Don Bosco Institute of Technology, Bangalore

(NAAC Accredited Institution)

Department of Electrical and Electronics Engineering

(Accredited by NBA)

Dt: 08/04/2022

NEW VERSION

VISION OF THE DEPARTMENT

Aspire to be a center of excellence to impart value based education in the field of Electrical and Electronics Engineering to transform the young minds to serve the societal needs.

MISSION OF THE DEPARTMENT

1.To provide theoretical and practical knowledge in the field of Electrical and Electronics Engineering.

2.To enhance the computational skills by usage of software tools.

3.To provide the learning environment to gain knowledge of Inter-disciplinary domains.

4.To collaborate with industry to facilitate learning beyond the curriculum.

PROGRAM SPECIFIC OUTCOMES

PSO1: Apply the fundamentals of mathematics, electrical and electronics engineering knowledge to formulate and solve the problems.

PSO2: Use the tools and techniques to implement the solutions in the area of electrical and electronic systems.

PSO3: Develop the ability of interpersonal skills for successful adaptation in multi disciplinary platform.

PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: To contribute in implementation of products and services through technology development in the area of electrical engineering and allied fields.

PEO 2: To develop professionally through training and lifelong learning keeping abreast of the technology developments.

PEO 3: To develop leadership qualities and entrepreneurship skills.

8/4/2022

HOD – EEE

Head of the Department
Dept. of Electrical & Electronics Engg.
Don Bosco Institute of Technology
Kumbalagodu, Bangalore - 560 074

8/4/22

IQAC – Director

Director - IQAC
Don Bosco Institute of Technology
Mysore Road, Kumbalagodu
Bengaluru-560 074

8-04-2022

Principal

PRINCIPAL
Don Bosco Institute of Technology
Kumbalagodu, Mysore Road,
Bangalore-560 074

PROGRAM OUTCOMES (PO)

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and engineering specialization to the solution of complex engineering problems.

2. **Problem Analysis:** Identify, formulate, review research literature, and analyse 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 for complex problems.

5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

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 lifelong learning in the broadest context of technological change.

1/4/2022

HOD - EEE

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2021 Scheme (AY 2022-23)

3rd Semester Course Outcome Definition

Course Name **Course Code: 21MAT31**

Transform Calculus, Fourier Series and Numerical Techniques

C201.1	Know the use of periodic signals and Fourier series to analyse circuits and system communications
C201.2	Explain the general linear system theory for continuous time signals and digital signal processing using the Fourier Transform and Z- Transforms
C201.3	Employ appropriate numerical Methods to solve algebraic and transcendental equations
C201.4	Apply Greens theorem, Divergence theorem and Stokes theorem in various applications in the field of electro- magnetic and flow problems
C201.5	Determine the external of functions and solve the simple problems of the calculus of variations

Course Name: Analog Electronic Circuits & Op-Amps **Course Code: 21EE32**

C202.1	Obtain the output characteristics of clipper and clamper
C202.2	Design and compare biasing circuits for transistor amplifier switching
C202.3	Explain the concept of feedback ,its types and design of feedback circuits
C202.4	Design and anlyze the power amplifier ,FET ,MOSFET & Oscillators
C202.5	Demonstrate various applications of op-amps

Course Name: Electric Circuit Analysis **Course Code: 21EE33**

C203.1	Understand the basic concepts, basic laws and methods of analysis of DC and AC networks and reduce the complexity of network using source shifting, source transformation and network reduction using transformations.
C203.2	Solve complex electric circuits using network theorems.
C203.3	Discuss resonance in series and parallel circuits and also the importance of initial conditions and their evaluation.
C203.4	Synthesize typical waveforms using Laplace transformation.
C203.5	Solve unbalanced three phase systems and also evaluate the performance of two port networks.

Course Name: Transformer & Generators Course Code: 21EE34

C204.1	To Understand the construction and operation of single phase Transformers performance
C204.2	To understand the performance of three phase transformers and concepts of DC machines.
C204.3	To understand the performance of AC machines

Course Name: ELECTRICAL MACHINE LAB – 1 **Course Code: 21EEL35**

C205.1	To Evaluate the performance of single phase & Three phase Transformer and its operation
C205.2	To Compute the voltage regulation of synchronous generator.
C205.3	Evaluate the performance & Power angle curve of synchronous generators from the test data.

Course Name: Social Connect & Responsibility **Course Code: 21SCR36**

C206.1	Communicate and connect to the surrounding.
C206.2	Create a responsible connection with the society.
C206.3	Involve in the community in general in which they work.
C206.4	Notice the needs and problems of the community and involve them in problem – solving.
C206.5	Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
C206.6	Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and *democratic attitudes*.

Course Name : Constitution of India and Professional Ethics **Course Code: 21CIP37**

C207.1	Analyse the basic structure of Indian Constitution
C207.2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution.
C207.3	Know about our Union Government, political structure & codes, procedures.
C207.4	Understand our State Executive & Elections system of India.
C207.5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution.

Course Name: CIRCUIT LAB USING PSPICE **Course Code: 21EEL382**

C208.1	Able to design & simulate KVL & KCL
C208.2	Able to design and simulate various theorems
C208.3	Able to Design & simulate Resonance
C208.4	Able to Design & simulate Two port network

2021 Scheme (AY 2022-23)

4th Semester Course Outcome Definition

Course Name
Complex Analysis, Probability and Statistical Methods

Course Code
21MAT41

C211.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
C211.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing.
C211.3	Apply discrete and continuous probability distributions in analyzing the probability models.
C211.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for statistical data.
C211.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Course Name: Digital System Design **Course Code 21EE42**

C212.1	Develop simplified switching equation using K Map and Quine MC clusky techniques.
C212.2	Design multiplexer ,Encoder, decoder, adder, subtractor and comparators as digital combinational control circuits
C212.3	*Design flipflops, counter, shift register as sequential control circuits*
C212.4	Develop mealy/moore models and state diagrams for the given clocked sequential circuit and explain the functioning of different types of memories

Course Name: MICROCONTROLLER ***Course Code: 21EE43***

C213.1	Describe 8051 architecture, registers, internal memory organization, addressing modes, instruction.
C213.2	Write assembly and C program for ALU operations, data conversions, accessing data and I/O port programming.
C213.3	Summarize basics of Serial Communication & interrupts & develop 8051 programs for the same.
C213.4	Interface 8051 to work with external devices for ADC, DAC, sensors, stepper motor, DC motor, LCD, Keyboard, Elevator using ALP & C.

Course Name: Electric Motors Course Code: 21EE44

C214.1	Explain the classification of DC motors, different methods of speed control and determine the efficiency.
C214.2	Explain different tests conducted on dc motors, determine various parameters from the tests conducted and explain torque-slip characteristics of three-phase IM in different regions.
C214.3	Explain no-load and blocked-rotor tests on three-phase IM, determine its equivalent circuit parameters and evaluate the performance of 3-phase IM from circle diagram.
C214.4	Explain different methods of starting and speed control of three-phase IM and construction and operation of single-phase IM.
C214.5	Explain the operation of SMs, V and inverted V curves and construction & operation of special motors.

Course Name: Biology for Engineers **Course Code: 21BE45**

C215.1	Elucidate the basic biological cocepts via relevent industrial applications and case studies
C215.2	*Evaluate the principles of design and development, for exploring novel bioengineering* projects
C215.3	Corroborate the concepts of biomemetics for specific requirements
C215.4	Think critically towards exploring innovative bio based solutions for socially relevant *problems*

Course Name: ELECTRICAL MACHINE LAB – II **Course Code: 21EEL46**

C216.1	To determine the performance characteristics and control of speed of DC Machines
C216.2	To Perform test on Induction motor and their characteristics
C216.3	To Conduct test on synchronous motor and their performance curves

Course Name: Samskrutika Kannada **Course Code: 21KSK47**

C217.1	To introduce Kannada Language, literature and culture
C217.2	To attach a desire for Pre modern and Modern Kannada Literary works and culture
C217.3	To understand and mention about people associated with Kannada
C217.4	To use the Administartive and Common words associated with Administrartive Kannada

Course Name: Op-Amp Lab

Course Code: 21EL484

C218.1	To design and simulate full wave rectifier voltage follower and frequency response of inverting non -inverting op-amp amplifiers
C218.2	To design and simulate oscillator and schmitt trigger circuit
C218.3	TO design and simulate voltage comparator ,different methods of waveform generation based on Op-Amp
C218.4	To design and simulate the response of filters and generate various signal waveform
C218.5	TO design and analyze DAC,ADC and Op-Amp instrument amplifier

Course Name: Universal Human Values **Course Code: BUHK409**

C219.1	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind
C219.2	They would have better critical ability.
C219.3	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society)
C219.4	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction

Course Name: Inter/Intra Institutional Internship **Course Code: 21INT49**

C219B.1	Student is able to construct the company profiles by compiling the brief history management structure, achievement.
C219B.2	Able to learn asses it's strength threat opportunities.
C219B.3	Able to determine the challenges and future potential for organisation in particular and in general
C219B.4	Able to learn theory and practical situations by accompanying task during the period

Coordinator

HOD - EEE

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Course Outcome Definition

Semester: 5th **AY 2022-23**

Course: Management and entrepreneurship **Course Code: 18EE51**

C301.1	Explain the field of management, task of the manager, planning and steps in decision making
C301.2	Discuss the structure of organization, importance of staffing, leadership styles, modes of communication, techniques of coordination and importance of managerial control in business
C301.3	Explain the concepts of entrepreneurship and a businessman's social responsibilities towards different groups
C301.4	Show an understanding of role of SSI's in the development of country and state/central level institutions/agencies supporting business enterprises
C301.5	Discuss the concepts of project management, capital budgeting, project feasibility studies, need for project report and new control techniques

Course: Microcontroller **Course Code: 18EE52**

C302.1	Explain the architecture of 8051, Instruction Set, Registers, Memory organisation and addressing modes
C302.2	write 8051 assembly level and C Programs for ALU operations, data conversion, data serialisation, I/O operations
C302.3	Interface 8051 with real world devices such as LCDs, Keyboards, ADC, DAC and sensors.

