5: Assess the applicability of communication protocols for IOT and Wireless Sensor Networks.
38	17ECL76	Advanced Communication Lab	CO1: Design & Demonstrate generation and detection of Digital Modulation Schemes and TDM. CO2:Determine the characteristics and response of Microwave devices and Optical wave guide CO3: Determine the characteristics of Micro strip antenna and compute the associated parameters . CO4: Measure Frequency, Wavelength, Power and Attenuation of Klystron Bench CO5: Simulate the Digital Modulation Scheme & line Codes with display of waveform.

39	17ECL77	VLSI Lab	CO1: Demonstrate the behavior of basic gates, buffer and transmission gate using Verilog coding. CO2: Realize the operation of flip-flops, adders, counters and SAR and verify the results. CO3 Design and draw Schematic, layout and verify LVS, DC and transient analysis of a CMOS Inverter. CO4 Design and draw Schematic, layout and verify DC, AC and transient analysis of CMOS differential amplifier, common source amplifier, common drain amplifier. CO5 Design and draw Schematic, layout and verify the simulation results of R-2R DAC, Op-Amp and SAR CMOS NAND and NOR gates.
40	17EC81	Wireless Cellular& LTE 4G Broadband	CO1. Appraise the historical evolution of cellular wireless technologies and identify the significance of different organizations/regulatory bodies across the world and the key technological enablers of LTE. CO2. Identify the essential wireless networking & communication technologies behind the LTE and related practical implementation challenges considering both uplink and downlink channels. CO3. Analyze air interface protocol, channel structure and related layer features for both downlink and uplink channels in the LTE standard.

41	17EC82	Fiber Optics & Networks	CO1:Classification and working of optical fiber with different modes of signal propagation. CO2:Describe the transmission characteristics and losses in optical fiber communication. transmission lines and waveguides CO3:Describe the construction and working principle of optical connectors, multiplexers and amplifiers. requirements for real-time applications. CO4:Describe the constructional features and the characteristics of optical sources and detectors. CO5:Illustrate the networking aspects of optical fiber and describe various standards associated with it.
42	17EC833	Radar Engineering	CO1: Demonstrate the understanding of the radar fundamentals, radar signals, Radar operating frequencies and its applications. CO2: Analyze the modified Radar range equation for the prediction of range performance and the detection of target signal in a noisy environment. CO3: Analyze the working principle of MTI and Doppler radar with its design considerations and relate the importance of microwave engineering and digital signal processing in the growth of RADAR technology. CO4: Compare Monopulse tracking and sequential lobing Radar tracking systems. CO5: Apply the fundamental knowledge of Antenna theory and communication systems for the parametric study of Radar subsystems, which includes Radar antenna, Radar Receiver, Duplexers, Receiver Protectors and Radar Displays.

	17EC84	Intrenship/Professional Practice	CO1: Design Project-related skills to develop a project CO2:Develop Employability enhancing activities CO3: Develop Professional behavior Onsight CO4:Develop their Communication skills
44	17ECP85	Project Work	CO1: Identify an Engineering problem and find appropirate solution for it. CO2: Design a project for current industrial standards CO3: implement project work in laboratory and industrial site CO4: Evaluate knowledge of contemporary issues and able to apply effectively for project management
45	17ECS86	Seminar	CO1: Students will better understand the role that effective presentations have in public/professional contexts and gain experience in formal/ informal presentation CO2:Students will demonstrate the ability to discern the assignment's intended audience and objectives and respond appropriately CO3: Students will be able to construct a paper consistent with expectations of the discipline, including an appropriate organization, style, voice and tone CO4: Students will be able to access information in a variety of ways appropriate to a discipline, including locating and using library collections and services and other search tools and databases and collaborate to work on intellectual projects.

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Principal
Ballari Institute of Technology & Management
BELLARY

CO's DATA 2018 SCHEME

Slno	Subject code	Title	Course Outcomes
1	18MAT31	Transform Calculus, Fourier Series And Numerical Techniques	CO1: Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering. CO2: Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory. CO3: Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems. CO4: Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods. CO5: Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
2	18EC32	Network Theory	CO1: Apply differential equation knowledge of mathematics to mesh/node analysis source transformation/source shifting of linear networks and to find the solution of passive linear networks CO2: Select and apply network theorems to obtain desired parameters of passive linear networks and also test linear passive two port networks. CO3: Correlate mathematical knowledge of initial value and final value theorem to analyze the behaviour of circuit elements under different transient conditions. CO4: Design as an individual to use the modern engineeirng simulation tool multisim/python programming to (i) verify network theorems (ii) Analyze the supernode and super mesh networks (iii) obtain RLC of a resonant circuit
3	18EC33	Electronic Devices	C203.1: Describe the principles of semiconductor Physics C203.2: Describe the principles and characteristics of different types of semiconductor devices C203.3: Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems. C203.4:Describe the fabrication process of semiconductor devices

4	18EC34	Digital System Design	CO1: Apply the fundamental concepts, terminology of logic design and different Boolean postulates and various simplification methods (K-map, Quin-MuClusky, MEV) to solve the given problem. CO2: Apply the knowledge of basic combinational components to design the other combinational circuits. CO3: Analyse the concepts of sequential circuits and design the different types of sequential circuits like registers, ripple counters. CO4: Design the various sequential circuits like synchronous counters, Mealy and Moore circuits. CO5: Design the various applications of digital circuits like code converters, ROM, PLAs, and FPGA.
5	18EC35	Computer Organization & Architecture	C205.1: Illustrate the functional units of Desktop, Notebook, Work station, Server and Super computers and analyze the basic performance equation of a processor. C205.2: To use instruction set and addressing modes in instruction execution and compare the same with Complex instruction set computer and Reduced instruction set computer. C205.3:Demonstrate the hardware and software features of a processor to communicate with its environment. C205.4:Summarize trade off between size, speed and cost with Random access memory, Read only memory and virtual memory of a processor. C205.5: Illustrate organization of single,multiple bus and microprogrammed processor.
6	18EC36	Power Electronics & Instrumentation	CO1: Build and test circuits using power electronic devices. CO2: Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters and SMPS. CO3: Define instrument errors. CO4: Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency. CO5: Describe the principle of operation of Digital instruments and PLCs and Use Instrumentation amplifier for measuring physical parameters.

7	18ECL37	Electronic Devices & Instrumentation Laboratory	C01: Understand the characteristics of various electronic devices and measurement of parameters. C02: Design and test simple electronic circuits C03: Use of circuit simulation software for the implementation and characterization of electronic circuits and devices.
8	18ECL38	Digital System DesignLaboratory	CO1: Apply Boolean laws to simply the digital circuits and design simple logic circuits. CO2: Design, test and evaluate various combinational circuits such as adder, subtractor, comparator, multiplexer and demultiplexer. CO3Construct the various flipflops and test for its functionality. CO4: Design and test the various sequential circuits such as shift register, pseudo sequence generators and counters. CO5: Simulate various sequential circuits.
9	18MAT41	Complex Analysis, Probability and Statistical Methods	CO1: Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory. CO2:Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing. CO3:Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field. CO4: Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data. CO5: Construct joint probability distributions and demonstrate the validity of testing the hypothesis.
10	18EC42	Analog Circuits	CO1: To design the basic BJT,MOSFET biasing circuits and analyze the small signal models. CO2: To understand the Mosfet amplifier configuration and analyze the frequency response of CS amplifier. CO3: To classify different feedback configurations and output stages. CO4: To analyze and apply Opamp with negative feedback. CO5: To analyze opamp circuits like ADC,active filters,applications of 555 timer.

11	18EC43	Control Systems	CO1: Derive a mathematical model of a given system(physical, mechanical or electrical) represented through block diagram and signal flow graph CO2: Determine the behaviour of time response and steady state errors of I and II order systems for standard test input signals CO3:Analyze the stability of a system using numerical (Rouths-Harwitz criteria)and graphical (root locus)app roach CO4: Evaluate and Correlate the stability of a system using time and frequency responses CO5:Model a control system in continuous and discrete time using state variable technique
12	18EC44	Engineering Statistics & Linear Algebra	CO1: Identify and associate single random variables with continuous and discrete distribution. CO2: Analyse bivariate or multivariate distribution and correlation between the random variables. CO3: Analyse the concepts of random process, power spectral densities with linear systems. CO4: Compute quantitative parameters for matrices, linear transformations and orthogonality of vectors and subspaces. CO5: Apply the techniques of determinants, use eigenvalues and eigenvectors to analyse the single valued decomposition.
13	18EC45	Signals & Systems	CO1: **Apply the Knowledge gained in the course to study the behaviour of a system by anlyzing the discrete components such as RC, LC Circuits, eualizers, amplifiers, filters and steady state response etc to anlyze the discrete components of a system.** **CO2: Analyze the given problem and then formulate appropriate solution for signal analysis and processing application using various time domian representations CO3: Exhibit the ability to use the latest tool such as Matlab or Python to simulate simple signal analysis and various CTF Properties CO4: Demonstrate the ability to design and test the systems with the help of Fourier Transforms** **CO5: Enhance the intra-Personal and inter-personal communication skills by working in group activietie to solve a given problem related to signals and systems, Z-Transforms**

14	18EC46	Microcontroller	Co1: Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller and Interfacing of 8051 to external memory and Instruction set of 8051. CO2: Write 8051 Assembly level programs using 8051 instruction set. CO3: Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051. CO4: Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, and I/O ports to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch. CO5: Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.
15	18ECL47	Microcontroller Laboratory	CO1: Enhance programming skills using assembly language and C. CO2: Write assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051. CO3: Interface different input and output devices to 8051 and control them using assembly language programs. CO4: Interface the serial devices to 8051 and do the serial transfer using C programming. CO5: Develop applications based on Microcontroller 8051.
16	18ECL48	Analog Circuits Laboratory	CO1: **Design** amplifier and Oscillator circuits using BJT/FETs and evaluate their performance characteristics. CO2: **Design** analog circuits using OPAMPs for different applications CO3: **Design and demonstrate** the 555 timer operations in Astable and Monostable configurations CO4: **Simulate and analyze** analog circuits that uses FETs/BJT and ICs for different electronic applications.
17	**18ES51**	Technological Innovation Management & Entrepreneurship	CO1:Recall and identify the relevance of management concepts & its principles. CO2:Describe, discuss and relate management functions adopted within an organization. CO3: Realize the social responsibilities towards business and entrepreneurship CO4:Understand the components in developing a business plan CO5:Awareness about various sources of funding and institutions

			supporting entrepreneurs
18	**18EC52**	Digital Signal Processing	CO1 Explain the frequency domain sampling and reconstruct discrete time signal CO2 Compute DFT of a discrete time sequence using Linear Transformation Techniques CO3 Evaluate Linear Convolution of Long input sequence and Impulse response using Overlap save and add methods CO4 Construct and design of digital IIR in Direct form I, Direct form II, digital FIR in linear , Lattice Structures using windowing technique CO5 Understand the DSP processor architecture
19	18EC53	Principles of Communication Systems(PCS)	C303.1: Analyse and compute performance of AM and FM modulation in the presence of noise at the receiver. C303.2Analyze and compute performance of digital formatting processes with quantization noise. C303.3 Multiplex digitally formatted signals at Transmitter and demultiplex the signals and reconstruct digitally formatted signals at the receiver.(m4,m5) C303.4 Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission.