Course: Power Electronics **Course Code: 18EE53**

C303.1	Explain application of power electronics types power diode it's characteristics free wheeling diode and diode rectifier
C303.2	Explain power transistor mosfet but igbt pulse transformer and opto coupler
C303.3	Able to explain thyristor characterics two transistor amplify turn on and off series and parallel protection ckts
C303.4	Able to explain controlled rectifier RL load with free wheeling diode 1-dual converter different types of AC voltage controller and DC to AC converters free

Course: Signals and Systems **Course Code: 18EE54**

C304.1	Classify the signals and systems and explain basic operations on signals and properties of systems
C304.2	Apply convolution in both continuous and discrete domain for the analysis of systems given impulse response of a system.
C304.3	Solve the continuous time and discrete time systems by various methods and their representation by block diagram
C304.4	Perform Fourier analysis for continuous and discrete time, linear time invariant systems
C304.5	Apply Z-transform and properties of Z transform for the analysis of discrete time systems

Course: Electrical Machine Design **Course Code: 18EE55**

C305.1	Able to discuss design factors, limitations, modern trends in design, manufacturing techniques and properties of different materials
C305.2	Derive the output equation for various electrical Machines
C305.3	Estimate the number of cooling tubes, no-load current and leakage reactance of transformer , stator & Rotor design of A.C & D.C Machines

Course: High Voltage Engineering **Course Code: 18EE56**

C306.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics, and solid dielectrics
C306.2	Explain generation of high voltages and currents
C306.3	Discuss measurement techniques for high voltages and currents
C306.4	Discuss overvoltage phenomenon and insulation coordination in electric power systems and testing of Electrical apparatus

Course: Microcontroller Lab **Course Code: 18EEL57**

C307.1	Write 8051 assembly level language programs for ALU operations, data transfer, arithmetic , Boolean and logical instructions & for code conversions
C307.2	Write 8051 assembly level language programs for various operations using subroutine for generation of delays, counters, configuration of SFRs for serial communication & Timers.
C307.3	Interface 8051 to work with external devices for Stepper motor control, DC motor control for controlling the speed
C307.4	Generate different waveforms using DAC Interface
C307.5	Work with a small team to carryout experiments using microcontroller concepts and prepare reports

Course: Power Electronics Lab **Course Code: 18EEL58**

C308.1	static characteristics of semiconductor devices to discuss their performance
C308.2	Trigger the SCR by differentmethods
C308.3	Verify the performance of single phase controlled full wave rectifier ,inverterand AC voltage controller with R and RL loads
C308.4	Control the speed of a dc motor, universal motor and stepper motors
C308.5	Perform Commutation of SCR by different methods

Environmental Studies **18CIV59**

C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale,
C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or questions related to the environment.
C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components
C309.4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

Course Outcome Definition

Semester: 6th

AY 2022-23

Course: CONTROL SYSTEMS **Course Code: 18EE61**

C310.1	Develop the mathematical model of mechanical and electrical system
C310.2	Develop transfer function for a given control system using block diagram reduction technique and signal flow graph method
C310.3	Determine transient and steady state time response of a simple control system
C310.4	Investigate the performance of a given system in time and frequency domain
C310.5	Determine the controller or compensator configuration and parameter values for the given design specification

Course: Power System Analysis 1 **Course Code: 18EE62**

C311.1	Able to model the power system components and construct PU impedance diagram of power system
C311.2	Able to analyse three phase symmetrical faults on Power system
C311.3	Able to Compute unbalanced phasor in terms of sequence components and vice versa and also develop sequence networks
C311.4	Able to analyse various unsymmetrical faults in power system

Course: Digital Signal Processing **Course Code: 18EE63**

C312.1	Apply DFT and IDFT to perform linear filtering techniques on given sequences to determine the output.
C312.2	Design and realise varioues IIR Filter using different techniques
C312.3	Design and realise various FIR Filter using different techniques

Electrical Vehicle Technology **18EE646**

C313.1	Able to explain the working of EV ,Hybrid EV and the energy storage requirements for EV and HEV
C313.2	Able to arrange the different power converter topology used for electric vehicle propulsion
C313.3	Develop and design the converter topology for EV application and transformer less topology for battery charging

Course: Remote Sensing and GIS **Course Code: 18CV651**

C314.1	Apply the knowledge of geometric principles to arrive at surveying problems
C314.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
C314.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments. 4
C314.4	Design and implement the different types of curves for devising type of alignments

Course: Control System Lab **Course Code: 18EEL66**

C315.1	Utilize software package and discrete components in assessing the time and frequency domain response of a given second order system
C315.2	Design, analyze and simulate Lead, Lag and Lag – Lead compensators for given specifications
C315.3	Determine the performance characteristics of ac and DC servomotors and synchro-transmitter receiver pair used in control systems.
C315.4	Simulate the DC position and feedback control system to study the effect of P, PI, PD and PID controller and Lead compensator on the step response of the system.
C315.5	Develop a script files to plot Root locus, Bode plot and Nyquist plot to study the stability of the system

Course: Digital Signal Processing Lab **Course Code: 18EEL67**

C316.1	Physical interpretation of sampling theorem in time & frequency domain
C316.2	Evaluate impulse response of a system
C316.3	Perform convolution & provide solution for given difference equation
C316.4	Compute DFT & IDFT of a given sequence using basic definition & fact methods
C316.5	Design & implement IIR & FIR filters

Course: Mini Project **Course Code: 18EEMP68**

C317.1	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
C317.2	Habituated to critical thinking and use problem solving skills
C317.3	Work in a team to achieve common goal
C317.4	Able to Manage the project by properly managing the finance.
C317.5	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms
C317.6	Present the mini-project and be able to defend it

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Course Outcome Definition

Semester: 7th

AY 2022-23

Course: Power System Analysis 2 **Course Code: 18EE71**

C401.1	Formulate Network Matrices and model for solving Load flow problems
C401.2	Perform steady state power flow analysis using numerical iterative techniques
C401.3	Analyse issues of economic load dispatch and Unit commitment Problems
C401.4	Analyse SC faults in power system Networks using Bus impedance matrix .
C401.5	Apply point by point method and Range kutta method to solve swing equation.

Course: Power System Protection **Course Code: 18EE72**

C402.1	Discuss performance of protection scheme component of protection scheme
C402.2	Discuss different types of protection relays effect of resistances on power swings
C402.3	Understand the pilot protection construction operation of different relays transformer and bus zones protection
C402.4	Understand different types of circuit breakers, fuses characteristics types protection against over voltage and over current modern trend in power system protection

Course: Solar and Wind Energy **Course Code: 18EE731**

C403.1	Discuss the importance of the role of renewable energy, the concept of energy storage devices and solar energy basic concepts.
C403.2	Discuss the concept of solar radiation data and application of solar thermal system
C403.3	Discuss the concept of solar PV system fabrication, operation of solar cell, sizing and design of PV system and application of solar PV system.
C403.4	Explain basic Principles of Wind Energy Conversion, collection of wind data, energy estimation and site selection and economics of wind energy.
C403.5	Discuss the performance of different wind-machines, energy storage, applications of wind energy and environmental aspects.

Course: Utilization of Electrical Power **Course Code: 18EE742**

C404.1	Explain different methods of electric heating & welding.
C404.2	Explain the laws of electrolysis, extraction, refining of metals and electro deposition process.
C404.3	Explain the laws of illumination, different types of lamps, lighting schemes and design of lighting systems.
C404.4	Analyze systems of electric traction, speed time curves and mechanics of train movement.

C404.5	Explain the motors used for electric traction, their control & braking and power supply system used for electric traction also Explain the working of electric and hybrid electric vehicles.

Course: Environmental Protection and Management **Course Code: 18CV753**

C405.1	To apply the corporate EMS compiling to international environmental management sysytem standards.
C405.2	To apply standards of various quality parameters with new technologies.
C405.3	To develop pollution prevention assessment team and implement waste minimization options.
C405.4	To prepare environmental audit systems for organizations.
C405.5	To apply EMS, waste audit and pollution prevention at various industries.

Course: POWER SYSTEM SIMULATION LAB **Course Code: 18EEL76**

C406.1	Assess the performance of medium and long transmission lines & to obtain the power angle characteristics of salient and non-salient pole alternator.
C406.2	Able to formulate bus admittance and bus impedance matrix of interconnected power system.
C406.3	Able tto solve power flow problems for simple power system.
C406.4	Able to assess the transient stability under 3 phase fault and unsymmetrical fault at different location in radial power system.
C406.5	Able to study optimal generation scheduling problem for thermal power plants.

Course: Relay and High Voltage Lab **Course Code: 18EEL77**

C407.1	Verify the characteristics of over current, under voltage and negative sequence relay for electromagnetic
C407.2	Verify the characteristics of microprocessor based over current, over voltage, under voltage relays
C407.3	Show knowledge of protecting motor and feeders.
C407.4	Analyze the spark over characteristics for both uniform and non-uniform configurations using High A and DC voltages.
C407.5	Measure high AC and DC voltages and breakdown strength of transformer oil
C407.6	Draw electric field and measure the capacitance of different electrode configuration models

Course: PROJECT PHASE – I AND SEMINAR **Course Code: 18EEP78**

C408.1	Undertake problem identification, formulation and solution
C408.2	Design engineering solutions to complex problems utilizing a systems approach
C408.3	Communicate with engineers and the community at large in written an oral forms
C408.4	Demonstrate a sound technical knowledge of their selected project topic

Semester: 8th **Course Outcome Definition**

AY 2022-23

Course: Power system Operation and control **Course Code: 18EE81**

C409.1	Describe various levels of controls in power systems, the vulnerability of the system components, architecture and configuration of SCADA
C409.2	Analyse Automatic Generation Control (AGC) and AGC in interconnected power systems
C409.3	Explain voltage, Reactive Power control, Reliability, Security and state estimation

Course: Power System Planning **Course Code: 18EE824**

C410.1	Understand planning methodology for optimum power system expansion with load forecasting & economic appraisal to mobilize resources to meet the investment
C410.2	Understand transmission, distribution and Planning requirement
C410.3	To analyse Reliability, Quality, Demand side planning and electrical market

Course: PROJECT WORK PHASE –II **Course Code: 18EEP83**

C411.1	Make links across different areas of knowledge and to generate, develop and evaluate ideas and information so as to apply these skills to the project task.
C411.2	Habituated to critical thinking and use problem solving skills
C411.3	Learn on their own, reflect on their learning and take appropriate actions to improve it.
C411.4	Work in a team to achieve common goal.
C411.5	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.
C411.6	Present the project and be able to defend it.

Course: Technical Seminar **Course Code: 18EES84**

C412.1	ability to identify state of art and futuristic technologies through self learning through others
C412.2	Ability to conduct detailed literature survey and self-study in order to completely understand the intricies of chosen topic.
C412.3	ability to conceptualize solutions built using in terms of architecture and technology design development
C412.4	ability to identify the scope and limitations of specific technology and create comprehensive technical reports using tools to make oral presentation

Course: Internship **Course Code: 18EEI85**

C413.1	Student is able to construct the company profiles by compiling the brief history management structure, achievement.
C413.2	Able to learn asses it's strength threat opportunities.
C413.3	Able to determine the challenges and future potential for organisation in particular and in general
C413.4	Able to learn theory and practical situations by accompanying task during the period

12/10/22

Coordinator

19/10/2022

HOD - EEE

VISION

"To be a Centre of excellence to impart quality education to transform the young minds into competent professionals with social relevance and global impact"

MISSION

M1 – To impart quality education to meet the needs of sustainable societal development.

M2 – To impart training in soft skills, professional ethics, environmental consciousness, and entrepreneurship.

M3 – To encourage students to pursue higher education and consultancy services through Industry-Institute interaction.

M4 – To inculcate the innovative, intellectual thinking and lifelong learning for holistic development.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO'S)

PEO-1 To demonstrate skills to realize the structures and services for societal needs using technological tools.

PEO-2 To plan, analyze, design, estimate and implement the project using codal provisions.

PEO-3 To exemplify ethics, leadership, entrepreneurship and environmental consciousness with emphasis on optimization of resources and services.

PEO-4 To be a lifelong learner with innovative practices for a successful career.

PROGRAM SPECIFIC OUTCOMES (PSO'S)

PSO-1 To identify the problem, prepare plan, analyze, design, estimate and execute the civil engineering projects using appropriate tools considering the health, safety and environmental factors.

PSO-2 To gain the knowledge and work in multidisciplinary domains engaging in lifelong learning for professional growth.

QUALITY POLICY

Department of Civil Engineering is committed to achieve academic excellence to impart quality technical education through innovative teaching, learning, and training by promoting an intellectual culture that bridge the gap between industry and academia to produce holistic graduates to meet the requirements of the society.

'Approved'

R. L. Rameeshg 18/4/22
HOD

18/4/22
PRINCIPAL

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Department of Civil Engineering
3.1.1. Course Outcomes (Cos)
BATCH-2019

Course code: 18CV31	**Course:** Transform Calculus, Fourier Series and Numerical Techniques
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C201.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
18C201.2	Demonstrate Fourier series to study the behaviors of periodic functions and their applications in system communications, digital signal processing and field theory.
18C201.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
18C201.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
18C201.5	Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Course code: 18CV32	**Course:** Strength of materials
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C202.1	To evaluate the basic concepts of the stresses and strains for different materials and strength of structural elements.
18C202.2	To evaluate the development of internal forces and resistance mechanism for one dimensional and two-dimensional structural elements.
18C202.3	To analyse different internal forces and stresses induced due to representative loads on structural elements.
18C202.4	To evaluate slope and deflections of beams.
18C202.5	To evaluate the behavior of torsion members, columns and struts.

Course code: 18CV33	**Course:** Fluid Mechanics
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C203.1	Possess a sound knowledge of fundamental properties of fluids and fluid Continuum
18C203.2	Compute and solve problems on hydrostatics, including practical applications
18C203.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
18C203.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
18C203.5	Compute the discharge through pipes and over notches and weirs

Course code: 18CV34	**Course: Building Materials and Construction**
Semester: III	**Year of Study: 22020-2021**
After studying this course students are able to	
18C204.1	Select suitable materials for buildings and adopt suitable construction techniques.
18C204.2	Decide suitable type of foundation based on soil parameters

18C204.3	Supervise the construction of different building elements based on suitability
18C204.4	Exhibit the knowledge of building finishes and form work requirements
18C204.5	Decide suitable type of paint and varnishes

Course code: 18CV35	**Course: Basic Surveying**
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C205.1	Possess a sound knowledge of fundamental principles Geodetics
18C205.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems.
18C205.3	Capture geodetic data to process and perform analysis for survey problems]
18C205.4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours

Course code: 18CV36	**Course: Engineering Geology**
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C206.1	Apply geological knowledge in different civil engineering practice.
18C206.2	Students will acquire knowledge on durability and competence of foundation rocks, and confidence enough to use the best building materials.
18C206.3	Civil Engineers are competent enough for the safety, stability, economy and life of the structures that they construct.
18C206.4	Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems.
18C206.5	Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering construction.

Course code: 18CVL37	**Course: Computer Aided Building Planning and Drawing**
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
18C207.1	Prepare, read and interpret the drawings in a professional set up.
18C207.2	Know the procedures of submission of drawings and Develop working and submission drawings for building.
18C207.3	Plan and design a residential or public building as per the given requirements.

Course code: 18CVL38	**Course: Building Materials Testing Laboratory**
Semester: III	**Year of Study: 2020-2021**
After studying this course students are able to	
17C208.1	Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
17C208.2	Identify, formulate and solve engineering problems of structural elements subjected to flexure.
17C208.3	Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

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Course code: 18MAT41	**Course: Complex Analysis, Probability and Statistical Methods**
Semester: IV	**Year of Study: 2020-2021**
After studying this course students are able to	
18C211.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
18C211.2	Utilize conformal transformation and complex integral arising in aerofoil theory, fluid flow visualization and image processing
18C211.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field
18C211.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
18C211.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis

Course code: 18CV42	**Course:** Analysis of Determinate Structures
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C212.1	Evaluate the forces i n determinate trusses by method of joints and sections.
18C212.2	Evaluate the deflection of cantilever, simply supported and overhanging beams by different methods
18C212.3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and bent frames.
18C212.4	Determine the stress resultants in arches and cables.
18C212.5	Understand the concept of influence lines and construct the ILD diagram for the moving loads.

Course code: 18CV43	**Course:** Applied Hydraulics
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C213.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
18C213.2	Design the open channels of various cross sections including economical channel sections
18C213.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,

18C213.4	Compute water surface profiles at different conditions
18C213.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions

Course code: 18CV44	**Course:** Concrete Technology
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C214.1	Relate material characteristics and their influence on microstructure of concrete
18C214.2	Distinguish concrete behavior based on its fresh and hardened state
18C214.3	Illustrate proportioning of different types of concrete mixes required fresh and hardened properties using professional codes
18C214.4	Understand special concrete , their applications for practical purpose

Course code: 18CV45	**Course:** Advanced Surveying
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C215.1	Apply the knowledge of geometric principles to arrive at surveying problems
18C215.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
18C215.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments;
18C215.4	Design and implement the different types of curves for deviating type of alignments.

Course code: 18CV46	**Course: water supply and treatment engineering**
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C216.1	Estimate average and peak water demand for a community.
18C216.2	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
18C216.3	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
18C216.4	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards

Course code: 18CVL47	**Course: ENGINEERING GEOLOGY LABORATORY**
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C217.1	The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices
18C217.2	The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects
18C217.3	The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods
18C217.4	The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area
18C217.5	The students will be able to identify the different structures in the field.

Course code: 18CVL48	**Course: fluid mechanics and hydraulic machines laboratory**
Semester: IV	**Year of Study: 2019-2020**

After studying this course students are able to	
18C218.1	Properties of fluids and the use of various instruments for fluid flow measurement.
18C218.2	Working of hydraulic machines under various conditions of working and their characteristics.

Course code: 18CPC49	**Course: fluid mechanics and hydraulic machines laboratory**
Semester: IV	**Year of Study: 2019-2020**
After studying this course students are able to	
18C219.1	Have constitutional knowledge and legal literacy.
18C219.2	Understand Engineering and Professional ethics and responsibilities of Engineers.
18C219.3	Understand the the cybercrimes and cyber laws for cyber safety measures

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Course code: 18CV51	**Course: Construction Management And Entrepreneurship**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C301.1	Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.
18C301.2	Understand labor output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.
18C301.3	Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value.
18C301.4	Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.

Course code: 18CV52	**Course: Analysis Of Indeterminate Structures**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C302.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
18C302.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method
18C302.3	Construct the bending moment diagram for beams and frames by Kani's method.
18C302.4	Construct the bending moment diagram for beams and frames using flexibility method
18C302.5	Analyze the beams and indeterminate frames by system stiffness method.

Course code:18CV53	**Course: Design Of RC Structural Elements**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C303.1	Understand the design philosophy and principles.

18C303.2	Solve engineering problems of RC elements subjected to flexure, shear and torsion.
18C303.3	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings.
18C303.4	Owns professional and ethical responsibility.

Course code: 18CV54	**Course: Basic Geotechnical Engineering**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C304.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
18C304.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
18C304.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
18C304.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
18C304.5	Capable of estimating load carrying capacity of single and group of piles

Course code: 18CV55	**Course: Municipal Wastewater Engineering**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C305.1	Select the appropriate sewer appurtenances and materials in sewer network.
18C305.2	Design the sewers network and understand the self-purification process in flowing water.
18C305.3	Design the varies physic- chemical treatment units
18C305.4	Design the various biological treatment units
18C305.5	Design various AOPs and low-cost treatment units.

Course code: 18CV56	**Course: Highway Engineering**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C306.1	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
18C306.2	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
18C306.3	Design road geometrics, structural components of pavement and drainage.
18C306.4	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

Course code: 18CVL57	**Course: Surveying Practice**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C307.1	Apply the basic principles of engineering surveying and for linear and angular measurements.
18C307.2	Comprehend effectively field procedures required for a professional surveyor.

18C307.3	Use techniques, skills and conventional surveying instruments necessary for engineering practice.

Course code: 18CVL58	**Course: Concrete And Highway Materials Laboratory**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C308.1	Able to interpret the experimental results of concrete and highway materials based on laboratory tests.
18C308.2	Determine the quality and suitability of cement.
18C308.3	Design appropriate concrete mix Using Professional codes
18C308.4	Determine strength and quality of concrete.
18C308.5	Evaluate the strength of structural elements using NDT techniques Test the soil for its suitability as sub grade soil for pavements

Course code: 18CIV59	**Course: Environmental Studies**
Semester: V	**Year of Study: 2021-2022**
After studying this course students are able to	
18C309.1	Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale
18C309.2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
18C309.3	Demonstrate ecology knowledge of a complex relationship between biotic and a biotic components.
18C309.4	Apply their ecological knowledge to illustrate global environmental issues
18C309.5	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues

Course code: 18CV61	**Course: Design Of Steel Structural Elements**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C311.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
18C311.2	Understand the Concept of Bolted and Welded connections.
18C311.3	Understand the Concept of Design of compression members, built-up columns and columns splices.
18C311.4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
18C311.5	Understand the Concept of Design of laterally supported and un-supported steel beams.

Course code: 18CV62	**Course: Applied Geotechnical Engineering**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C312.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
18C312.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils

18C312.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
18C312.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
18C312.5	Capable of estimating load carrying capacity of single and group of piles

Course code:18CV63	**Course: Hydrology And Irrigation Engineering**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C313.1	Understand the importance of hydrology and its components.
18C313.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
18C313.3	Estimate runoff and develop unit hydrographs.
18C313.4	Find the benefits and ill-effects of irrigation ,also the quantity of irrigation water and frequency of irrigation for various crops.
18C313.5	Find the canal capacity, design the canal and compute the reservoir capacity.

Course code:18CV644	**Course: Ground Improvement Techniques**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C314.1	Give solutions to solve various problems associated with soil formations having less strength.
18C314.2	Use effectively the various methods of ground improvement techniques depending upon the requirements
18C314.3	utilize properly the locally available materials and techniques for ground improvement so that economy in the design of foundations of various civil engineering structures

Course code: 18ME652	**Course:** World Class Manufacturing
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C315.1	Understand the basics of world class manufacturing & recent trends in manufacturing.
18C315.2	Understand Customization of product for manufacturing
18C315.3	Understand the implementation of new technologies & compare the existing industries with WCM industries.

Course code: 18CVL66	**Course: Software Application Laboratory**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C316.1	Analysis of plane trusses, continuous beams, portal frames , multistory structure by using Staad pro software
18C316.2	Project planning and scheduling of a building project using any project management software
18C316.3	GIS applications for creation of map

Course code: 18CVL67	**Course: Environmental Engineering Laboratory**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C317.1	Acquire capability to conduct experiments and estimate the concentration of different parameters
18C317.2	Compare the result with standards and discuss based on the purpose of analysis.
18C317.3	Determine type of treatment, degree of treatment for water and waste water.
18C317.4	Determine type of treatment, degree of treatment for waste water.
18C317.5	Identify the parameter to be analyzed for the student project work in environmental stream

Course code: 18CVEP68	**Course: Extensive Survey Project**
Semester: VI	**Year of Study: 2021-2022**
After studying this course students are able to	
18C318.1	Apply Surveying knowledge and tools effectively for the projects
18C318.2	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
18C318.3	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication and presentation skills.
18C318.4	Professional etiquettes at workplace, meeting and general
18C318.5	Establishing trust based relationships in teams & organizational environment
18C318.6	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques

Course code:18CV71	**Course: Quantity Surveying And Contract Management**
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C402.1	Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.
18C402.2	Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.
18C402.3	Prepare the specifications and analyze the rates for various items of work.
18C402.4	Assess contract and tender documents for various construction works.
18C402.5	Prepare valuation reports of buildings.

Course code: 18CV72	**Course: Design Of RCC And Steel Structures**
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C402.1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
18C402.2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members

Course code: 18CV732	**Course: Air Pollution And Control**
Semester: VII	**Year of Study: 2022-2023**

After studying this course students are able to	
17C403.1	Identify the major sources of air pollution and their effects on health and environment
17C403.2	Evaluate the dispersion of air pollutants in atmosphere and to develop air quality models
17C403.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants
17C403.4	Choose and design control techniques for particulate and gaseous emissions
17C403.5	Understand the environmental laws and acts

Course code: 17CV741	**Course:** Design of Bridges
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C404.1	Identify the major sources of air pollution and understand their effects on health and environment.
18C404.2	Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
18C404.3	Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
18C404.4	Choose and design control techniques for particulate and gaseous emissions

Course code:18CV745	**Course:** Urban Transportation and Planning
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C405.1	Design, conduct and administer surveys to provide the data required for transportation planning.
18C405.2	Supervise the process of data collection about travel behavior and analyze the data for use in transport planning.
18C405.3	Develop and calibrate modal split, trip generation rates for specific types of land use developments.
18C405.4	Adopt the steps that are necessary to complete a long-term transportation plan.