20	18EC54	Information Theory and Coding	CO1: Examine mathematically the performance parameters of the digital communication system (information system) to solve simple engineering problems related to it. CO2: Analyze statistical modeling of independent and dependent information sources (Ex: Markov Source) for the given specifications. CO3: Apply the basic rules and properties of coding for fundamental Source coding to encode the source output by constructing r-ary codes with the help of suitable optimum source coding algorithm (Shannon's encoding algorithm, Shannon-Fano and Huffman encoding algorithm) for the given specifications. CO4: Analyze the design aspects of communication channels (Continuous and Discrete Channel Modeling) in terms of channel capacity and entropy functions. CO5: Design Channel encoder and decoder using different error control coding schemes (Block codes and Convolutional Codes) and realize the importance of Error control coding in Communication systems.
21	18EC55	Electromagnetic Waves	CO1: Solve problems on Electric force, electric field intensity due to point, linear, volume charges by applying Coulombs Law and Guass Law. CO2: Determine Energy and Potential for various charge distributions and apply continuity equation of current to calculate flow of current, total charge, charge density etc for Conductors. CO3: Apply Poissons and Laplace equations for solving boundary value problems associated with electrostatics and magneto-statics. CO4: Analyze the applications of magneto-statics by applying Biot-Savart law, Ampere's circuital law and derive the concepts of magnetic forces and materials to characterize the magnetic circuits. CO5: Analyze Maxwell's equations for Static fields, time varying fields, EM waves in free space, conductors and Evaluate power associated with EM waves using Poynting theorem.

22	18EC56	Verilog HDL	CO1:Depict the importance of HDL's and Current Trends in HDL's, VLSI IC circuit design flow. CO2:Utilize Verilog constructsas per the IEEE 1364-2001 Verilog standard to designand verify (testbench)the digital circuits for the given specifications. CO3: Differentiate between top down and bottom –up digital design flow, Modules and Module Instances in Verilog. CO4:Analyse the functionality of Verilog code for the specified digital logic circuit as per the given specifications. CO5: Identify the significance of tasks, functions, additional features such as procedural continuous assignment statements, override parameters, and issues involved in logic synthesis.
23	18ECL57	Digital Signal Processing Lab	CO1: Demonstrate sampling theorem and evaluate Impulse response of a given system CO2: Compute Linear and Circular convolution of two given sequences CO3:Evaluate Auto correlation and cross correlation of given sequences and verify their properties CO4: Draw Magnitude and frequency spectrum by computing N point DFT of a sequence CO5: Design FIR and IIR Filters. Implement FIR and IIR Filters to meet the given specifications
24	18ECL58	HDL Laboratory	CO1:Apply the Verilog HDL/VHDL constructs to model a list of combinational and sequential digital circuits in dataflow, behavioral or gate styles and simulate the same using Xilinx/Modelsim/Altera or any EDA tool. CO2:Write Synthesizable Verilog/VHDL codes to describe digital circuits and program FPGA/CPLD to experience the semi-custom VLSI design flow. CO3:Demonstrate the use of FPGA/CPLD to interface external peripherals such as stepper motor, LCD, DC Motors and validate the designs usingappropriate apparatus(likeoscilloscope) for the given specifications. CO4:Demonstrate the use of Verilog HDL/VHDL constructs to generate waveforms such as sine, triangular, square for the given specifications, and validate the same by interfacing DAC to FPGA/CPLD, and displaying on an oscilloscope.

Principal
Ballari Institute of Technology & Management
BELLARY

DEPARTMENT OF MECHANICAL ENGINEERING:

Programme outcomes (POs):

- **PO-1.Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO-2.Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO-3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.
- **PO-4.Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO-5.Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO-6.The engineer and society:** Apply to reason informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice.
- **PO-7.Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- **PO-8.Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO-9. Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO-10.Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO-11.Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO-12. Lifelong learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO's):

1. **PSO1:** Ability to utilize their knowledge in Mechanical Engineering Sciences on an applied basis.
2. **PSO2:** Ability to apply learned principles to the analysis, design, development and implementation to more advanced mechanical systems or processes.

Course Outcomes of all courses

Subject: BASIC THERMODYNAMICS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions.
CO-2	Determine heat, work, internal energy, enthalpy for flow &non-flow process using First and Second Law of Thermodynamics.
CO-3	Determine change in internal energy, change in enthalpy and change in entropy using TDS relations for ideal gases
CO-4	Incorporate available energy and unavailable energy. Interpret behaviour of pure substances and its applications to practical problems.
CO-5	Calculate Thermodynamics properties of real gases at all ranges of pressure, temperatures using modified equation of state including Vander Waals equation, Redlich Wong equation and Beattie-Bridgeman equation

Subject: Computer Aided Machine Drawing	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Improve their visualization skills.
CO-2	Understand the theory of projection.
CO-3	Make component drawings.
CO-4	Produce the assembly drawings using part drawings.
CO-5	Engage in lifelong learning using sketching and drawing as communication tool.

Subject: Metal casting & welding	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Describe the casting process, preparation of Green, Core, dry sand moulds and Sweep, Shell, Investment and plaster moulds. Explain the Pattern, Core, Gating, Riser system and Jolt, Squeeze, Sand Slinger Moulding Machines.
CO-2	Compare the Gas fired pit, Resistance, Coreless, Electrical and Cupola Metal Furnaces; Compare the Gravity, Pressure die, and Centrifugal, Squeeze, slush and Continuous Metal mould castings.
CO-3	Explain the Solidification process and Casting of Non-Ferrous Metals.
CO-4	Describe the Metal Arc, TIG, MIG, Submerged and Atomic Hydrogen Welding processes used in manufacturing. Explain the Resistance, Explosive, Thermit, Laser and Electron Beam Special type of welding process used in manufacturing.
CO-5	Describe the Metallurgical aspects in Welding and inspection for the quality assurance of product made of casting and joining process.

Subject: MMM	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the concepts of Metrology, Standards, Calibration and apply knowledge of Linear, Angular measurements
CO-2	Understand the various types of comparators and their applications along with system of Limits, tolerance and gauging principles
CO-3	Describe Screw thread, Gear terminology and their measurements using different methods and understand Laser, CMM machines
CO-4	Explain measuring system, its components, transducers, Primary, Intermediate Transducing devices.
CO-5	Describe Terminating and Mechanical measurements --Force, Temperature, Pressure and Strain measuring devices

Subject MECHANICS OF MATERIALS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations. Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads.
CO-2	Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle. Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders
CO-3	Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples. Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL. Determine slopes and deflections at various points on beams subjected to UDL, UVL, Point loads and couples
CO-4	Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also to determine elastic stability of columns using Rankin's and Euler's theory.
CO-5	Understand the concept of strain energy and compute strain energy for applied loads and apply the theories of failures.

Subject: MATERIAL SCIENCE	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Describe the mechanical properties of metals, their alloys and various modes of failure
CO-2	Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.
CO-3	Explain the processes of heat treatment of various alloys.
CO-4	Understand the properties and potentialities of various materials available and material selection procedures.

CO-5	Know about composite materials and their processing as well as applications.

Subject: MACHINE TOOLS AND OPERATIONS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	To Explain the construction and specification of various machine tools
CO-2	To Describe various machining process pertaining to relative motion between tool and work piece
CO-3	To discuss different cutting tool materials, tool nomenclature and surface finish
CO-4	To apply mechanics of machining process to evaluate machining time
CO-5	To analyze tool wear mechanisms and equations to enhance tool life and minimizing machining cost

Subject: FOUNDRY AND FORGING Lab	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	To provide an insight in to different sand preparation and foundry equipment
CO-2	To Provide an insight in to different forging tools and equipments
CO-3	To provide training to students to enhance their practical skills
CO-4	To practically demonstrate precautions to be taken during casting and hot working
CO-5	To develop team qualities and ethical principles

Subject: Machine Shop LAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	List the different parts of lathe, shaping and milling machines
CO-2	Develop the model independently by using lathe
CO-3	Develop the model independently by using shaping
CO-4	Differentiate between shaping and planning
CO-5	Calculate the index crank movement for cutting gears/teeth using simple indexing method.

Subject Mechanical Measurements and Metrology Lab	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	To Calibrate Pressure Gauge, LVDT, Thermocouple, Load Cell, Micrometer
CO-2	To Measure Angle Using, Sine Bar, Sine Center, Bevel Protractor, Alignment Using Autocollimator
CO-3	To Demonstrate Measurements Using Toolmakers Microscope, Optical Projector, Optical Flates

CO-4	To Measure Screw Thread Parameters, Gear Tooth Profile Using 2- Wire Method, Vernier Gear Tooth Micrometer
CO-5	To Measure Surface Roughness Using Comparator and To Measure Cutting Tool Forces Using Lathe, Drill Tool Dynamometers

MATERIAL TESTING LAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Acquire experimentation skills in the field of material testing
CO-2	Develop theoretical understanding of the mechanical properties of materials by performing experiments
CO-3	Apply the knowledge to analyze a material failure and determine the failure inducing agent/s.
CO-4	Apply the knowledge of testing methods in related areas
CO-5	Know how to improve structure/behaviour of materials for various industrial applications

Subject: APPLIED THERMODYNAMICS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.
CO-2	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment. Apply thermodynamic concepts to analyze turbo machines.
CO-3	Determine performance parameters of refrigeration and air-conditioning systems. Understand the principles and applications of refrigeration systems.
CO-4	Analyze air-conditioning processes using the principles of psychrometry and Evaluate cooling and heating loads in an air-conditioning system.
CO-5	Understand the working, applications, relevance of air and identify methods for performance improvement

Subject: FLUID MECHANICS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Identify and calculate the key fluid properties used in the analysis of fluid behaviour, Understand and apply the principles of pressure, buoyancy and floatation

CO-2	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
CO-3	Understand and apply the principles of fluid kinematics and dynamics.
CO-4	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
CO-5	Understand the basic concept of compressible flow and CFD

Subject: KINEMATICS OF MACHINES	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand and identify the working of mechanisms and their applications.
CO-2	Analyse the mechanisms with their velocity and acceleration diagrams through graphical approach.
CO-3	Function on multi-disciplinary teams.
CO-4	Analyse the mechanisms with their velocity and acceleration through analytical approach.
CO-5	Design the working profile of cam and analyse its outcome.

Subject: DESIGN OF MACHINE ELEMENTS I	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Apply the design standards and codes to analyze the stresses induced in the various components having different cross-section based on the type of load and their direction.
CO-2	Analyse and design threaded fasteners subjected to static, dynamic and fatigue loading together with eccentric loads and to solve problems using factor of safety for different components.
CO-3	Design and analyze the shafts subjected to fluctuating and combined loads, keys, couplings as well as cotter and knuckle joints.
CO-4	Analyse and design riveted joints, brackets and welded joints subjected to eccentric load and also to demonstrate the engineering solutions related to the design problems encountered.