Course code:18EE754	**Course:** Electrical Energy Conservation And Auditing
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C406.1	Know about energy scenario nationwide and worldwide; outline Energy Conservation Act and its features
18C406.2	Discuss load management techniques and energy efficiency in electrical systems
18C406.3	Understand energy audit methodology and energy conservation
18C406.4	Understand various pillars of electricity market design and availability based tariff (ABT)

Course code: 18CVL76	**Course:** Computer Aided Detailing of Structures
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C407.1	Detailing of RCC Structures
18C407.2	Detailing of Steel Structures

Course code: 18CVL77	**Course: Geotechnical Engineering Laboratory**
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C407.1	Physical and index properties of the soil

18C407.2	Classify based on index properties and field identification
18C407.3	To determine OMC and MDD, plan and assess field compaction program
18C407.4	Shearstrengthandconsolidationparameterstoassessstrengthanddeformationcharacteristics
18C407.5	In-sit shear strength characteristics (SPT-Demonstration)

Course code: 18CVP78	**Course: Project Work Phase - 1**
Semester: VII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C408.1	Identify the problem to provide solution through technology.
18C408.2	Analyze literature about emerging trending technology, research concept and determine the significance of gap in literature review.
18C408.3	Illustrate different solution for the new concept on innovation going on related to societal, environmental and technology.
18C408.4	Formulate aim & scope of the proposed project work and define objectives, methodology and expected outcomes.

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Course code:18CV81	**Course: Design Of Pre-Stress concrete**
Semester: VIII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C411.1	Understand the requirement of PSC members for present scenario
18C411.2	Analyse the stresses encountered in PSC element during transfer and at working.
18C411.3	Understand the effectiveness of the design of PSC after studying losses
18C411.4	Capable of analyzing the PSC element and finding its efficiency.
18C411.5	Design PSC beam for different requirements.

Course code: 18CV825	**Course: Pavement Design**
Semester: VIII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C412.1	Systematically generate and compile required data's for design of pavement(highway and airfield)
18C412.2	Analyse stress, strain and deflection by Business's and Burmister's and Westergaard's theory.& design of flexible pavement conforming to IRC 37 2001
18C412.3	Understand flexible pavement failure,maintenance,and evaluation
18C412.4	Analyse stress,strain, and deflection and design of rigid pavement conforming to IRC 58-2001
18C412.5	Understand rigid pavement failure,maintenance and evaluation

Course code: 18CVP83	**Course: Project Work Phase - 2**
Semester: VIII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C413.1	Determine the parameters required in project work with usage of codal provision and modern software tools.
18C413.2	Implementation of the innovative concept and applying suitable methodology in project work.

18C413.3	Tabulate and discuss the results with respect to defined objectives by using appropriate performance metrics.

Course code: 18CVS84	**Course: Technical Seminar**
Semester: VIII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C414.1	Ability to identify the futuristic technologies through self-motivation for any topic of interest.
18C414.2	Ability to conduct a detailed literature survey and understand the concept of the chosen topic.
18C414.3	Ability to conceptualize solution built using various cutting edge technologies in terms of their planning, design and deployment.
18C414.4	Ability to identify the scope and limitations of specific technology in terms of their applicability along with visualization.
18C414.5	Ability to create comprehensive technical reports using relevant tools and to make oral presentation of technical topics with adherence to timeliness, clarity and such other soft skills alongside a presentable attitude and behavior.

Course code: 18CVI85	**Course: Internship /Professional Practice**
Semester: VIII	**Year of Study: 2022-2023**
After studying this course students are able to	
18C415.1	Apply knowledge in relevant to the field and study through professional attitude towards work and responsibility.
18C415.2	Apply interpersonal communication skills with technical and non-technical staff to undertake lifelong learning as an individual in the work place.
18C415.3	Ability to use the techniques, skills and modern engineering tools necessary for civil engineering practices.

R.L. Ramesh

HOD CIVIL

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Department of CSE (Artificial Intelligence & Machine Learning)

VISION

Empower the students to be socially responsible technocrats in the area of Artificial Intelligence and Machine Learning through quality education.

MISSION

- To provide the fundamental knowledge of Artificial Intelligence and Machine Learning domain and allied subjects.
- To establish the practical platform to solve problems and implement the projects.
- To provide inter disciplinary knowledge.
- To link with the industry in teaching learning process.

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Department of CSE (Artificial Intelligence & Machine Learning)

1.1.3 PEOs

PEO1 To provide students with a sound knowledge of science, mathematics, and engineering principles together with an in-depth disciplinary knowledge required to succeed in the profession of IT.

PEO2 To provide students an academic environment with an awareness of advanced technological growth leading to life-long learning needed for a successful professional career, excellence, and leadership.

PEO3 To train students with a wide scientific and engineering knowledge to comprehend, analyse design, and create innovative software solutions and products for the problems of real life.

PEO4 To prepare students for graduate and postgraduate programmes and succeed in their career in the field of Artificial Intelligence and Machine Learning.

PEO5 To empower students with effective communication skills, teamwork, a multidisciplinary approach, and an ability to relate engineering issues to the broader social context.

PEO6 To inculcate in students professional and ethical attitude with a strong character to uphold the spiritual and cultural values.

1.1.4 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 analyse 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 the 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 modelling to complex engineering activities with an understanding of the limitations.

PO_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.

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 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.

1.1.5 PSOs

PSO_1: Able to analyse the algorithms and identifying the implementation tools.

PSO_2: Able to design and implement the algorithms using programming languages and tools.

PSO_3: Select the hardware, controllers and software interfacing platform.

PSO_4: Implement real time projects using AI, RPA, ML and Big data.

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Department of CSE (Artificial Intelligence & Machine Learning)

Course Outcome Definition

Semester : 3rd **AY: 2022-23**

Course Title : Transform Calculus, Fourier Series And Numerical Techniques
Course Code : 21MAT31

C201.1	To solve ordinary differential equations using Laplace transform
C201.2	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
C201.3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
C201.4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
C201.5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Course Title : Data Structures and Applications **Course Code : 21CS32**

C202.1	Identify different data structures and their applications
C202.2	Apply stack and queues in solving problems
C202.3	Demonstrate applications of linked list.
C202.4	Explore the applications of trees and graphs to model and solve the real-world problem.
C202.5	Make use of Hashing techniques and resolve collisions during mapping of key value pairs

Course Title : Analog and Digital Electronics Course Code : 21EE33

C203.1	Design and analyze applications of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp
C203.2	Explain the basic principles of A/D and D/A conversion circuits and develop the same
C203.3	Simplify digital circuits using Karnaugh Maps and Quine-McCluskey Methods
C203.4	Explain Gates and flip flops and make use in designing different data processing circuits, registers and counters and compare the types
C203.5	Develop simple HDL programs

Course Title : COMPUTER ORGANIZATION AND ARCHITECTURE
Course Code : 21CS34

C204.1	Explain the organization and architecture of computer systems with machine instructions and programs
C204.2	Analyze the input/output devices communicating with computer system
C204.3	Demonstrate the functions of different types of memory devices
C204.4	Apply different data types on simple arithmetic and logical unit
C204.5	Analyze the functions of basic processing unit, Parallel processing and pipelining

Course Title : OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY
Course Code : 21CSL35

C205.1	Use Eclipse/NetBeans IDE to design, develop, debug Java Projects
C205.2	Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP
C205.3	Demonstrate the ability to design and develop java programs, analyze, and interpret object-oriented data and document results
C205.4	Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs
C205.5	Develop user friendly applications using File I/O and GUI concepts

Course Title : MASTERING OFFICE
Course Code : 21CSL381

C206.1	Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet
C206.2	Create, edit, save and print documents with list tables, header, footer, graphic, spellchecker, mail merge and grammar checker
C206.3	Attain the knowledge about spreadsheet with formula, macros spell checker etc
C206.4	Demonstrate the ability to apply application software in an office environment
C206.5	Use Google Suite for office data management tasks

Course Title : PROGRAMMING IN C++
Course Code : 21CSL382

C207.1	Able to understand and design the solution to a problem using object-oriented programming concepts.
C207.2	Able to reuse the code with extensible Class types, User-defined operators and function Overloading
C207.3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism
C207.4	Identify and explore the Performance analysis of I/O Streams
C207.5	Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

HOD

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Department of CSE (Artificial Intelligence & Machine Learning)

Course Outcome Definition

Semester : IV **AY: 2022-23**

Course Title : MATHEMATICAL FOUNDATIONS FOR COMPUTING

Course Code : 21CS41

C210.1	Apply the concepts of logic for effective computation and relating problems in the Engineering domain.
C210.2	Analyze the concepts of functions and relations to various fields of Engineering. Comprehend the concepts of Graph Theory for various applications of Computational sciences.
C210.3	Apply discrete and continuous probability distributions in analysing the probability models arising in the engineering field.
C210.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
C210.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.

Course Title : Design and Analysis of Algorithms **Course Code : 21CS42**

C211.1	Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.
C211.2	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same
C211.3	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.
C211.4	Apply and analyze dynamic programming approaches to solve some problems and improve an algorithm time efficiency by sacrificing space.
C211.5	Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.

Course Title : MICROCONTROLLER AND EMBEDDED SYSTEMS
Course Code : 21CS43

C212.1	Explain C-Compilers and optimization
C212.2	Describe the ARM microcontroller's architectural features and program module
C212.3	Apply the knowledge gained from programming on ARM to different applications.
C212.4	Program the basic hardware components and their application selection method
C212.5	Demonstrate the need for a real-time operating system for embedded system applications

Course Title : OPERATING SYSTEMS
Course Code : 21CS44

C213.1	Identify the structure of an operating system and its scheduling mechanism
C213.2	Demonstrate the allocation of resources for a process using scheduling algorithm
C213.3	Identify root causes of deadlock and provide the solution for deadlock elimination
C213.4	Explore about the storage structures and learn about the Linux Operating system
C213.5	Analyze Storage Structures and Implement Customized Case study

Course Title : PYTHON PROGRAMMING LABORATORY
Course Code : 21CSL46

C214.1	Demonstrate proficiency in handling of loops and creation of functions.
C214.2	Identify the methods to create and manipulate lists, tuples and dictionaries.
C214.3	Discover the commonly used operations involving regular expressions and file system.
C214.4	Interpret the concepts of Object-Oriented Programming as used in Python
C214.5	Determine the need for scraping websites and working with PDF, JSON and other file formats.

Course Title : WEB PROGRAMMING
Course Code : 21CSL481

C215.1	Describe the fundamentals of web and concept of HTML.
C215.2	Use the concepts of HTML, XHTML to construct the web pages.
C215.3	Interpret CSS for dynamic documents.
C215.4	Evaluate different concepts of JavaScript & Construct dynamic documents.
C215.5	Design a small project with JavaScript and XHTML.

Course Title : UNIX SHELL PROGRAMMING
Course Code : 21CS482

C216.1	Know the basics of Unix concepts and commands
C216.2	Evaluate the UNIX file system
C216.3	Apply Changes in file system
C216.4	Understand scripts and programs
C216.5	Analyze Facility with UNIX system process

Course Title : R PROGRAMMING
Course Code : 21CSL483

C217.1	To understand the fundamental syntax of R through readings, practice exercises
C217.2	To demonstrations, and writing R code
C217.3	To apply critical programming language concepts such as data types, iteration
C217.4	To understand control structures, functions, and Boolean operators by writing R programs and through examples
C217.5	To import a variety of data formats into R using R-Studio
C217.6	To prepare or tidy data for in preparation for analyze

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE OUTCOMES

3rd SEMESTER 21-SCHEME				
Sl No.	**Subject Name**	**Subject Code**		**Course Outcomes**
1	TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	21MAT31	CO 1	To solve ordinary differential equations using Laplace transform.
			CO 2.	Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
			CO 3	To use Fourier transforms to analyse problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations.
			CO 4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations.
			CO 5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
2	DATA STRUCTURES AND APPLICATIONS	21CS32	CO 1	Identify different data structures and their applications.
			CO 2	Apply stack and queues in solving problems.
			CO 3	Demonstrate applications of linked list.
			CO 4	Explore the applications of trees and graphs to model and solve the real-world problem.
			CO 5	Make use of Hashing techniques and resolve collisions during mapping of key value pairs.
3	ANALOG AND DIGITAL ELECTRONICS	21CS33	CO 1	Design and analyse application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
			CO 2	Explain the basic principles of A/D and D/A conversion circuits and develop the same.
			CO 3	Simplify digital circuits using Karnaugh Map, and Quine-McClusky Methods.
			CO 4	Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
			CO 5	Develop simple HDL programs.
4	COMPUTER ORGANIZATION AND ARCHITECTURE	21CS34	CO 1	Explain the organization and architecture of computer systems with machine instructions and programs.
			CO 2	Analyse the input/output devices communicating with computer system.
			CO 3	Demonstrate the functions of different types of memory devices.
			CO 4	Apply different data types on simple arithmetic and logical unit.
			CO 5	Analyse the functions of basic processing unit, Parallel processing and pipelining.