Subject: DYNAMICS OF MACHINERY	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Gain the knowledge of static and dynamic equilibrium and analyse for four-bar and slider crank mechanisms with and with-out friction
CO-2	Understand the principles of balancing of rotating and reciprocating masses.
CO-3	Understand analyse the equilibrium of governors and gyroscopes for their respective applications
CO-4	Understand vibrations characteristics of single degree of freedom systems.
CO-5	Characterise the single degree freedom systems subjected to free and forced vibrations

	with and without damping

Subject: ENERGY & ENVIRONMENT	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Summarize the basic concepts of energy, its distribution and general Scenario.
CO-2	Explain different energy storage systems, energy management, audit and economic analysis.
CO-3	Summarize the environment eco system and its need for awareness.
CO-4	Identify the various types of environment pollution and their effects.
C05	Discuss the social issues of the environment with associated acts.

Subject: Management & Engineering Economics	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand needs, functions roles, scope, evolution of management and purpose of planning and analyze.
CO-2	Discuss decision making, organizing, staffing, Directing and controlling.
CO-3	select best economical model from various available alternatives.
CO-4	Understand various interest rate methods and implement the suitable one.
CO-5	Estimate various depreciation values of commodities.

Subject: NON-TRADITIONAL MACHINING	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Select a suitable machining process to produce different shapes of required accuracy.
CO-2	Evaluate the effects of different processes parameters.
CO-3	Analysis and apply the various metal machining techniques to produce different shapes.
CO-4	Participate and succeed in competitive examinations.
C05	Machining process applications

Subject: Turbo machines	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Define and classify the TM, Identify and describe the parts of TM. Understand the applications of Dimensionless numbers for solving fluid flow problems. Apply the knowledge of Thermodynamics of fluid flow to study various efficiencies of fluids and Reheat factor
CO-2	Apply the Euler's Turbine equation to obtain the velocity diagram and analysis of velocity diagram of a turbo machine with suitable scale ratio.

CO-3	Evaluate conditions for max. Blade efficiencies for different steam turbines Solve the problems using the velocity diagrams to obtain power output, rotor efficiency, etc for Steam and Hydraulic turbines.
CO-4	Evaluate the performance of centrifugal pump for single stage and multistage. Solve the problems using the velocity diagrams to obtain power output, rotor efficiency, etc for centrifugal pump
CO-5	Evaluate the performance of Compressors. Solve the problems using the velocity diagrams to obtain power output, rotor efficiency, etc of axial flow compressors.

Subject: MPIII	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Select a suitable metal forming process to produce different shapes. Evaluate the effect of different process parameters.
CO-2	Design a system & conduct experiment experiments analyse and interpret stress strain concepts.
CO-3	Identify the forging and rolling process. Design a system, extrusion process, component or process as per needs & Specification
CO-4	Analyze and apply the various metal forming techniques to produce different die shapes. Skills to use high energy rate forming processes for producing more complex shapes.
CO-5	Apply the powder metallurgy techniques to produce different shapes by controlling their metallurgy with different alloying elements.

Subject: ENERGY CONVERSION LAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Perform experiments to determine the properties of fuels and oils.
CO-2	To determine calorific value of fuel and viscosity of given fuel/oils
CO-3	Conduct experiments on engines and draw characteristics and Test basic performance parameters of I.C. Engine and implement the knowledge in industry
CO-4	Identify exhaust emission, factors affecting them and report the remedies.
CO-5	Determine the energy flow pattern through the I C Engine and Exhibit his competency towards preventive maintenance of IC engines.

Subject: FM LAB
COURSE OUTCOME STATEMENT

	At the end of the course, students will be able to ….
CO-1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
CO-2	Conduct experiments on hydraulic turbines and pumps to draw characteristics
CO-3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
CO-4	Determine the energy flow pattern through the hydraulic turbines and pumps
CO-5	Exhibit his competency towards preventive maintenance of hydraulic machines

Subject: Computer integrated manufacturing	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	To impart knowledge of CIM and Automation and different concepts of automation by developing mathematical models.
CO-2	To make students to understand the Computer Applications in Design and Manufacturing [CAD / CAM) leading to Computer integrated systems. Enable them to perform various transformations of entities on display devices.
CO-3	To expose students to automated flow lines, assembly lines, Line Balancing Techniques, and Flexible Manufacturing Systems.
CO-4	To expose students to automated flow lines, assembly lines, Line Balancing Techniques, and Flexible Manufacturing Systems.
CO-5	To expose the students to CNC Machine Tools, CNC part programming, and industrial robots. To introduce the students to concepts of Additive Manufacturing, Internet of Things, and Industry 4.0leading to Smart Factory.

Subject: DESIGN OF MACHINE ELEMENTS II	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Analyze & design curved beams, compound cylinders along with behaviour of stresses and power transmission elements
CO-2	Analyze & design helical compression & tension springs with respect to static & dynamic axial loads
CO-3	Analyze & design spur, helical, bevel, & worm gears with respect to tooth bending strength. Analyze and design various types of brakes and clutches and check for heat generation and dissipation
CO-4	Understand the principle operation of bearings, and the properties of lubricants. Also analyze and design the different parts of IC Engine.

Subject: Finite Element Method	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the concepts behind formulation methods in FEM
CO-2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
CO-3	Develop element characteristic equation and generation of global equation.
CO-4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts and solve them displacements, stress and strain induced
CO-5	Able to apply suitable boundary conditions to a global equation for heat transfer, fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strain induced

Subject: HEAT TRANSFER	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the basic concepts of laws governing modes of heat transfer, analyse different types of boiling and condensation process and basic terms used in mass transfer analysis.
CO-2	Analyse One dimensional transient heat conduction in solids with negligible internal temperature gradient (lumped system analysis) using transient temperature charts and derive general 3D conduction equation in Cartesian coordinate system along with Concepts of overall heat transfer co-efficient
CO-3	Explain the boundary layer concepts and applications of dimensional analysis for free and forced convection, recite the significance of dimensionless numbers.
CO-4	Explain different types of heat exchangers and analyse the LMTD & NTU for parallel and counter flow heat exchangers
CO-5	Explain the basic laws and terms used in radiation heat transfer

Subject: METAL FORMING	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Able to understand the concept of different metal forming processes
CO-2	Able to understand different yield criteria
CO-3	Able to approach metal forming processes both analytically and numerically
CO-4	Able to design metal forming processes

CO-5	Able to understand high energy rate forming methods and powder metallurgy

Subject: MECHATRONICS AND MICROPROCESSOR	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the concept of measurement and control system, working principle and applications of light sensor
CO-2	Define electrical systems, mechanical switches and understand the operational amplifier, digital signals and multiplexers
CO-3	Discuss the evaluation of micro-processor and understand the concept of conversion of real numbers, floating point notations, and over flow and underflow
CO-4	Understand the basic elements of control system 8085A and differentiate between microprocessor and microcontroller
CO-5	Analyze the organization of INTEL 8085 data address buses, programming 8085 processor and example of Intel 8085 and 4004 register organization

Subject: TQM	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Explain the various approaches of TQM
CO-2	Infer the customer perception of Quality
CO-3	Analyze customer needs and perceptions to design feedback system
CO-4	Apply statistical tools for continuous improvement of systems
CO-5	Apply statistical tools for industrial improvement

Subject: CAMA LAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Use the computer aided techniques to facilitate the process of product design and development
CO-2	Identify a set of design variables and the governing equations to analyze a conceptual design
CO-3	Optimize the mesh size and type and apply appropriate types of boundary constraints in the CAE process
CO-4	Analyze and optimize a design with the aid of modern CAE software.
CO-5	To apply the basic principles to carry out dynamic analysis to know the natural frequency of different kind of beams.

Subject: HEAT TRANSFER LAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….

CO-1	Perform experiments to determine the thermal conductivity of a metal rod
CO-2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values
CO-3	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin
CO-4	Estimate performance of a refrigerator and effectiveness of fin
CO-5	Estimate the effectiveness and NTU of parallel and counter flow Heat exchanger and Determine surface emissivity and Stefan Boltzmann constant .

Subject: ENGINEERING ECONOMICS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the fundamentals of the Engineering economics.
CO-2	Compare the various Project(s) using present worth/ Equivalent Annual worth methods.
CO-3	Compute the rate of return of the Project(s)
CO-4	Determine the Depreciation charges of the Machine/Equipment.
CO-5	Analyze the various alternatives & criteria of replacement and predict the effect of inflation on it.

Subject: EXPERIMENTAL STRESS ANALYSIS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Apply the method of electrical resistance strain gauges to study & characterize the behaviour of solid bodies.
CO-2	Analyse the strains induced using strain gauge rosettes.
CO-3	Illustrate the basic principles of photo elasticity, 2-D, 3-D photo elasticity and use it as an analysis tool.
CO-4	Determine stress-strain behaviour of solid bodies using methods of photo-elastic & brittle coatings.
CO-5	Analyse moire fringe by geometrical approach and displacement method.

Subject: HYDRAULICS AND PNEUMATICS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Differentiate between the terms hydraulics and pneumatics. Specify the fluid power systems. Apply Pascal's law to a hydraulic system. Explain the operation and various performance factors of gear, vane, and piston pumps.
CO-2	Explain the operation and features of hydraulic actuators and motors.
CO-3	To understand the various control components such as PCV,FCV,DCV
CO-4	Describe the operation of a complete hydraulic circuit drawn with symbols for all components and its maintenance.
CO-5	Demonstrate the purpose, construction, and operation of a pneumatic system. State the operating principles of fluidic devices, Understand the operation of electrical components used in electromechanical relay control systems.

Subject: MECHANICAL VIBRATIONS	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Discuss the importance of vibrations and Fourier theorem applied to engineering problems.
CO-2	Design various vibrations measuring instruments and Predict free and forced (harmonic, periodic, non-periodic) vibration of continuous systems.
CO-3	Compose linear vibratory models of dynamic systems with changing complexities (SDOF, MDOF), and of real life engineering systems.
CO-4	Formulate free and forced (harmonic, periodic, non-periodic) vibration response of single and multi-degree of freedom systems
CO-5	Analyse the signals using condition monitoring technique.

Subject: OPERATION RESEARCH	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understanding the basics of decision making and solving the LPP by various methods
CO-2	Finding the optimal solution for transportation and assignment problem
CO-3	Solving the project evaluation and network problems, queuing theory, service pattern and arrival pattern
CO-4	Finding the optimal strategy of a player using various dominance rule and by graphical method, sequencing of various jobs on various machines and graphical method

Subject: CIMLAB	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Generate CNC Lathe part program for Turning, Facing, Chamfer, Grooving, Step turning, Taper turning, circular interpolation etc.
CO-2	Generate CNC Mill part programming for point to point motions, line motions, circular interpolation, contour motion, pocket milling-circular, rectangular, mirror commands etc
CO-3	Use canned cycles for drilling, peck drilling, Boring, Tapping, Turning , Facing, Taper turning thread cutting etc
CO-4	Simulate tool path for different machining operations of small components using CNC Lathe & CNC Milling machine
CO-5	Use high end CAM packages for machining complex parts ; use state of art cutting tools and related cutting parameters; optimize cycle time .

Subject: Design Lab	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	To understand the working principles of machine elements such as Governors, Gyroscopes, etc..
CO-2	To identify forces and couples in rotating mechanical system components as well as natural frequency, logarithmic decrement, damping ratio and damping Coefficient in a single degree of freedom vibrating systems
CO-3	To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft.
CO-4	To determine the minimum film thickness, load carrying capacity, frictional torque and pressure distribution of journal bearing
CO-5	To measure strain in various machine elements using strain gauges and determine strain induced in a structural member using the principle of photo-elasticity

Subject: AUTOMOVITVE ENGG	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Compare different combustion chamber for I C engines and Explain methods of cooling and lubrication.
CO-2	Distinguish between supercharger and turbocharger with construction and operation.
CO-3	Describe battery, magneto and electronic ignition system and analyze emission standards.
CO-4	Classify suspension system and distinguish between mechanical, vacuum, hydraulic breaking system and analyze steering mechanism.
CO-5	Identify various pollutants and Understand emission standards.

Subject: FOUNDRY TECHNOLOGY	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Students can able to demonstrate the oxidation of liquid metals, gas dissolution in liquid metals, method of degassing, fluidity, factors affecting fluidity, fluidity tests, hot tearing, shrinkage of liquid metals.
CO-2	Introduction to casting design, redesign considerations, design for minimum casting stresses, Design for directional solidification for different condition.
CO-3	students can able understand the concept of crystallization and development of cast structure and concept of progressive and directional solidification, need of gating system and rise ring system in casting methods
CO-4	students can able to demonstrate the special moulding technique for manufacturing different components by using different pattern , developments in cupola melting-- Hot blast cupola, water cooled cupola, Balanced blast cupola, coke less cupola, cupola charge calculations, ferrous foundry; Melting procedures, casting characteristics , production , specification and properties of some ferrous metals

CO-5	Students can able to demonstrate the non ferrous foundry; Melting procedures, casting characteristics, production, specification and properties of some typical aluminium, copper and magnesium based alloy castings. Modernization and mechanization in foundry techniques

Subject: CONTROL ENGINEEREING	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Understand the concepts of control systems and build a mathematical model for non-electrical systems using analogy concept.
CO-2	Understand block diagram concepts and represent the same for different control systems
CO-3	Determine the time response of different order systems for various inputs
CO-4	Analyze the stability of the control systems using various techniques and Discuss the system compensation,
CO-5	Express and solve system equations in state variable form

Subject: OM	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Define production and operation management, basic approach of new and old systems of management
CO-2	Develop decision process, list the characteristics of decision-making and forecasting techniques
CO-3	Analyze the importance of capacity and location planning
CO-4	Apply the aggregate planning and plan for effective inventory management
CO-5	Discuss the overview of MRP-II and ERP capacity requirement planning and apply importance of purchasing and SCM

Subject: Project Work	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Interpret various Engineering problems
CO-2	Design and carryout a project for current industrial standards
CO-3	Demonstrate an ability to work in laboratory and industrial site on multidisciplinary tasks in teams
CO-4	Observe experimentally the impact of engineering solutions on society and need for sustainable development.
CO-5	Evaluate knowledge of contemporary issues and able to apply effectively for project Management.

Subject: SEMINAR	
COURSE OUTCOME STATEMENT	
	At the end of the course, students will be able to ….
CO-1	Students will better understand the role that effective presentations have in public/professional contexts and gain experience in formal/ informal presentation
CO-2	Students will demonstrate the ability to discern the assignment's intended audience and objectives and respond appropriately

CO-3	Students will be able to construct a paper consistent with expectations of the discipline, including an appropriate organization, style, voice and tone
CO-4	Students will be able to access information in a variety of ways appropriate to a discipline, including locating and using library collections and services and other search tools and DB.
CO-5	Students will demonstrate the ability to collaborate with others as they work on intellectual projects (reading, writing, speaking, researching...).

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Ballari Instiute of Technology & Management,
Ballari.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING:

Programme outcomes (POs):

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage project sand in multi-disciplinary environments.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
	Program Specific Outcomes
PSO1	Analyze, design and solve problems in the field of electrical and electronics engineering by applying knowledge acquired from core subjects allied subjects.
PSO2	Develop products or software using technological developments to cater the needs of society and the industry.

CO'S OF 3RD SEM SUBJECTS

TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES (18MAT31)
CO1: Use Laplace transform and inverse Laplace transform in solving differential/integral equation arising in network analysis, control systems and other fields of engineering.
CO2: Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3: Make use of Fourier transform and z-transform to illustrate discrete /continuous function arising in wave and heat propagation, signal and systems.
CO4: Solve 1st and 2nd order ordinary differential equations arising in engineering problems using in single step and multi step numerical methods.
CO 5: determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

ELECTRIC CIRCUIT ANALYSIS (18EE32)
CO1: Analyze DC & AC Networks by applying basic laws and transformation techniques.
CO2: Evaluate complexity of network using various transformation techniques and network theorems.
CO3: Solve numerical examples on series, parallel resonance and initial conditions.
CO4: Synthesize typical wave forms using Laplace transformation
CO 5: Evaluate the performance of two port network and unbalanced three phase system.

TRANSFORMER AND GENERATORS (18EE33)
CO1: Determine the efficiency, voltage regulation and equivalent circuit constants of a 1-phase transformer from O.C and S.C test.
CO2:Compare the types of 3-phase transformer connections (bank) with respect to advantages, disadvantages and applications.
CO3:Analyze the performance characteristics of D.C. generator and synchronous generators.
CO4: Determine the voltage regulation of a synchronous generator by EMF, MMF and ZPF methods.
CO5:Discuss the parallel operation of 1-phase transformer and synchronous generator.

ANALOG ELECTRONIC CIRCUITS (18EE34)
CO1: Examine the output response of clipper and clamper circuits
CO2: Analyze different transistor biasing circuits and transistor at low frequency
CO3: Derive the input and output impedances of feedback and general amplifiers
CO4: Evaluate the efficiency of power amplifiers and compare various oscillators
CO5: Analyze FET and MOSFET amplifiers in the common source mode with fixed bias configuration

DIGITAL SYSTEM DESIGN (18EE35)
CO1: Discuss combinational circuits.
CO2: Implement adder, subtractor, decoder, encoders, binary comparators, multiplexers, demultiplexers and code converter.
CO3: Design sequential circuits
CO4: Analyze Moore and Mealy models and State machine notations.
CO5: Explain the functioning of Read only and Read/Write Memories, Programmable ROM, EPROM and Flash memory.

ELECTRICAL & ELECTRONIC MEASUREMENT (15EE36)
CO1: Determine the values of Resistance, Inductance, Capacitance and magnetic circuit parameters.
CO2: Deduce the Expressions for various parameters such as torque, power, power factor of 3-phase circuits.
CO3: Analyse the methods of extension of Instrument ranges .
CO4: Compare Electronic and Digital Instruments.
CO5: Distinguish display devices and Recording devices.

ELECTRICAL MACHINES LAB-1(18EEL37)
CO1: Pre-determine efficiency, voltage regulation and equivalent circuit constants of a 1-phase transformer by conducting O.C and S.C tests.
CO2: Perform parallel operation of two different kVA transformers to determine the load shared by each transformer.
CO3: Conduct experiments on 3-phase transformer connections (Bank) to determine the efficiency.
CO4: Pre-determine voltage regulation of a 3-phase synchronous generator by EMF and MMF methods by Conducting O.C and S.C tests.
CO5: Analyze the performance of synchronous generator by connecting it to the infinite bus bar.

ELECTRONICS LABORATORY(18EEL38)
CO1:Test rectifier circuits with and without filter.
CO2: Analyse BJT amplifier and oscillators.
CO3: Realize Boolean expressions, adders and subtractors using basic gates.
CO4: Design BCD to excess 3 code converter, binary to gray code converter.
CO5: Design counters and sequence generators.

CONSTITUTION OF INDIA, PROFESSIONAL ETHICS AND CYBER LAW (CPC) (18CPC39)
CO 1: Have constitutional knowledge and legal literacy.
CO 2: Understand Engineering and Professional ethics and responsibilities of Engineers.
CO 3: Understand the the cybercrimes and cyber laws for cyber safety measures.

CO'S OF 4th SEM SUBJECTS

COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS (18MAT41)
CO1: Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
CO2: Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
CO3: Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
CO4: Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
CO5: Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

ELECTRICAL POWER GENERATION (18EE42)
CO 1:Analyse block diagram pertaining to different power plants
CO 2:Identify the equipments employed in power plants & sub-stations
CO 3:Adopt suitable grounding methods of electrical equipment in power system.
CO 4:Analyse the economic aspects of power generation
CO 5:Select suitable methods for improving the power factor.

TRANSMISSION AND DISTRIBUTION (18EE43)
CO-1:Calculate sag at different levels of support and deduce expressions for advantages of high voltage transmission.
CO-2:Compare Insulator types, methods of increasing string efficiency,GMR & GMD.
CO-3:Estimate the values of inductance and capacitance with equilateral & unsymmetrical spacing, ABCD constants.
CO-4:Categorize the transmission lines and Underground cables.
CO-5:Analyse AC distribution systems, advantages & Disadvantages of Corona, methods of reducing corona.

ELECTRIC MOTORS (18EE44)
CO-1:Determine the losses and efficiency of DC machines by direct and indirect tests.
CO-2:Analyse the performance characteristics of 3-phase induction motors.

CO-3:Discuss the speed control methods of DC and AC motors.
CO-4:Compare construction, operation, characteristics and applications of single phase induction motors and special motors.
CO-5:Analyse the performance characteristics of synchronous motor.

ELECTROMAGNETIC FIELD THEORY (18EE45)
CO-1:Solve problems on electric force, electric field intensity due to point, linear, volume charges by applying Coulomb's law and Gauss's law.
CO-2:Determine energy and potential for various charge distributions and apply continuity equation of current to calculate flow of current, total charge, charge density for conductors.
CO-3:Apply Poisson's and Laplace's equation for solving boundary value problems associated with electrostatics and magneto-statics.
CO-4:Analyze the applications of magneto-statics by applying Biot-savart's law, Ampere's circuital law and derive the concepts of magnetic forces and materials to characterize the magnetic circuits.
CO-5: Analyze Maxwell's equations for static fields, time varying fields, EM waves in free space, conductors and evaluate power associated with EM waves using Poynting theorem.

OPERATIONAL AMPLIFIERS AND LINEAR INTEGRATED CIRCUITS (18EE46)
CO-1:Analyze the operations of Op-Amp, Regulator, Timer and PLL.
CO-2:Design linear circuits using Linear IC's.
CO-3:Construct Comparators, Converters signal processing circuits, filters and voltage regulators.
CO-4:Analyze the performance factors of PLL and generators
CO-5:Demonstrate the applications of 555 Timer and Converters.