5	OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY	21CSL35	CO 1	Use Eclipse/NetBeans IDE to design, develop, debug Java Projects.
			CO 2	Analyse the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP.
			CO 3	Demonstrate the ability to design and develop java programs, analyze, and interpret object-oriented data and document results.
			CO 4	Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs.
			CO 5	Develop user friendly applications using File I/O and GUI concepts.
6	MASTERING OFFICE	21CSL381	CO 1	Know the basics of computers and prepare documents, spreadsheets, make small presentations with audio, video and graphs and would be acquainted with internet.
			CO 2	Create, edit, save and print documents with list tables, header, footer, graphic, spellchecker, mail merge and grammar checker.
			CO 3	Attain the knowledge about spreadsheet with formula, macros spell checker etc.
			CO 4	Demonstrate the ability to apply application software in an office environment.
			CO 5	Use Google Suite for office data management tasks.
7	PROGRAMMING IN C++	21CS382	CO 1	Able to understand and design the solution to a problem using object-oriented programming concepts.
			CO 2	Able to reuse the code with extensible Class types, User-defined operators and function Overloading.
			CO 3	Achieve code reusability and extensibility by means of Inheritance and Polymorphism.
			CO 4	Identify and explore the Performance analysis of I/O Streams.
			CO 5	Implement the features of C++ including templates, exceptions and file handling for providing programmed solutions to complex problems.

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

COURSE OUTCOMES

4th SEMESTER 21-SCHEME				
Sl No.	**Subject Name**	**Subject Code**		**Course Outcomes**
1	DESIGN AND ANALYSIS OF ALGORITHMS	21CS42	CO 1	Analyse the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.
			CO 2	Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same.
			CO 3	Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.
			CO 4	Apply and analyse dynamic programming approaches to solve some problems. and improve an algorithm time efficiency by sacrificing space.
			CO 5	Apply and analyse backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.
2	MICROCONTROLLER AND EMBEDDED SYSTEMS	21CS43	CO 1	Explain C-Compilers and optimization.
			CO 2	Describe the ARM microcontroller's architectural features and program module.
			CO 3	Apply the knowledge gained from programming on ARM to different applications.
			CO 4	Program the basic hardware components and their application selection method.
			CO 5	Demonstrate the need for a real-time operating system for embedded system applications.
3	OPERATING SYSTEMS	21CS44	CO 1	Identify the structure of an operating system and its scheduling mechanism.
			CO 2	Demonstrate the allocation of resources for a process using scheduling algorithm.
			CO 3	Identify root causes of deadlock and provide the solution for deadlock elimination.
			CO 4	Explore about the storage structures and learn about the Linux Operating system.
			CO 5	Analyse Storage Structures and Implement Customized Case study.
4	PYTHON PROGRAMMING LABORATORY	21CSL46	CO 1	Demonstrate proficiency in handling of loops and creation of functions.
			CO 2	Identify the methods to create and manipulate lists, tuples and dictionaries.
			CO 3	Discover the commonly used operations involving regular expressions and file system.
			CO 4	Interpret the concepts of Object-Oriented Programming as used in Python.
			CO 5	Determine the need for scraping websites and working with PDF, JSON and other file formats.

5	WEB PROGRAMMING	21CSL481	CO 1	Describe the fundamentals of web and concept of HTML.
			CO 2	Use the concepts of HTML, XHTML to construct the web pages.
			CO 3	Interpret CSS for dynamic documents.
			CO 4	Evaluate different concepts of JavaScript & Construct dynamic documents.
			CO 5	Design a small project with JavaScript and XHTML.
6	UNIX SHELL PROGRAMMING	21CS482	CO 1	Know the basics of Unix concepts and commands.
			CO 2	Evaluate the UNIX file system.
			CO 3	Apply Changes in file system.
			CO 4	Understand scripts and programs.
			CO 5	Analyse Facility with UNIX system process.
7	R PROGRAMMING	21CSL483	CO 1	To understand the fundamental syntax of R through readings, practice exercises.
			CO 2	To demonstrations, and writing R code.
			CO 3	To apply critical programming language concepts such as data types, iteration.
			CO 4	To understand control structures, functions, and Boolean operators by writing R programs and through examples.
			CO 5	To import a variety of data formats into R using R-Studio.
			CO 6	To prepare or tidy data for in preparation for analyze.

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D: 05-07-2021

WAYANAMAC EDUCATION TRUST

Vision	Mission
To become a World class Education Center to provide Globally Relevant Higher Education in the fields of Engineering and Management	Foster an Intellectual and Ethical environment, in which both Skill and Spirit thrive, so as to Impart High Quality Education, Training and services with an International Outlook

DON BOSCO INSTITUTE OF TECHNOLOGY

Vision

To be a center of excellence to transform young minds in technical and management education fostering innovation and entrepreneurial skills with ethical, environmental and social responsibility.

Mission

M1: To impart quality education in order to meet the needs of industry and society.

M2: To collaborate with academia, industry and research institutes to strengthen teaching and learning process.

M3: To promote equitable and harmonious development of students to work in teams.

M4: To imbibe lifelong learning skills and entrepreneurial skills exhibiting leadership.

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DON BOSCO INSTITUTE OF TECHNOLOGY

(NAAC Accredited Institution)

Department of Electronics and Communication Engineering

Accredited by NBA & Permanently affiliated to VTU

VISION OF THE DEPARTMENT:

To nurture and disseminate the body of knowledge in the field of Electronics and Communication Engineering along with ethical values to serve the society globally.

MISSION OF THE DEPARTMENT:

M1: To impart knowledge through teaching learning process that builds strong concepts in Electronics and Communication Engineering.

M2: To inculcate technical, professional, managerial and leadership skills.

M3: To nurture students to provide sustainable solutions keeping environmental considerations and ethical practices.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates shall be able to employ the acquired engineering knowledge for technological development and management.

PEO2: Graduates shall be able to exhibit life-long learning acquired through specialized technical training, higher education and professional activities.

PEO3: Graduates shall be able to solve engineering issues from a broader social perspective for contributing to the needs of the society.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Ability to analyze and design electronic components and subsystems in the areas of communication and signal processing.

PSO2: Ability to design embedded systems and VLSI circuits to realize products for societal needs using relevant tools and technologies.

PSO3: To inculcate managerial skills with ethical and human values for a sustainable society.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

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 in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: **Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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IQAC Director 28/5/22

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(NBA Accredited Department)
COURSE OUTCOMES

3rd SEM 21-SCHEME				
Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
1	TRANSFORM CALCULUS, FOURIER SERIES AND NUMERICAL TECHNIQUES	21MAT31	CO1	To solve ordinary differential equations using Laplace transform
			CO2	Demonstrate the Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory
			CO3	To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z transform techniques to solve difference equations
			CO4	To solve mathematical models represented by initial or boundary value problems involving partial differential equations
			CO5	Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis
2	DIGITAL SYSTEM DESIGN USING VERILOG	21EC32	CO1	Simplify Boolean functions using K-map and Quine-McCluskey minimization technique.
			CO2	Analyze and design for combinational logic circuits
			CO3	Analyze the concepts of Flip Flops (SR, D, T and JK) and to design the synchronous sequential circuits using Flip Flops
			CO4	Model Combinational circuits (adders, subtractors, multiplexers) and sequential circuits using Verilog descriptions.
3	BASIC SIGNAL PROCESSING	21EC33	CO1	Understand the basics of Linear Algebra
			CO2	Analyze different types of signals and systems
			CO3	Analyze the properties of discrete time signals & systems
			CO4	Analyze discrete time signals & systems using Z transforms
4	ANALOG ELECTRONIC CIRCUITS	21EC34	CO1	Understand the characteristics of BJTs and FETs for switching and amplifier circuits.
			CO2	Design and analyze FET amplifiers and oscillators with different circuit configurations and biasing conditions.
			CO3	Understand the feedback topologies and approximations in the design of amplifiers and oscillators.
			CO4	Design of circuits using linear ICs for wide range applications such as ADC, DAC, filters and timers.
			CO5	Understand the power electronic device components and its functions for basic power electronics circuits.
5	ANALOG AND DIGITAL ELECTRONICS LAB	21ECL35	CO1	Design and analyze the BJT/FET amplifier and oscillator circuits
			CO2	Design and test Opamp circuits to realize the mathematical computations, DAC and precision rectifiers.
			CO3	Design and test the combinational logic circuits for the given specifications.
			CO4	Test the sequential logic circuits for the given functionality.
			CO5	Demonstrate the basic electronic circuit experiments using SCR and 555 timer.

6	SOCIAL CONNECT AND RESPONSIBILITY	21UH36/21SC36	CO1	Understand social responsibility
			CO2	Practice sustainability and creativity
			CO3	Showcase planning and organizational skills
7	CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS	21CHT37	CO1	Analyze the basic structure of Indian Constitution
			CO2	Remember their Fundamental Rights, DPSP's and Fundamental Duties (FD's) of our constitution
			CO3	know about our Union Government, political structure & codes, procedures
			CO4	Understand our State Executive & Electoral system of India
			CO5	Remember the Amendments and Emergency Provisions, other important provisions given by the constitution
8	LOGIC DESIGN USING PSPICE (MULTISIM	21EC381	CO1	Demonstrate the truth table of various expressions and combinational circuits using logic gates
			CO2	Design various combinational circuits such as adders, subtractors, comparators, multiplexers and code converters
			CO3	Construct flip-flops, counters and shift registers.
			CO4	Design and implement synchronous counters.