ELECTRICAL MACHINE LAB-2 (18EEL47)
CO-1: Conduct an experiment to control the speed of DC Shunt motor by armature and field control methods.
CO-2: Pre-determine the losses and efficiency of DC machines by conducting direct and indirect loading tests.
CO-3: Assess performance characteristics of DC shunt motor, 1-Ø induction motor and 3-Ø induction motor by performing load test .
CO-4: Analyze the performance characteristics of 1-Ø and 3-Ø induction motors by Conducting No-load and Blocked rotor tests.
CO-5: Perform experiment on synchronous motor to draw V-curves and Inverted V-curves for different loads.

OP- AMP AND LINEAR ICS LABORATORY (18EEL48)
CO-1: Design precision fill wave rectifier and RC phase shift oscillator.
CO-2:Analyze inverting & non inverting amplifiers using op-amp
CO-3:Demonstrate the operation of Schmitt trigger, comparator, ZCD, adder, subtractor, integrator, differentiator circuits using
CO-4:Examine the operation of R-2R ladder DAC& 2-bit Flash ADC
CO-5:Analyze IC555timer based pulse generator for specified pulse and voltage regulator using 78 and79 series ICs.

CO'S OF 5th SEM SUBJECTS

MANAGEMENT & ENTREPRENEURSHIP (18EE51)
CO-1:Compare management & administration with the principles and approaches , focusing on the managerial tasks and process.

CO-2: Analyze about the work allocation in the organization, the modes of communication and importance of managerial coordination & control in business.
CO-3: Evaluate the social consideration for effective use in business applications.
CO-4: Distinguish the concepts of entrepreneurship and the role and importance of the entrepreneur in economic development.
CO-5: Communicate the concepts of project management, capital building process, project feasibility study, project appraisal and project financing.

MICROCONTROLLER(18EE52)
CO-1:Differentiate between Microprocesssor and Microcontroller.
CO-2:Illustrate the internal organization of microcontroller and memory organization.
CO-3:Demonstrate programming proficiency using various addressing modes and instructions of microcontroller.
CO-4:Develop assembly and embedded C programs in 8051 microcontroller.
CO-5:Demonstrate the interfacing of microcontroller with external pheripheral devices.

POWER ELECTRONICS (18EE53)
CO-1:Analyse performance of diode rectifiers with R & RL loads.
CO-2:Compare the performance of various power semiconductor devices.
CO-3:Analyse various turn on, turn -off and protection methods of thyristors.
CO-4:Design various single phase & three phase power converters.
CO-5:Evaluate the performance of chopper and inverter circuits.

SIGNALS AND SYSTEMS (18EE54)
CO-1:Analyze different types of signals and perform various operations on signals
CO-2: Analyze various system properties
CO-3:Determine the response of systems using convolution sum , convolution integral, and block diagram representation of a linear time invariant system
CO-4:Solve differential equations and difference equations of system to determine response
CO-5:Apply the continuous time Fourier transform, discrete time Fourier transform, z-Transform, to the analysis of LTI continuous and discrete-time systems.

ELECTRICAL MACHINE DESIGN (18EE55)
CO-1:Classify the materials used in electrical machines with their design limitations.
CO-2:Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer.
CO-3:Develop the output equations of transformer, DC machines and AC machines.
CO-4:Design the field windings, stator and rotor circuits of a DC and AC machines.
CO-5:Analyze the effect of short circuit ratio on performance of synchronous machines.

HIGH VOLTAGE ENGINEERING (18EE56)
CO-1:illustrate conduction & breakdown in gases,liquid and solid dielectrics
CO-2:analyze the generation of high voltages,currents and impulse voltages
CO-3:measure of impulse voltages,currents and high voltages
CO-4:analyze the causes for over voltages and switching surges
CO-5:compare effective techniques for non destructive testing of materials and electrical apparatus

MICROCONTROLLER LAB (18EEL57)
CO-1:Implement the programming skills for data transfer, arithmetic, boolean and logical operations.
CO-2:Develop ALP for code conversion programs.
CO-3:Demonstrate ALP using subroutines for generation of delays, counters, configuration of SFRs for serial communication
CO-4:Illustrate interfacing of stepper motor and Dc motor for controlling the speed.
CO-5:Simulate different waveforms using DAC interface.

POWER ELECTRONICS LAB (18EEL58)
CO-1:Perform experiment to sketch the static characteristics of semi conductor devices
CO-2:Analyze Triggering of the SCR by different methods.
CO-3: Assess the performance of single phase controlled full wave rectifier and AC voltage rectifier with R and RL loads.
CO-4: conduct experiment to control speed of DC motor, universal motor and stepper motor.
CO-5: Analyze the performance of single phase full bridge inverter connected to R load.

ENVIRONMENTAL STUDIES (18CIV59)
CO1: Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
CO2: Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
CO3: Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.
CO4: Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

CO'S OF 6th SEM SUBJECTS

CONTROL SYSTEMS (18EE61)
CO-1:Develop the differential equations for given mechanical and electrical systems
CO-2:Apply block diagram manipulation and signal flow graph methods to obtain transfer function of systems
CO-3:Evaluate the stability of LTI systems using RH criterion, root locus, Bode Plot and Nyquist plot
CO-4:Investigate the performance of a given system in time and frequency domain
CO-5:Compare the different compensator configurations and controller configurations

POWER SYSTEM ANALYSIS – 1 (18EE62)
CO-1:Apply the concept of single line diagram and P.U system
CO-2:Evaluate short circuit analysis for symmetrical and unsymmetrical components in power system
CO-3:Apply the concept of sequence impedence and sequence network in power system
CO-4:Analyze 3- phase synchronous machine for different unsymmetrical faults using symmetrical component
CO-5:Analyze dynamics of synchronous machine,stability and EAC for different fault conditions

DIGITAL SIGNAL PROCESSING (18EE63)
CO-1:Compute DFT and IDFT of discrete time sequences using properties of DFT
CO-2:Evaluate DFTs using convolution methods
CO-3:Develop FFT algorithms for computing the DFT of Discrete time sequence.
CO-4:Design IIR and FIR filters
CO-5:Realize IIR and FIR digital filters in different structures

COMPUTER AIDED ELECTRICAL DRAWING (18EE643)
CO-1:To draw the DC and AC armature winding diagrams for given number of poles and slots or conductors.
CO-2:To draw single line diagrams of power stations from the station layout data.
CO-3:To draw sectional views of assembled transformer from design data.
CO-4:To draw sectional views of DC machine and its parts from design data.
CO-5:To draw sectional views of alternator and its parts from design data.

CONTROL SYSTEM LABORATORY (1EEL66)
CO-1:Evaluate time domain specifications of a typical second order system
CO-2:Analyse lead, lag and lead lag compensating networks
CO-3:Compare different types of controllers.
CO-4: Sketch the characteristics of AC,DC servomotors and synchro transmitter and receiver pairs
CO-5:Investigate the stability of given TF using Nyquist,Bode and Root locus plots.

DIGITAL SIGNAL PROCESSING LAB (1EEL67)
CO-1:Evaluate the impulse response of a system.
CO-2:Perform convolution of given sequence to evaluate the response of a system.
CO-3:Compute DFT and IDFT of a given sequence using the basic definition and fast method
CO-4:Provide a solution for a given difference equation.
CO-5:Design and implement IIR and FIR filters.

CO'S OF 7th SEM SUBJECTS

POWER SYSTEM ANALYSIS-2 (17EE71)
CO-1: Formulate network matrices and models for solving load flow problems.
CO-2:Perform steady state power flow analysis of power systems and solution of swing equation for multi-machine stability by using numerical iterative techniques.
CO-3:Adopt a method to control voltage profile and for optimal unit commitment.
CO-4: Discuss optimal scheduling for thermal system, hydro-thermal system, power system security and reliability.
CO-5:Analyze short circuit faults in power system networks using bus impedance matrix.

POWER SYSTEM PROTECTION (17EE72)
CO-1 Compare the performance of various relays.
CO-2:Distinguish between over current protection and distance protection
CO-3 Analyze different protection schemes of generator and transformer
CO-4: Categorize different types of circuit breakers and fuses
CO-5:Analyze protection against over voltages and Gas Insulated Substation

HVE (17EE73)
CO-1:illustrate conduction & breakdown in gases, liquid and solid dielectrics
CO-2:analyze the generation of high voltages, currents and impulse voltages
CO-3:measure of impulse voltages, currents and high voltages
CO-4:analyze the causes for over voltages and switching surges
CO-5:compare effective techniques for non destructive testing of materials and electrical apparatus

UTILIZATION OF ELECTRICAL POWER (17EE742)
CO1: Illustrate methods and applications of electric heating for industry.
CO2: Design illumination system for various applications.
CO3: Analyse mechanics of train movement and performance characteristics of traction motors
CO4: Discuss electric braking and electrification of traction system
CO5: Analyze the configuration of electric and hybrid-electric vehicles.

T & C (17EE752)
CO1: Identify the tools and equipments used for installation and maintenance of various electrical equipments.
CO2: Describe the process of plan, installation and commissioning of various electrical equipments.
CO3: Differentiate the performance specifications of various electrical equipments.
CO4: Explain the routine, type and special tests for various electrical equipments.
CO5: Illustrate the operation of an various electrical equipments and switchgears.

PSS LAB(17EEL76)
CO-1:Develop a program in MATLAB to evaluate the performance of short, medium and long transmission lines.
CO-2:Develop a program in MATLAB to evaluate the transient stability of a single machine connected to infinite bus bar under three phase fault in a radial power system by using swing equation.
CO-3:Develop programs in MATLAB to formulate bus admittance and bus impedance matrices of interconnected power systems.
CO-4:Use Mi-Power software package to solve power flow problem for simple power systems and to study symmetrical and unsymmetrical faults in radial power systems.
CO-5:Use Mi-Power software package to study optimal generation scheduling problems for thermal power plants and the power angle characteristics of salient and non-salient pole alternator.

RELAY & HIGH VOLTAGE LAB(17EEL77)
CO-1:Demonstrate the operation of microprocessor based and Electro mechanical type relays at fault conditions such as over current, over voltage and under voltage and plot their characteristics at different T.S.M's and P.S.M's
CO-2:Demonstrate operation of negative sequence relay, bias characteristics of differential relay.
CO-3:Demonstrate feeder and motor protection scheme and fault studies.
CO-4:Determine breakdown strength of gaseous and liquid insulators for HVAC and HVDC.
CO-5:Perform field mapping using electrolytic tank

PROJECT PHASE-I (17EEP78)
CO1:Identify real world electrical engineering problems through survey and review of literature.
CO2: Apply fundamental knowledge of mathematics, science and engineering principles in designing the system components with consideration of environmental factors, economy, safety and societal needs
CO3: Identify a suitable engineering technology /software tool/data interpretation for carrying out projects.
CO4: Demonstrate the knowledge, skills and attitude of professional engineers.
CO5: communicate effectively and develop technical report s ethically.

CO'S OF 8th SEM SUBJECTS

POWER SYSTEM OPERATION AND CONTROL(17EE81)
CO-1:Highlight the importance of SCADA and Unit Commitment in power system.
CO-2:Discuss the issues of hydrothermal scheduling and solutions to hydro thermal problems
CO-3:Model the AVR and ALFC loop for single area, multi-control area and interconnected system
CO-4:Analyze the need of reactive power and voltage stability in power system.
CO-5:Distinguish the different methods of state estimation and power system reliability.

IDA(17EE82)
CO-1:Analyze the dynamics and operational modes of electrical drives
CO-2:Determine the ratings of the motors based on duty cycle and thermal model of heating and cooling
CO-3:Compare the performance of DC motor drives fed by different converters
CO-4:Analyze the performance of AC motor drives under different operating conditions and Techniques
CO-5:Select the elctric drives based on the industrial applications

INTEGRATION OF DISTRIBUTED GENERATION (17EE833)
CO1: Review the different reasons for new type of power production in the power system
CO2: Analyze the effects of integration of distributed generation on the performance the system.
CO3: Examine increased risk of overloading and losses of DG integration
CO4: Analyze impact of distributed generation on voltage magnitude variation
CO5: Analyze various power quality disturbances developed due to DG integration.

INTERNSHIP (17EE84)
CO-1:Apply knowledge of the industry & skills learnt to classroom work.
CO-2:Acquire practical experience in industry
CO-3:Recognize the areas for career and skill development
CO-4:Develop the skills to enable lifelong learning
CO-5:Develop oral communication skills and develop technical reports ethically

PROJECT PHASE –II (17EEP85)
CO-1:Formulate real world electrical engineering problems through survey and review of literature.
CO-2: Develop project with consideration of environmental factors, economy, safety and societal needs.
CO-3:Apply appropriate technology/modern tools
CO-4:Demonstrate the leadership skills and ability to work individually as well as in team
CO-5:Develop oral Communication skills and write the project report ethically

TECHNICAL SEMINAR (17EES86)
CO-1:Identify topic of current, real-time issues in the field of electrical engineering. Through survey and review of literature
CO-2:Attain the knowledge of topic selected through independent and collaborative learning.
CO-3:Explore concepts in social and academic contexts .
CO-4:Apply principles of ethics and respect in interaction with others
CO-5:Communicate effectively to audience and develop technical reports ethically

Principal
Ballari Institute of Technology & Management
BELLARY

DEPARTMENT OF CIVIL ENGINEERING:

Program Outcomes (PO's):

Graduates Attributes (GAs) form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practice at the appropriate level. The GAs are exemplars of the attributes expected of a graduate of an accredited programme.The **Graduate Attributes** of the NBA are as following:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization for the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet t h e specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:**
   - The problems cannot be solved by straightforward application of knowledge, theories, and techniques applicable to the engineering discipline. *
   - That may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions.
   - That requires consideration of appropriate constraints/requirements not explicitly given in the problem statement. (like cost, power requirement, durability, product life, etc.).
   - Which need to be defined (modeled) within an appropriate mathematical framework
   - That often requires the use of modern computational concepts and tools.#
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling to complex engineering activities, with an understanding of the limitations.
6. **The engineer and society:** Apply to reason informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with t h e society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of t h e engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. The POs formulated for each program by the institute must be consistent with the NBA's Graduate Attributes. The POs must foster the attainment of the PEOs.

Program Specific Outcomes (PSO's)

- Graduates will be able to plan, analyze and design civil engineering structures by utilizing natural resources effectively.
- Graduates will be able to apply their civil engineering knowledge in the new age construction methods and techniques to solve real-life problems.

Course code	Course Name	CO-numbering	Statement
18CV14/24	Elements of civil Engineering and Engineering	C104.1	Mention the Application of various fields of Civil Engineering.
		C104.2	Compute the resultant of given force system subjected to various loads.
		C104.3	Comprehend the action of force moment and other loads on system of rigid bodies.
		C104.4	Locate the Centroid and compute the Moment of Inertia of regular and built-up sections.
		C104.5	Express the relationship between the motion of bodies and analze the bodies in motion.

Course code	Course Name	CO-numbering	Statement
18CV32	STRENGTH OF MATERIALS	C302.1	Apply the basic concepts of the stresses and strains for different materials and strength of structural elements.
		C302.2	To know the development of internal forces and resistance mechanism for one dimensional and two dimensional
		C302.3	To analyse and understand different internal forces and stresses induced due to representative loads on structural
		C302.4	To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and
		C302.5	To evaluate the behavior of torsional members, columns and struts.

Course code	Course Name	CO-numbering	Statement
18CV33	FLUID MECHANICS	C303.1	Apply the basic knowledge of fluid mechanics on fluid properties & sove problems on fluid pressure
		C303.2	solve problems on hydrostatics & fluid dynamics including practical applications
		C303.3	Evaluate the rate of flow through weirs & venturimeter
		C303.4	Evaluate the discharge through pipes using bernoulli's principal,discharge through notches
		C303.5	Evaluate the discharge through notches

Course code	Course Name	CO-numbering	Statement
18CV34	Building Materials and Construction	C304.1	Choose suitable building materials and test to be conducted.
		C304.2	Examine the soil properties to select suitable foundation
		C304.3	Classify the different Construction methods for building elements.
		C304.4	Design the stairs and also knowing about the doors, windows and formwork requirements
		C304.5	Relate the various materials required for building finishes.

Course code	Course Name	CO-numbering	Statement
18CV35	Basic Surveying	C305.1	Posses a sound knowledge of fundamental principles Geodetics
		C305.2	Measurement of horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
		C305.3	Measurement of vertical plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
		C305.4	Capture geodetic data to process and perform analysis for survey problems
		C305.5	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course code	Course Name	CO-numbering	Statement

18CV36	ENGINEERING GEOLOGY	C306.1	Understanding the earth and mineralogy concept
		C306.2	Identify kinds of rocks , asses their properties , Explain various terms in structural geology and rock mechanics
		C306.3	Explain aspects of landforms in construction and concept of earthquakes
		C306.4	Assess various structural features and geological tools in ground water Exploration, understanding hydrological cycle.
		C306.5	Apply remote sensing and GIS applications in civil engineering practice and concept of natural disaster

Course code	Course Name	CO-numbering	Statement
18CVL37	Computer Aided Building Planning & Drawing	C307.1	Use of different commands of AUTO CAD Software.
		C307.2	Create layout plan, sanction drawings, working drawing using concept of layers.
		C307.3	Select the tools in AUTO CAD software to draw the various building components.
		C307.4	Plan and design of residential or public building as per the given requirement.
		C307.5	Preparing the drawings and detailing of RCC structural elements and other civil related drawing.

Course code	Course Name	CO-numbering	Statement
18CVL38	Building Materials Testing Laboratory	C308.1	Identify Define materials properties and differentiate ideal construction materials
		C308.2	Know the importance of elastic constants such as youngs modulus,rigidity modulus and bulk modulus.
		C308.3	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
		C308.4	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
		C308.5	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding

Course code	Course Name	CO-numbering	Statement
18CV42	Analysis of Determinate Structures	C402.1	Evaluate the forces i n determinate trusses by method of joints and sections.
		C402.2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
		C402.3	Apply the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames
		C402.4	Determine the stress resultants in arches and cables
		C402.5	Understand the concept of influence lines and construct the ILD diagram for the moving loads.

Course code	Course Name	CO-numbering	Statement
18CV43	Applied Hydraulics	C403.1	Apply dimensional analysis to develop mathematical modeling
		C403.2	compute the parametric values in prototype by analyzing the corresponding model parameters
		C403.3	Design the open channels of various cross sections including economical channel sections
		C403.4	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, Compute water surface profiles at different conditions
		C403.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions

Course code	Course Name	CO-numbering	Statement
18CV44	Concrete Technology	C404.1	Choose the materials used to make concrete; including their sources, and its characteristics.
		C404.2	Demonstrate the tests relevant to the application of concrete at laboratory and site.
		C404.3	Identify the durability properties of concrete.

		C404.4	Evaluate properties of concrete in fresh and hardened state.
		C404.5	Design the concrete mix as per IS code specifications

Course code	Course Name	CO-numbering	Statement
18CV45	Advanced Surveying	C405.1	Apply the knowledge of geometric principles to arrive at surveying problems
		C405.2	Select modern instruments to obtain geo-spatial data and analyse the same to appropriate Engineering problems.
		C405.3	Analyse survey problems with the use of electronics instrumnents.
		C405.4	Design the different types of curves for deviating type of alignmnets.
		C405.5	Design of transition and vertical curves

Course code	Course Name	CO-numbering	Statement
18CV46	Water Supply & Treatment Engineering	C406.1	Adopt average and peak water demand for a community in water resource management.
		C406.2	Identify available sources of water, quantitatively & qualitatively and make apropriate choice for a community.
		C406.3	Examine the water quality and environmental significance of various parameters and plan suitable tretment system.
		C406.4	Design a comprehensive water treatment and distribution system to purify and distrribute water to the required water quality stan
		C406.5	Design a water supply system to purify and distrribute water to the required water quality standards

Course code	Course Name	CO-numbering	Statement
18CVL47	Engineering Geology Laboratory	C407.1	Identify different kinds of minerals,rocks and maps
		C407.2	identify various minerals and rock properties
		C407.3	apply and solve structural problems related to dip and strike
		C407.4	analyse interpretation of geological maps and satellite imageries
		C407.5	conduct experiment on electrical resistivity method for groundwater exploration

Course code	Course Name	CO-numbering	Statement
18CVL48	Fluid Mechanics and Hydraulic Machines Laboratory	C408.1	Apply the basic fundamentals to find the effect of fluid properties on a flow system
		C408.2	Analyse variety of a fluid flow and mesauring devices
		C408.3	Conduct experiments in pipe flows and open channel flows
		C408.4	Select and analyse an appropriate turbines with respect to given situtation in power plants
		C408.5	To estimate performance parameter of a given centrifugal and reciprocating pump

Course code	Course Name	CO-numbering	Statement
18CV51	Construction Management & Entrepreneurship	C501.1	List and explain the different characteristics ,functions, purpose of management, types of organization, project plans, prepare
		C501.2	Basic concepts of resource management, classify different types of construction equipments, estimate various costs, explain mate
		C501.3	Explain the concept of quality control, quality standards, factors affecting quality, ISO standards, TQM, concepts of HSE, ethics
		C501.4	Solve problems related to interests rates, payments & comparison of alternatives.
		C501.5	Describe entrepreneurship, MSME & different schemes of entrepreneurship, types of business plans and planning process, explai

Course code	Course Name	CO-numbering	Statement

18CV52	ANALYSIS OF INDETERMINATE STRUCTURES	C502.1	Apply the knowledge of mathematics and engineering in calculating slope, deflection, bending moment and shear force
		C502.2	Formulate and solve problems in Moment distribution method
		C502.3	Analyze structural system and interpret data by kanis method
		C502.4	Analyze the beams & indeterminate frames by stiffness matrix method
		C502.5	Evaluate flexibility methods to solve engineering problems

Course code	Course Name	CO-numbering	Statement
18CV53	DESIGN OF RC STRUCTURAL ELEMENTS	C503.1	Apply the concepts of design philosophy, and principles of limit state in the analysis of RC structures.
		C503.2	Analyse the forces and moments acting on RC elements using limit state method
		C503.3	Design the singly, doubly and flange RC beam sections for shear and torsion as per IS Code 456-2000
		C503.4	Design slabs and staircases by using the limit state concepts as per IS Code 456-2000.
		C503.5	Design of column and footing for different loading conditions.