HOD-ECE

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(NBA Accredited Department)
COURSE OUTCOMES
4TH SEM 21-SCHEME

Sl. No	SUBJECT NAME	Subject Code		Course Outcomes(CO)
1	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS	21MAT41	CO1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory,communication, planning, analysis, design, construction, and deployment
			CO2	Utilize conformal transformation and complex integral arising in inviscid 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
2	DIGITAL SIGNAL PROCESSING	21EC42	CO1	Determine response of LTI system using time domain and DFT techniques
			CO2	Compute DFT of real and complex discrete time signals
			CO3	Compute DFT using FFT algorithms
			CO4	Design FIR and IIR Digital Filters
			CO5	Design of Digital Filters using DSP processor
3	CIRCUITS AND CONTROL	21EC43	CO1	Analyze and solve Electric circuit, by applying, loop analysis, Nodal analysis and by applying network Theorems.
			CO2	Evaluate two port parameters of a network and Apply Laplace transforms to solve electric networks.
			CO3	Deduce transfer function of a given physical system, from differential equation representation or Block Diagram representation and SFG representation
			CO4	Calculate time response specifications and analyse the stability of the system
			CO5	Draw and analyze the effect of gain on system behaviour using root loci.
			CO6	Perform frequency response Analysis and find the stability of the system
			CO7	Represent State model of the system and find the time response of the system.
4	COMMUNICATION THEORY	21EC44	CO1	Understand the amplitude and frequency modulation techniques and perform time and frequency domain transformations.
			CO2	Identify the schemes for amplitude and frequency modulation and demodulation of analog signals and compare the performance.
			CO3	Characterize the influence of channel noise on analog modulated signals
			CO4	Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems.
			CO5	Illustration of digital formatting representations used for Multiplexers, Vocoders and Video transmission

4	BIOLOGY FOR ENGINEERS	21EC49	CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies
			CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
			CO3	Corroborate the concepts of biomimetics for specific requirements.
			CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems.
5	COMMUNICATION LABORATORY I	21ECL48	CO1	Demonstrate the AM and FM modulation and demodulation by representing the signals in time and frequency domain.
			CO2	Design and test the sampling, Multiplexing and PAM with relevant circuits
			CO3	Demonstrate the basic circuitry and operations used in AM and FM receivers.
			CO4	Illustrate the operation of PCM and delta modulations for different input conditions.
6	C++ BASICS	21EC1.482	CO1	Write C++ program to solve simple and complex problems
			CO2	Apply and implement major object-oriented concepts like message passing, function overloading, operator overloading and inheritance to solve real-world problems.
			CO3	Use major C++ features such as Templates for data type independent designs and File I/O to deal with large data set.
			CO4	Analyze, design and develop solutions to real-world problems applying OOP concepts of C++
7	UNIVERSAL HUMAN VALUES	21UH49	CO1	Holistic vision of life
			CO2	Socially responsible behaviour
			CO3	Environmentally responsible work
			CO4	Ethical human conduct
			CO5	Having Competence and Capabilities for Maintaining Health and Hygiene
			CO6	Appreciation and aspiration for excellence (merit) and gratitude for all

HOD-ECE

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

(NBA Accredited Department)

COURSE OUTCOMES

5TH SEM 18-SCHEME

Sl. No.	SUBJECT NAME	Subject Code		Course Outcomes(CO):
1	TECHNOLOGICAL INNOVATION MANAGEMENT AND ENTREPRENEURSHIP	18ES51	CO1	Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business
			CO2	Describe the functions of Managers, Entrepreneurs and their social responsibilities
			CO3	Understand the components in developing a business plan
			CO4	Awareness about various sources of funding and institutions supporting entrepreneurs
2	DIGITAL SIGNAL PROCESSING	18EC52	CO1	Determine response of LTI systems using time domain and DFT techniques.
			CO2	Compute DFT of real and complex discrete time signals
			CO3	Computation of DFT using FFT algorithms and linear filtering approach.
			CO4	Design and realize FIR and IIR digital filters
			CO5	Understand the DSP processor architecture.
3	PRINCIPLES OF COMMUNICATION SYSTEMS	18EC53	CO1	Analyze and compare performance of AM and FM modulation in the presence of noise at the receiver.
			CO2	Analyze and compare performance of digital formatting processes with quantization noise.
			CO3	Multiplex digitally formatted signals at Transmitter and demultiplex the signals and reconstruct digitally formatted signals at the receiver.
			CO4	Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission.
4	INFORMATION THEORY AND CODING	18EC54	CO1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
			CO2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms
			CO3	Model the continuous and discrete communication channels using input, output and joint probabilities
			CO4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
			CO5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.
5	ELECTROMAGNETIC WAVES	18EC55	CO1	Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume
			CO2	Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.
			CO3	Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations
			CO4	Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits.
			CO5	Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem

6	VERILOG HDL	18ECL56	CO1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
			CO2	Design and verify the functionality of digital circuits/systems using test benches.
			CO3	Identify the suitable Abstraction level for a particular digital design.
			CO4	Write the programs more effectively using Verilog tasks, functions and directives.
			CO5	Perform timing and delay Simulation.
			CO6	Interpret the various constructs in logic synthesis.
7	DIGITAL SIGNAL PROCESSING LABORATORY	18ECL57	CO1	Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.
			CO2	Modeling of discrete time signals and systems and verification of its properties and results.
			CO3	Implementation of discrete computations using DSP processor and verify the results.
			CO4	Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.
8	HDL LABORATORY	18ECL58	CO1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.
			CO2	Describe sequential circuits like Flip Flops and counters in Behavioral description and obtain simulation waveforms.
			CO3	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
			CO4	Interface the hardware to the programmable chips and obtain the required output.
9	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 a biotic components.
			CO4	Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

(NBA Accredited Department)

COURSE OUTCOMES

6TH SEM 18-SCHEME

Sl. No	SUBJECT NAME	Subject Code		Course Outcomes(CO)
1	DIGITAL COMMUNICATIONS	18EC61	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	Test and validate symbol processing and performance parameters at the receiver unidentified and corrupted bandlimited channels.
			CO4	Demonstrate that bandpass signals subjected to corruptions and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria.
2	EMBEDDED SYSTEMS	18EC62	CO1	Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.
			CO2	Apply the knowledge gained for Programming ARM Cortex M3 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.
3	MICROWAVE and ANTENNAS	18EC63	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 a RF system.
			CO5	Recommend various antenna configurations according to the applications.
4	DIGITAL SYSTEM DESIGN USING VERILOG / PYTHON	18EC644/	CO1	Construct the combinational circuits, using discrete gates and programmable logic devices.
			CO2	Describe how arithmetic operations can be performed for each kind of code, and also combinational circuits that implement arithmetic operations.
			CO3	Design a semiconductor memory for specific chip design.
			CO4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
		18EC646	CO5	Synthesize different types of I/O controllers that are used in embedded systems.
			CO6	Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
			CO2	Demonstrate proficiency in handling Strings and File Systems.
			CO3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

			CO4	Interpret the concepts of Object-Oriented Programming as used in Python.
5	PROGRAMMING IN JAVA/ REMOT SENSING AND GIS/ RENEWABLE ENERGY SYSTEMS	18CS653	CO1	Explain the object-oriented concepts and JAVA
			CO2	Develop computer programs to solve real-world problems in Java.
			CO3	Develop simple GUI interfaces for a computer program to interact with users
		18CV651	CO1	Collectdataanddelineatevariousfeaturesfromthesatelliteimageryusingthespectralsignatures
			CO2	Analyze different features of ground information to create raster or vector data.
			CO3	Performdigitalclassificationandcreatedifferentthematicmapsforsolvingspecificproblems
			CO4	Make decision based on the GIS analysis on thematic maps.
		18EE653	CO1	Discuss causes of energy scarcity and its solution, energy resources and availability of renewable energy.
			CO2	Outline energy from sun, energy reaching the Earth's surface and solar thermal energy applications.
			CO3	Discuss types of solar collectors, their configurations, solar cell system, its characteristics and their applications.
			CO4	Explain generation of energy from hydrogen, wind, geothermal system, solid waste and agriculture refuse.
			CO5	Discuss production of energy from biomass, biogas.
			CO6	Summarize tidal energy resources, sea wave energy and ocean thermal energy.
6	EMBEDDED SYSTEMS LAB	18ECL66	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.
7	COMMUNICATION LAB	18ECL67	CO1	Determine the characteristics and response of microwave waveguide.
			CO2	Determine the characteristics of microstrip antennas and devices and compute the parameters associated with it.
			CO3	Design and test the digital and analog modulation circuits and display the waveforms.
			CO4	Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.
8	MINI PROJECT	18ECMP68	CO1	Ability to practice acquired knowledge within the chosen area of technology for project development.
			CO2	Ability to Explore and strengthen the understanding of fundamentals through practical application of theoretical concepts.
			CO3	Ability to provide students hands-on experience on, troubleshooting, maintenance, fabrication, innovation, record keeping, documentation etc, thereby enhancing the skill and competency part of technical education.
			CO4	Ability to Identify, improve, develop and justify the technical aspects of the chosen project for societal and environmental benefits.

22/11/23

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Dept. of Electronics & Communication

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
(NBA Accredited Department)
COURSE OUTCOMES

7TH SEM 18-SCHEME

Sl. No.	SUBJECT NAME	Subject Code		Course Outcomes(CO)
1	COMPUTER NETWORKS	18EC71	CO1	Understand the concept of networking
			CO2	Identify the protocols and services of different layers
			CO3	Distinguish the basic network configurations and standards associated with each network
			CO4	Analyze a simple network and measure its parameter
2	VLSI DESIGN	18EC72	CO1	Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling
			CO2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects
			CO3	Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirement
			CO4	Interpret Memory elements along with timing considerations
			CO5	Interpret testing and testability issues in VLSI Design
3	SATELLITE COMMUNICATION	18EC732	CO1	Ability to describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
			CO2	Ability to classify the electronic hardware systems associated with the satellite subsystem and earth station.
			CO3	Ability to discuss the communication satellites with the focus on national satellite system.
			CO4	Ability to compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.
			CO5	Ability to illustrate the satellites used for applications in remote sensing, weather forecasting and navigation.
4	CRYPTOGRAPHY/MACHINE LEARNING	18EC744	CO1	Explain basic cryptographic algorithms to encrypt and decrypt the data.
			CO2	Use symmetric and asymmetric cryptography algorithms to encrypt and decrypt the information.
			CO3	Describe the mathematics associated with cryptography.
			CO4	Apply concepts of modern algebra in cryptography algorithms.
			CO5	Apply pseudo random sequence in stream cipher algorithms.
		18EC745	CO1	Identify the problems in machine learning.
			CO2	Select supervised, unsupervised or reinforcement learning for problem solving.
			CO3	Apply theory of probability and statistics in machine learning.
			CO4	Apply concept learning, ANN, Bayes classifier, k nearest neighbor
			CO5	Perform statistical analysis of machine learning techniques.

5	INTRODUCTION TO BIG DATA ANALYTICS/	18CS751	CO1	Explain the importance of data and data analysis
			CO2	Interpret the probabilistic models for data
			CO3	Define hypothesis, uncertainty principle
			CO4	Evaluate regression analysis
		18SC753	CO1	Identify the AI based problems
			CO2	Apply techniques to solve the AI problems
			CO3	Define learning and explain various learning techniques
			CO4	Discuss on expert systems
6	COMPUTER NETWORKS LAB	18ECL76	CO1	Choose suitable tools to model a network
			CO2	Use the network simulator for learning and practice of networking algorithms
			CO3	Illustrate the operations of network protocols and algorithms using C programming
			CO4	Simulate the network with different configurations to measure the performance parameters
			CO5	Implement the data link and routing protocols using C programming
7	VLSI LABORATORY	18ECL77	CO1	Design and simulate combinational and sequential circuits using verilog HDL
			CO2	Understand the synthesis process of digital circuits using EDA tool
			CO3	Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list
			CO4	Design and simulate basic CMOS circuits like inverter, common source two input NAND gate and differential amplifier
8	PROJECT WORK PHASE-1	18ECP78	CO1	Ability to analyze the problem, formulation and solution of the selected project
			CO2	Ability to develop solutions for contemporary problems using modern tools for sustainable development.
			CO3	Ability to demonstrate ethical and professional sustainability while working in a team and communicate effectively for the benefit of the society.
			CO4	Ability to understand the engineering, finance and management principles.