Course code	Course Name	CO-numbering	Statement
18CV54	Basic Geotechnical Engineering	C504.1	Identify and classify the soil based on index properties
		C504.2	Describe the soil structure and compaction characterstics of soils
		C504.3	Explain the permeability of soil and ground water seepage.
		C504.4	Solve practical problems related to estimation of consolidation settlement of soil deposits also time required for the same
		C504.5	Estimate shear strength parameters of different types of soils using the data of different shear tests

Course code	Course Name	CO-numbering	Statement
18CV55	Municipal Wastewater Engineering	C505.1	Apply the methods of sewage disposal system in municipal & industrial waste water.
		C505.2	Acqurie capability to design sewer and sewer treatment plant.
		C505.3	Evaluate degree of treatment and type of treatment for disposal,reuse and recycle.
		C505.4	Identify the waste streams and design the industrial waste water treatment plant.
		C505.5	Inspect sewage and industrail effluent issues.

Course code	Course Name	CO-numbering	Statement
18CV56	Highway Engineering	C506.1	Identify the different modes of transportation, type of roads and pattern and phasing development in India.
		C506.2	Apply various engineering surveys to select ideal allignment to prepare drawings and report for new and realligned projects.
		C506.3	Design road gerometrics, structural components of pavement and drinage.
		C506.4	Examine the engineering properties of materials and suggest suitability of the same for construction of different components of fl
		C506.5	Estimate highway economics by different methods and knowledge of highway finance.

Course code	Course Name	CO-numbering	Statement
18CVL57	Surveying Practice	C507.1	Apply the basic principles of engineering surveying for linear measurements.
		C507.2	Apply the basic principles of engineering surveying for angular measurements.
		C507.3	Comprehend effectively field procedures required for a professional surveyor
		C507.4	Use techniques, skills and conventional surveying instruments necessary for horizontal plane measurements.
		C507.5	Use techniques, skills and conventional surveying instruments necessary for vertical plane measurements.

Course code	Course Name	CO-numbering	Statement
18CVL58	Concrete and Highway Materials Laboratory	C508.1	Conduct appropriate laboratory experiments and interpret the results.
		C508.2	Determine the quality and suitability of cement
		C508.3	Design appropriate concrete mix and Determine strength and quality of concrete.
		C508.4	Examine the road aggregates and bitumen for their suitability as road material.
		C508.5	Test the soil for its suitability as sub grade soil for pavements.

Course code	Course Name	CO-numbering	Statement
18CV61	Design of Steel Structural Elements	C601.1	Apply the basic concepts of limit state method in steel structures.
		C601.2	Recognize the design philosophy of steel structures also design structural steel joints
		C601.3	Design of steel members subjected to compression as per codel provision
		C601.4	Analyze and design of tension members & column bases.
		C601.5	Design of beams as per IS code specifications.

Course code	Course Name	CO-numbering	Statement
18CV62	Applied Geotechnical Engineering	C602.1	Identify the different geotechnical site investigation methods for different civil engineering projects
		C602.2	Analyze the Stresses in soils due to different load conditions
		C602.3	Estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
		C602.4	Design shallow foundation of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform b
		C602.5	Capable of estimating load carrying capacity of single and group of piles

Course code	Course Name	CO-numbering	Statement
18CV63	Hydrology and Irrigation Engineering	C603.1	Understand the importance of hydrology and Irrigation its components.
		C603.2	Measure precipitation and analyse the data and analyse the losses in precipitation.
		C603.3	Estimating runoff from deriving unit hydrographs for various durations and construction of S-curve
		C603.4	Discuss the benefits and methods of Irrigation, Finding the quantity of irrigation water and frequency of irrigation for various
		C603.5	Design the canal and computation of the reservoir capacity.

Course code	Course Name	CO-numbering	Statement
18CV645	Railway, Harbours, Tunnelling & Airports	C604.1	Identify the variours components of different modes of transport.
		C604.2	Identify the different design conspects of railways,tunnel,harbour and airports
		C604.3	Sketch the different components, layout of railways, harbours,tunnels and airport
		C604.4	Execute and schedule the various construction and maintainance work of different modes of transport
		C604.5	Design the length, requirements and components of railway and runway orientation of an airport.

Course code	Course Name	CO-numbering	Statement
18CV65	Non Conventional Energy Resources (Mechani	C605.1	
		C605.2	

		C605.3	
		C605.4	
		C605.5	

Course code	Course Name	CO-numbering	Statement
18CVL66	Software Application Laboratory	C606.1	Apply the fundamental concepts in the analysis and scheduling of different structural elements.
		C606.2	Analysis of plan trusses, continous beams and 3D framed structures usind Staad Pro.
		C606.3	Scheduling of building using microsoft project software.
		C606.4	Understanding the concept of spreadsheet to achieve various calculations in civil engineering field.
		C606.5	Prepare a map's using GIS software.

Course code	Course Name	CO-numbering	Statement
18CVL67	Environmental Engineering Laboratory	C607.1	Identify the different equipments & safety standards of water & wastewater.
		C607.2	Conducting experiments & estimating the concentration of different parameters
		C607.3	Distinguish the characteristics of Water and Wastewater.
		C607.4	Compare the test results with water & wastewater standards to draw suitable conclusion.
		C607.5	Able to demonstrate various testing procedures for water & waste water.

Course code	Course Name	CO-numbering	Statement
18CVEP	Extensive Survey project	C608.1	Identify the topography and different surveys required for various civil engineering projects.
		C608.2	Apply the various equipment and methods of survey for different civil engineering projects.
		C608.3	Analyse the field data and prepare the drawings based on the survey field work.
		C608.4	Design the various elements of water tank, water supply and highway engineering project.
		C608.5	Evaluate and calculate the bill of quantities for various works based on the survey and drawings prepared.

Course code	Course Name	CO-numbering	Statement
17CV71	Municipal Wastewater Engineering	C701.1	Apply the methods of sewage disposal system in municipal & industrial waste water.
		C701.2	Acqurie capability to design sewer and sewer treatment plant.
		C701.3	Evaluate degree of treatment and type of treatment for disposal,reuse and recycle.
		C701.4	Identify the waste streams and design the industrial waste water treatment plant.
		C701.5	Inspect sewage and industrail effluent issues.

Course code	Course Name	CO-numbering	Statement
17CV72	Design of RCC and Steel Structures	C702.1	Aquires the basic knowledge of combined footing using codal provissions.
		C702.2	Apply the knowledge of retaining wall using codal provissions
		C702.3	Able to Analyse the gantry girder using codal provissions.
		C702.4	Able to Analyse design the plate girder using codal provissions
		C702.5	Analyse the truss for different loading condition using codal provissions.

Course code	Course Name	CO-numbering	Statement

17CV73	HYDROLOGY AND IRRIGATION	C703.1	To know the importance of hydrology and Irrigation its components.
		C703.2	Measure precipitation and analyse the data and analyse the losses in precipitation.
		C703.3	Estimating runoff from deriving unit hydrographs for various durations and construction of S-curve
		C703.4	Discuss the benefits and methods of Irrigation, Finding the quantity of irrigation water and frequency of irrigation for
		C703.5	Design the canal and computation of the reservoir capacity

Course code	Course Name	CO-numbering	Statement
17CV744	Ground Water Hydraulics	C704.1	Characterize the properties of ground water & aquifier
		C704.2	Quantify the ground water flow
		C704.3	Analyse the flow of water in wells (well hydraulics)
		C704.4	Locate the occurrence of ground water and augment ground water resource
		C704.5	Apply ground water development method

Course code	Course Name	CO-numbering	Statement
17CV75	Repair and Rehabilitation & Retrofitting	C705.1	Apply Suitable Methods To Find The Deterioration Of Concrete Structures
		C705.2	Assess The Damage For Different Type Of Structure In Different Conditions.
		C705.3	Examine The Various Effects Of Environment Its Durability And Serviceability
		C705.4	Summarise The Principles Of Repair And Rehabilitation Of Structures
		C705.5	Recognise Ideal Materials For Different Repair And Retrofitting Technique.

Course code	Course Name	CO-numbering	Statement
17CVL76	Environmental Engineering Laboratory	C706.1	Identify the different equipments & safety standards of water & wastewater.
		C706.2	Conducting experiments & estimating the concentration of different parameters
		C706.3	Distinguish the characteristics of Water and Wastewater.
		C706.4	Compare the test results with water & wastewater standards to draw suitable conclusion.
		C706.5	Able to demonstrate various testing procedures for water & waste water.

Course code	Course Name	CO-numbering	Statement
17CVL77	Computer Aided Detailing of Structures	C707.1	Idetntify the autocad commands for detailing of structures
		C707.2	Apply the basic fundamentals of rcc and steel in structural drawings as per codal provisions
		C707.3	Select the tools in autocad software to draw the structural drawings of various RCC components
		C707.4	Prepare structural drawings of various steel connections by using autocad software
		C707.5	Presenting the reinforcement and other details of various structural elementsfor the purpose of field execution

Course code	Course Name	CO-numbering	Statement
17CV81	Quantity survey & Contract Management	C801.1	Apply engineering fundamentals to estimate and workout the quantities of civil engineering projects
		C801.2	Analyse the quantity of materials required for civil engineering works such as roads, manhole, septic tank as per specifications
		C801.3	Estimate the cost of expenditure of different items of works
		C801.4	Prepare contracts and tenders in construction practices.

		C801.5	Prepare detailed report considering estimation and valuation process.

Course code	Course Name	CO-numbering	Statement
17CV82	Design of Prestressed Concrete	C802.1	Apply the basic knowledge and understand the requirement of PSC members for present scenario.
		C802.2	Describe the methods of casting PSC members.
		C802.3	Analyse the stresses encountered in PSC element during transfer and at working, losses and efficiency
		C802.4	Apply the IS standards for designing the PSC elements
		C802.5	Design PSC beam for different requirements.

Course code	Course Name	CO-numbering	Statement
17CV833	PAVEMENT DESIGN	C803.1	List the characteristics, components and basic concepts of pavement.
		C803.2	Analyse stresses, strain and deflection by Boussinesq's, Burmister's and Westergaard's theory.
		C803.3	Design rigid pavement and flexible pavement confirming to IRC 58-2002 and IRC 37-2001.
		C803.4	Describe the different types of failures in flexible and rigid pavement and maintenance works.
		C803.5	Evaluate the functional and structural condition of pavement.