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
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COURSE OUTCOMES

VIII SEM (VTU/2018)

Sl. No.	SUBJECT NAME	Subject Code		Course Outcomes(CO)
1	WIRELESS AND CELLULAR COMMUNICATIO N	18ECS81	CO1	Ability to explain the concepts of propagation mechanisms like reflection, diffraction, scattering in wireless channels
			CO2	Ability to develop a schemic for idle mode, call setup, call progress handling, call teardown in GSM network
			CO3	Ability to develop a schemic for idle mode, call setup, call progress handling, call teardown in CDMA network
			CO4	Ability to understand the basic operations of Air interface in LTE 4G system
2	NETWORK SECURITY	18ECS82	CO1	Ability to explain Network Security protocols
			CO2	Understand the concept of Transport Level Security and Secure Socket Layer
			CO3	Ability to explain Enterprise Security Framework
			CO4	Ability to apply concepts of cybersecurity framework in computer system administration
3	OPTICAL COMMUNICATIO N NETWORKS	18ECS824	CO1	Classification and working of optical fiber with different modes of signal propagation
			CO2	Describe the transmission characteristics and losses in optical fiber communication
			CO3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers
			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
4	JECT WORK PHAS	18ECP83	CO1	Analyse the problem, formulation and solution of the selected project
			CO2	Develop solutions for contemporary problems using modern tools for sustainable development
			CO3	Demonstrate ethical and professional sustainability while working in a team and communicate effectively for the benefit of the society
			CO4	Understand the engineering, finance and management principles
5	ECHNICAL SEMINA	18ECS84	CO1	Ability to identify state-of-the-art and futuristic technologies through self-motivation and through collaboration with others
			CO2	Ability to conduct a detailed literature survey and self-study in order to completely understand the intricacies of the chosen topic
			CO3	Ability to conceptualize solutions built using state-of-the-art technologies in terms of their architecture, design and deployment
			CO4	Ability to identify the scope and limitations of specific technology in terms of their applicability along with a visualization of the issues to grow specific technology
			CO5	Ability to create comprehensive technical reports using relevant tools and to make oral presentation of technical topics with adherence to timeliness, clarity and such other soft skills alongside a presentable attitude and behaviour
6	INTERNSHIP	18ECI85	CO1	Ability to learn current technologies used in industry
			CO2	Ability To communicate effectively and write profound technical reports
			CO3	Able to Provides dissemination of the technology learnt
			CO4	Able to Provides additional information beyond the learnings during the internship use of his/her own thoughts

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(NAAC Accredited Institution)

Department of Information Science & Engineering

(Accredited by NBA and Permanently Affiliated to VTU)

VISION

Empower the students to thrive for excellence in the area of Information Science and Engineering to use technology for sustainable development for social needs.

MISSION

1) To provide theoretical and practical knowledge of Information Science and Engineering.
2) To provide inter disciplinary knowledge to be the leaders with social responsibility.
3) To collaborate with industry to facilitate content beyond syllabus.
4) To promote team work through projects, co-curricular and social activities.

Program Educational Objectives (PEOs)

1) Graduates will contribute in development of software applications keeping abreast of the development.
2) Exhibit competence as an individual, in teams with leadership and managerial skills.
3) By optimizing the technology, the graduates will be able to adopt lifelong learning.

Program Specific Outcomes (PSOs)

PSO 1: Apply the Mathematical tools, Electronics & Embedded Systems Knowledge, and Programming Knowhow to develop softwares.

PSO 2: Use of Artificial Intelligence and Machine Learning, High-Performance Computing, Cloud Computing, Network Security technologies and Software Engineering for providing solutions to the technological and social needs.

PSO 3: Work individually and in teams, ethically exhibiting the managerial and leadership skills with sustainable Environment.

Program Outcomes (POs)

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.

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Department of Management Studies & Research

Vision

To be a centre of eminence that fosters quality in management education and research through collaborative learning and developing world class business leaders capable of managing change and transformation in a globally competitive environment.

Mission

M1: To impart management education that implies and nurtures management students with entrepreneurial mind set.

M2: Creating collaborative learning environment through industry institute interaction and networking with professional bodies to enhance employability skills & career opportunities to the management students.

M3: To inculcate research among young minds recognized as a driving force of progress and innovation.

M4: To foster continuous learning for innovative solutions with ethical values so that they become capable transformational leaders and contributing members of the society and dynamic business world.

Programme Educational Objectives (PEOs)

The PEOs of MBA will enable the graduates:

PEO1: To nurture students of management studies with contemporary skills of management enabling them to adapt and operate in diverse sectors of economy.

PEO2: To inculculate the leadership qualities and team building skills among management students.

PEO3: Exhibit competence in research aptitude and entrepreneurial abilities to solve problems in real world. It instils resilience and adaptability in students in facing the challenges of the contemporary business world.

PEO4: Be lifelong learners for easy transition into the dynamic world of business with ethics.

Program Specific Outcomes (PSOs)

The post graduate students of the programme shall develop the ability to:

PSO1: Demonstrate the professional knowledge of management science to solve complex business problems with innovative solutions to achieve the stated business goals.

PSO2: Analyse and interpret the dynamic business environment and crafting business strategies and decisions at the national and global level.

PSO3: Establish openness to explore solutions to social issues in understanding business ethics and resolving ethical dilemmas.

PSO4: Adapt and focus on achieving the organisational goal and objectives with complete zeal and commitment.

Program Outcomes (POs)

On successful completion of the MBA Programme the students shall develop

PO1: Ability to demonstrate knowledge of management theories and practices to solve complex corporate /business problems using limited resources.

PO2: Competence to analyse and design statistics – based business decision making.

PO3: Proficiency to identify business opportunities, design and implement innovations in work place with value based leadership.

PO4: Aptitude to understand, analyze and apply ethical principles for making judicious managerial decisions.

PO5: Capability to communicate effectively with various stakeholders and contributing member in realising the organizational goals.

PO6: Adaptability to engage in continuous learning for the holistic individual development.

17/01/2023

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74
Department of Management Studies and Research

COURSE OUTCOMES (2022-23)

1st SEM 2022 SCHEME

Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
1	Principles of Management and OB	22MBA11	CO1	Gain practical experience in the field of Management and Organization Behaviour
			CO2	Acquire the conceptual knowledge of Management, various functions of Management and theories in OB
			CO3	Comprehend and apply management and behavioural models to relate attitude, perception and personality.
			CO4	Analyse the recent trends in Management and OB models
2	Entrepreneurship Development	22MBA12	CO1	Display keen interest and orientation towards entrepreneurship, entrepreneurial opportunity Modules in order to setup a busine
			CO2	To know about the various business models and B-Plans across Business sectors.
			CO3	Able to understand the importance of marketing and different forms of businesses.
			CO4	Become aware about various sources of funding and institutions supporting entrepreneurs.
			CO5	Awareness about legal aspects and ways to protect the ideas.
			CO6	To understand the ways of starting a business and to know how to foster their ideas.
3	Accounting for Managers	22MBA13	CO1	Know what and how books of accounts and financial statements are prepared.
			CO2	How to interpret financial statements of companies for decision making
			CO3	Independently undertake financial statement analyses and take decisions
4	Statistics for Managers	22MBA14	CO1	Understand how to organize, manage, and present the data
			CO2	Use and apply a wide variety of specific statistical tools
			CO3	Understand the applications of probability in business
			CO4	Effectively interpret the results of statistical analysis
			CO5	Develop competence of using computer packages to solve the problems
5	Marketing Management	22MBA15	CO1	Comprehend the concepts of Marketing Management.
			CO2	Gain knowledge on consumer behaviour and buying process
			CO3	Understand concept of Product and Brand Management, Branding and Pricing strategies
			CO4	Identify marketing channels and the concept of product distribution,
			CO5	Simply ideas into a viable marketing plan for various modes of marketing
6	Business Communication	22MBA16	CO1	The students will be aware of their communication skills and know their potential to become successful managers
			CO2	The students will get enabled with the mechanics of writing and can compose the business letters in English precisely and effe
			CO3	The students will be introduced to the managerial communication practices in business those are in vogue.
			CO4	Students will get trained in the art of Interpersonal communication and technological advancement and social

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3rd SEM- 2020 SCHEME				
Sl. No	Subject Name	Subject Code	Course Outcomes(CO)	
1	Emerging Exponential Technologies	20MBA301	CO1	Identify different emerging technologies
			CO2	Select appropriate technology and tools for a given task
			CO3	Identify necessary inputs for application of emerging technologies
			CO4	Understand the latest developments in the area of technology to support business
2	Technology and Operational Strategy	20MBA302	CO1	Acquire the knowledge about the concepts of production and operation management
			CO2	Demonstrate the basic concepts of process mapping
			CO3	Evaluate the importance of Lean Manufacturing
			CO4	Develop strategies of Total quality management
			CO5	Understand the roles of ISO standards and production system
3	Services Marketing	20MBAMM303	CO1	Develop an understanding about the various concepts and importance of Services Marketing.
			CO2	Enhance knowledge about emerging issues and trends in the service sector.
			CO3	Learn to implement service strategies to meet new challenges
4	Marketing Research &Analytics	20MBAMM304	CO1	Comprehend the objectives of Market research & its application in solving marketing problems.
			CO2	Appreciate the use of different data collection methods, sampling design techniques, measurement methods to analyze the data
			CO3	Generalize and interpret the data with the help of various measurement techniques.
			CO4	To understand the emergence of new trends in research.
5	Consumer Behaviour	20MBAMM305	CO1	Explain the background and concepts vital for understanding Consumer Behaviour
			CO2	Identify the role of variables that determines Consumer Behaviour in Social & cultural domain
			CO3	Identifying the psychological and behavioural practices adopted by organizations to enhance the Consumer
6	Retail Management	20MBAMM306	CO1	Career development in the field of sales
			CO2	Management of sales
			CO3	Find out the contemporary retail management, issues, and strategies.
			CO4	Evaluate the recent trends in retailing and its impact in the success of modern business
			CO5	Relate store management and visual merchandising practices for effective retailing.
7	Investment Management	20MBAFM303	CO1	The student will understand the capital market and various instruments for investment.
			CO2	The learner will be able to assess the risk and return associated with investments and methods to value securities
			CO3	The student will be able to analyse the Economy, Industry and Company framework for Investment Management.
			CO4	The student will learn the theories of Portfolio management and also the tools and techniques for efficient portfolio manageme

8	Direct Taxation	20MBAFM304	CO1	Understand the basics of taxation and process of computing residential status
			CO2	Calculate taxable income under different heads
			CO3	Understand deductions and calculation of tax liability of Individuals
			CO4	Know the corporate tax system
9	Banking and Financial Serv	20MBAFM305	CO1	The Student will be acquainted to various Banking and Non-Banking financial services in India
			CO2	The Student will understand the activities of Merchant Banking and credit rating
			CO3	The Student will be equipped to understand micro financing and other financial services in India
			CO4	The Student will understand how to evaluate and compare leasing & hire purchase
10	Advanced Financial Manag	20MBAFM306	CO1	Get an overview of capital structure theories.
			CO2	Understand and assess the dividend policy of the firm
			CO3	Realize the importance of management of working capital in an organization
			CO4	Be aware of the techniques of cash, inventory and receivables management
11	Recruitment and Selection	20MBAHR303	CO1	Gain the practical insight of various principles and practices of recruitment and selection
			CO2	Acquire knowledge of latest conceptual framework used in recruitment and selection process and procedure applied in various industries.
			CO3	Illustrate the application of recruitment and selection tools and techniques in various sectors.
			CO4	Develop a greater understanding about strategies for workforce planning and assessment, analyse the hiring management system followed in various industries.
12	Human Resource Analytics	20MBAHR304	CO1	Gain practical insight of HR Processes, HR analytics and predictive modelling used in HR functions.
			CO2	Acquire conceptual knowledge of HRA frameworks, models and approaches
			CO3	Illustrate the application of datafication of HR, predictive analytics tools and techniques
			CO4	Analyse the employee data set, considering the various concepts and functions of HR, facilitating the decision making in business context.
13	Industrial Relations and Labour Laws	20MBAHR305	CO1	Gain practical experience related to labour legislations in India across various sectors.
			CO2	Acquire conceptual knowledge of Industrial relations and labour laws followed within industries.
			CO3	Develop the greater understanding of IR concepts and its application in solving various issues in IR.
			CO4	Apply the IR and labour laws concepts in various industries in India.
14	Compensation Management & Reward System	20MBAHR306	CO1	Gain insights of various conceptual aspects of Compensation and Benefits to achieve organizational goals.
			CO2	Determine the performance based compensation system for business excellence and solve various cases.
			CO3	Designing the compensation strategies for attraction, motivation and retaining high quality workforce
			CO4	Understand the Legal & Administrative Issues in global compensation to prepare compensation plan, CTC, wage survey