Course code	Course Name	CO-numbering	Statement
17CV84	INTERNSHIP	C804.1	Apply knowledge of the industry & skills learnt to classroom work.
		C804.2	Acquire practical experience in industry.
		C804.3	Recognize the areas for career and skill development.
		C804.4	Develop the skills to enable life long learning.
		C804.5	Develop oral communication skills and develop technical reports ethically.

Course code	Course Name	CO-numbering	Statement
17CVP85	PROJECT WORK	C805.1	Identify real world civil engineering problems through survey and review of literature.
		C805.2	Design and develop project with consideration of environmental factors, economy, safety and societal needs.
		C805.3	Apply appropriate technology/modern tools
		C805.4	Demonstrate the leadership skills and ability to work individually as well as in team.
		C805.5	Develop oral Communication skills and write the project report ethically.

Course code	Course Name	CO-numbering	Statement
17CVS86	SEMINAR	C806.1	Identify topic of current, real-time issues in the field of Civil engineering. Through survey and review of literature
		C806.2	Attain the knowledge of topic selected through independent and collaborative learning.
		C806.3	Explore concepts in social and academic contexts
		C806.4	Apply principles of ethics and respect in interaction with others.
		C806.5	Communicate effectively to audience and develop technical reports ethically

Principal
Ballari Institute of Technology & Management
BELLARY

DEPARTMENT OF MASTERS IN BUSINESS ADMINISTRATION:

Program Outcomes (PO's):

1. PO1: Apply knowledge of Management theories and practice to solve business problems.
2. PO2: Foster analytical and critical thinking abilities for data-based decision-making.
3. PO3: Ability to develop value-based leadership ability
4. PO4: Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of the business.
5. PO5: Ability to lead themselves and others in the achievement of organizational goals contributing effectively to a team environment.

Program-specific outcomes

- PSO1: To develop and demonstrate skills and competencies by integrating financial models to resolve unprecedented challenges.
- PSO2: To demonstrate knowledge, skills, and strategies to design effective marketing capabilities in the real-world environment.
- PSO3: Ability to manage the human capital and ensure effective HR audits for building competitive business.

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
Management Organizational & Behavior 18MBA11 (1st SEM) COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the concepts & principles of management
CO-2	Analyze the various aspects of centralization & decentralization
CO-3	Apply the fundamental principles of organization behavior
CO-4	Evaluate the individual attributes towards achieving organization goals.
CO-5	Develop the practical application of managerial & behavioral theories

Managerial Economics 18MBA12 (1st SEM) COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the micro economic concepts for effective functioning of a firm and Industry
CO-2	Assess and forecast demand
CO-3	Apply the concepts of production and cost for optimization of production
CO-4	Design competitive strategies like pricing, product differentiation etc and marketing according to the market structure
CO-5	Identify, assess profits and apply BEP for decision making

Accounting for Managers 18MBA13 (1st SEM) COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the concepts of Income tax with a comprehensive reading
CO-2	Analyse the different income heads of taxable incomes in Income Tax
CO-3	Evaluate the exemptions and deductions available for different assesses while computing the total income
CO-4	Analyse the corporate tax system
CO-5	Develop the Total income statement of individual assesses

Business Statistics & Analytics 18MBA14 (1st SEM) COURSE OUTCOME STATEMENT

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the basic concepts of descriptive statistic techniques to visualise data systematically
CO-2	Analyse the business situations with appropriate use of decision making techniques
CO-3	Evaluate the business scenarios to predict solution by using time series techniques
CO-4	Design and solve business problems using linear programming methods
CO-5	Communicate and comprehend the projects using network techniques

Marketing Management 18MBA15 (1st SEM) COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Have an ability to access the business scenario and apply the fundamental concepts of marketing to aid business solutions.
CO-2	Analyse various models of consumer buying behaviour for better visualization of customer traits.
CO-3	Formulate the marketing plans by evaluating the various factors of business situation.
CO-4	Design the implementation of commercial and distribution aspects of products and service.
CO-5	Communicate the viable marketing campaign by appropriate marketing strategy .

Managerial Communication 18MBA16 (1st SEM) COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the various communication theories and models for a better business communication.
CO-2	Distinguish various methods of communication for appropriate business scenarios.
CO-3	Examine the mechanics of writing and construct effective paragraphs in business letters.
CO-4	Demonstrate competencies in business presentations.
CO-5	Develop an art of business communication through business reports for analyzing business situations.

Recruitment & Selection 18MBAHR301 (3rd SEM) {HR Specilization}
COURSE OUTCOME STATEMENT

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the knowledge of job analysis and various techniques of job analysis in recruitment and selection process.
CO-2	Analyze the various sources of recruitment.
CO-3	Evaluate the procedure practiced for screening candidates.
CO-4	Construct various selection tests to evaluate ability of candidates in selection process.
CO-5	Design various documentations to execute selection process.

HR Analytics 18MBAHR302 (3rd SEM) {HR Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Develop Broad Understanding Of Theoretical Frame Work By Value Creation Through Demonstration Of Hr Analytics
CO-2	Ability To Evaluate Various Performance Indicators In The Hr Domain
CO-3	Able To Formulate data Creation Procedures For The Better Decision Making
CO-4	Ability To Conduct Activities In Assessing The Study Of Hr Contacts In Any Organization
CO-5	To Create Hr Scorecard For Measuring Various Functions

Compensation & Reward System 18MBAHR303 (3rd SEM) {HR Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the various conceptual frame works & models for effective planning in compensation management
CO-2	Analyze the various methods & techniques in calculating compensation of employees
CO-3	Evaluate the various forces & factors in determinig the comepensation benefits
CO-4	Create & implement performance based wages & incentive plans
CO-5	Design an legislative frame work for strategic implementation of compensation plans

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
Learning & Development 18MBAHR304 (3rd SEM) {HR Specilization}COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the fundamentals of learning theories and transfer of training in organization.
CO-2	Analyse the training needs of an organization.
CO-3	Assess and implement various contemporary methods of learning and development.
CO-4	Evaluate various training evaluation methods.
CO-5	Design various career management systems.

Industrial Relations & Legislations 18MBAHR305 (3rd SEM) {HR Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	To Apply the concepts of Industrial Relations.
CO-2	To illustrate the role of trade unions in the Industrial set-up for Greviance and Discipline Management
CO-3	To examine the labour relations issues pertaining to collective bargaining and legislations
CO-4	To evaluate a comprehensive prospective about the legal framework stipulated under, factories act and Industrial dispute act.
CO-5	Implimentation of various Industrial Acts.

Conflict & Negotiation Management 18MBAHR306 (3rd SEM) {HR Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the concepts of Conflict and Negotiation for Interpersonal Relations
CO-2	Analyse the nature of Conflict Management process
CO-3	Evaluate the Conflict and Negotiation Management techniques to resolve organizational conflicts.
CO-4	Examine the various Negotiation strategies for ethical negotiation
CO-5	Evaluate cross-cultural and gender dimensions of negotiation

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
Consumer Behavior 18MBAMM301 (3rd SEM) {MKTG Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Comprehend the concept of Consumer Behaviour and Cosummerism
CO-2	Apply the influences of factors affecting in Consumer behaviour decision making models
CO-3	Evaluate the internal dynamics such as personality,peception,learning,motivation and attitude
CO-4	Relate external influence like social clas, culture and groups
CO-5	Analyse the process of consumer diffusion of innovation

Retail Management 18MBAMM302 (3rd SEM) {MKTG Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Visualize and apply the contemporary retail management, issues, and strategies to scenario for retail application.
CO-2	Comprehend and Analyzing the strategic significance components in functionalizing the retail organization.
CO-3	Evaluating the various methods and techniques of Retail operations and Store management.
CO-4	Develop comprehensive research plans by accessing the national and international Retail scenario for business decisions.
CO-5	Effectively communicate the Audit and ethics in Retail Management.

Services Marketing 18MBAMM303 (3rd SEM) {MKTG Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Able to utilize the concepts of the services marketing with the overview of customer behavior towards service industry
CO-2	Able to analyze the customer expectation by appropriate tools and frame works
CO-3	Able to evaluate and develop the service outcomes with appropriate leadership strategies
CO-4	Able to design the service process with focus on employees and customer relationships.
CO-5	Ability to communicate service contents by appropriate element of service infrastructure over viewing the service scape and physical evidence.

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)

Advanced Financial Management 18MBAFM304 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the concept of capital structure and capital structure theories
CO-2	Evaluate the dividend policy of the firm
CO-3	Apply the techniques of inventory and receivable management
CO-4	Develop the techniques of managing different component of working capital in an organisation
CO-5	Forcasting cash flows by applying cash management models

Cost Management 18MBAFM305 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the cost methods and techniques to solve real time problems of the industries
CO-2	Demonstrate knowledge regarding overheads, apportionment and its application
CO-3	Analyse the various costs by using marginal costing techniques and make decisions
CO-4	Evaluate various budgets and compare costs using budgetory control and standard costing techniques
CO-5	Apply the emerging trends in costings like ABC and compare with traditional costing to help in cost audit

Project Appraisal Planning & Control 18MBAFM306 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply concepts of project planning in project appraisal.
CO-2	Analyze & appraise the implementation of project with the help of various tools and techniques.
CO-3	Assess financial & social risks concerned with project implementation.
CO-4	Evaluate the project constraints by assessing the qualitative & quantitative factors in capital budgeting.
CO-5	Develop the Total income statement of individual assesses

Advanced Financial Management 18MBAFM304 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the concept of capital structure and capital structure theories
CO-2	Evaluate the dividend policy of the firm
CO-3	Apply the techniques of inventory and receivable management
CO-4	Develop the techniques of managing different component of working capital in an organisation
CO-5	Forcasting cash flows by applying cash management models

Cost Management 18MBAFM305 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply the cost methods and techniques to solve real time problems of the industries
CO-2	Demonstrate knowledge regarding overheads, apportionment and its application
CO-3	Analyse the various costs by using marginal costing techniques and make decisions
CO-4	Evaluate various budgets and compare costs using budgetory control and standard costing techniques
CO-5	Apply the emerging trends in costings like ABC and compare with traditional costing to help in cost audit

Project Appraisal Planning & Control 18MBAFM306 (3rd SEM) {FINANCE Specilization} COURSE OUTCOME STATEMENT	
Course Outcome	***At the end of the course, students will be able to:***
CO-1	Apply concepts of project planning in project appraisal.
CO-2	Analyze & appraise the implementation of project with the help of various tools and techniques.
CO-3	Assess financial & social risks concerned with project implementation.
CO-4	Evaluate the project constraints by assessing the qualitative & quantitative factors in capital budgeting.

DMS-MBA-COURSE OUTCOME STATEMENT for 1st & 3rd Sem----Batch (2018-2020)	
CO-5	Create an implementation plan for a project.

Principal
Ballari Institute of Technology & Management
BELLARY