HOD - MBA

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DON BOSCO INSTITUTE OF TECHNOLOGY, BANGALORE-74
Department of Management Studies and Research

COURSE OUTCOMES (2022-23)

2nd SEM 2022 SCHEME				
1	Human Resource Management	22MBA21	CO1	Understand and gain practical experience in the field of Human Resource Concepts, functions and theories.
			CO2	Acquire conceptual insight of Human Resource and various functions of HR.
			CO3	Apply personnel, managerial and welfare aspects of HR.
			CO4	Perceive greater understanding about HR practices.
			CO5	Perceive knowledge about the future trends in HRM.
2	Financial Management	22MBA22	CO1	Understand the basic financial concepts.
			CO2	Apply time value of money.
			CO3	Evaluate the investment decisions.
			CO4	Estimate working capital requirements.
			CO5	Analyze the capital structure and dividend decisions.
3	Research Methodology & IPR	22MBA23	CO1	Understand various research approaches, techniques and strategies in the appropriate in business.
			CO2	Apply a range of quantitative / qualitative research techniques to business and day to day management problems.
			CO3	Demonstrate knowledge and understanding of data analysis, interpretation and report writing.
			CO4	Develop necessary critical thinking skills in order to evaluate different research approaches in Business.
			CO5	Discuss various forms of the intellectual property, its relevance and business impact in the changing global business environment and leading International Instruments concerning IPR.
4	Operations Research	22MBA24	CO1	Get an insight into the fundamentals of Operations Research and its definition, characteristics and phases phases
			CO2	Use appropriate quantitative techniques to get feasible and optimal solutions.
			CO3	Understand the usage of game theory , Queuing Theory and Simulation for Solving Business Problems.
			CO4	Understand and apply the network diagram for project completion
5	Strategic Management	22MBA25	CO1	Students should get clear idea about the concept of Strategic Management, its relevance, Characteristics, process nature and purpose.
			CO2	Student to acquire an understanding of how firms successfully institutionalize a strategy and create an organizational structure for domestic and overseas operations and gain competitive advantage.
			CO3	To give the students an insight on strategy at different levels of an organization to gain competitive advantage.
			CO4	To help students understand the strategic drive in multinational firms and their decisions in different markets.
6	Managerial Economics	22MBA26	CO1	The student will understand the application of Economic Principles in Management decision making.
			CO2	The student will earn the microeconomic concepts and apply them for effective functioning of a Firm and Industry.
			CO3	The Student will be able to understand, assess and forecast the demand.
			CO4	The student will apply the concepts of production and cost for optimization of production.
			CO5	The student will design competitive strategies like pricing, product differentiation etc. and marketing according to the market structure.
			CO6	The student will be able to understand the impact of macroeconomic concepts.

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4TH SEM 2020 SCHEME				
1	B2B Marketing Management	20MBAMM401	CO1	Understand significance of B2B marketing
			CO2	Ability to create an integrated marketing communications plan which includes promotional strategies
			CO3	Effectively use marketing communication for customer acquisition
			CO4	Define and apply knowledge of various aspects of managerial decision making related to marketing communications strategy and tactics
2	Logistics and Supply Chain Management	20MBAMM402	CO1	Demonstrate knowledge of the functions of logistics and supply chain management
			CO2	To relate concepts and activities of the supply chain to actual organizations
			CO3	Highlight the role of technology in logistics and supply chain management.
			CO4	Evaluate cases for effective supply chain management and its implementation
3	Digital and Social Marketing	20MBAMM403	CO1	Recognize appropriate e-marketing objectives
			CO2	Appreciate the e-commerce framework and technology
			CO3	Illustrate the use of search engine marketing, online advertising and marketing strategies
			CO4	Develop social media strategy's to solve business problems
4	Strategic Brand Management	20MBAMM404	CO1	Comprehend & correlate all the management functions which are happening around with fundamental concepts and principles of management
			CO2	[illegible] applications of the same
			CO3	[illegible] organizational goals
			CO4	[illegible] world/situation
			CO5	Understand and demonstrate their exposure on recent trends in management
5	Agri Business Marketing	20MBAMM405	CO1	Highlight the characteristics of Indian rural markets and describe the differences between rural and the urban economy.
			CO2	Analyze the roadblocks of Indian rural market and advocate solutions for the problems of rural markets.
			CO3	Emphasize the different strategies adopted by Indian companies for rural markets
			CO4	Apply the strategies to be adopted for influencing the rural consumers.
6	International Marketing Management	20MBAMM406	CO1	Understand the differences between domestic marketing and international marketing.
			CO2	Understand the concept of international pricing and distribution decision
			CO3	Acquire the knowledge of import export documentation.
7	Risk Management and Insurance	20MBAFM401	CO1	Understand various types of risks.
			CO2	Assess the process of identifying and measuring the risk
			CO3	Acquaint with the functioning of life insurance in risk management
			CO4	Understand general insurance contract.
8	Financial Derivatives	20MBAFM402	CO1	Understand the mechanism of forwards/futures, options, financial swaps, various credit derivatives and VaR with their features, merits and demerits.
			CO2	Assess the application of forwards/futures, options, financial swaps, various credit derivatives and VaR using numerical problems
			CO3	Application of financial derivatives in risk management.
			CO4	Critically evaluate various financial derivatives.
9	Indirect Taxation	20MBAFM403	CO1	Have clarity about GSTsystem in India.
			CO2	Understanding of levy and collection of GSTin India.
			CO3	Have an overview of customs duty in India.
			CO4	Understanding of valuation for customs duty.

10	Mergers, Acquisition and Corporate Restructuring	20SMBAFM404	CO1	Understand M&A with its different classifications, strategies, theories, motives etc
			CO2	Conduct financial evaluation of M&A
			CO3	Analyze the results after evaluation
			CO4	Critically evaluate different types of M&A, takeover and restructure strategies
11	Corporate Valuation	20MBAF30405	CO1	Understand corporate valuation and valuation process
			CO2	Familiarize himself with the standard techniques of corporate valuation
			CO3	Develop analytical skills relevant for corporate evaluation and value based management
			CO4	Critically evaluate IPOs, M&As, Bankruptcy cases
12	International Financial Management	20MBAFM406	CO1	The student will have an understanding of the International Financial Environment
			CO2	The student will know about the foreign exchange market, participants and transactions
			CO3	The student will be able to use derivatives in foreign exchange risk management
			CO4	The student will be able to evaluate the Firm's Exposure to risk in International environment and various theories associated with it
13	Organizational Leadership	20MBAHR401	CO1	Understand the fundamental concepts and principles, theories of Organizational Leadership
			CO2	Analyze the organizational leadership styles, approaches and issues, its impact on the followers by using leadership theories and interventions
			CO3	Developing better insight in understanding the leadership issues that influence them to work effectively in groups
			CO4	Demonstrate their ability to apply of their knowledge in organizational leadership
14	Personal Growth and Interpersonal Effectiveness	20MBAHR402	CO1	Have in-depth understanding the various personality traits which promotes personal growth
			CO2	Analyze the concepts of human personality, behaviour and functioning of mind
			CO3	Learn and apply the psychometrics tests in understanding the personality traits
			CO4	Develop the greater insights of self, and others through various theories and prepare the developmental plan for interpersonal effectiveness
15	International HRM	20MBAHR403	CO1	Gain conceptual knowledge and practical experience in understanding the HR concepts globally
			CO2	Comprehend and correlate the strategic approaches to HR aspects amongst PCN's, TCN's and HCN's
			CO3	Develop knowledge and apply the concepts of HR in global perspective
			CO4	Have a better insight of HR concepts, policies and practices by critically analysing the impact of contemporary issues globally
16	Organization Change and development	20MBAHR404	CO1	Gain conceptual insight of change management models, OD processes and interventions
			CO2	Develop the understanding of OD to apply OD aspects in private and public sectors in India
			CO3	Analyze the tools and techniques available to implement changes in the organization environment
			CO4	Handle the OD interventions by analysing the role of OD consultant
17	HR Audit	20MBAHR405	CO1	Gain conceptual knowledge and practical experience in understanding the HR Audit
			CO2	Conceptualize and correlate the strategic approaches to HR Audit aspects
			CO3	Develop knowledge and apply the concepts of HR Audit in the organization
			CO4	Have a better insight of HR Audit concepts, policies and practices by critically analysing the impact of contemporary issues in the organization
18	Management Consulting for Business Excellence	20MBAHR406	CO1	Gain the practical insight of various principles and practices of Consultancy and Consultancy
			CO2	Acquire knowledge of latest conceptual framework used by Consultants and Consultancy, process and procedures applied in various sectors
			CO3	Illustrate the application of Consultancy and Consultancy tools and techniques in various sectors
			CO4	Develop a greater understanding about strategies adopted/undertaken by Consultants and Consultancy

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Department Mechanical Engineering

QUALITY POLICY

Mechanical Engineering Department is committed to impart quality education, research and training for attaining excellence through innovation and continual improvement to produce the most competent Engineers, who are eager to work in a culture of challenge and creativity, with ethical and professional standards to serve a sustainable society.

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31/10/22

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Institute Vision & Mission

VISION

To be a centre of Excellence to transform young minds in technical and management education, fostering innovation and entrepreneurial skills with ethical, environmental and societal responsibility.

MISSION

M1: To impart quality education in order to meet the needs of industry and society.

M2: To collaborate with academia industry and research institutes to strengthen teaching and learning process.

M3: To promote equitable and harmonious development of students to work in teams.

M4: To imbibe lifelong learning skills and entrepreneurial skills exhibiting leadership.

Values :- Pursuit of excellence, Accountability, teamwork and leadership, Endurance.

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DEPARTMENT OF MECHANICAL ENGINEERING

DEPARTMENT VISION

"Pursuit's excellence through quality education to aspirants in the field of Mechanical Engineering, in order to transform them into socially responsible professionals and leaders to serve a sustainable society"

DEPARTMENT MISSION

M1 - To provide quality education and experience based learning in engineering through strong theoretical foundations and practical training to make globally competent engineers.

M2 - To develop critical thinking abilities, entrepreneurial skills, leadership qualities and innovative Practices.

M3 - To inculcate a passion for understanding professionalism and resources with ethics, safety and sustainable contribution to the society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO -1 To prepare graduates for successful careers in engineering, technological organizations and other industries with the emphasis in the fields of Thermal, Design, Manufacturing, Service and R&D.

PEO - 2 The graduates to recognize the importance and participate in continuous learning activities to enhance their professional skills in engineering and management.

PEO - 3 To inculcate our graduates to become industrial entrepreneurs to develop products, processes and to solve technical or societal problem in context with contribution to the betterment of society.

PEO - 4 To develop the professional and ethical values in diverse culture among students.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO - 1 Model, Analyze and Design mechanical components and systems using engineering knowledge and computational tools.

PSO - 2 Identify the manufacturing methods and plan processes for mechanical components and systems to meet end-user needs optimally.

PSO – 3 Develop automated systems using technologies and simulation tools.

'Approved'
Director - IQAC
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DEPARTMENT OF MECHANICAL ENGINEERING

Programme Outcomes (POs)

Programme outcomes are narrower statements that defines what students are expected to know and be able to do at the time of graduation. Graduated students of **Bachelor of Mechanical Engineering** programme at **Don Bosco Institute of Technology** will attain the following programme outcomes in the field of Mechanical Engineering.

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 analyse complex engineering problems reaching substantiated conclusions using the first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis, and interpretation of data and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics, and responsibilities, and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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DON BOSCO INSTITUTE OF TECHNOLOGY
Department of Mechanical Engineering

COs 2022-23 Odd Semester

2021 scheme COURSE OUTCOMES 3rd SEM				
Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
1	Transform Calculus, Fourier Series and Numerical Techniques	21MAT31	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 extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.
2	Metal casting, Forming and Joining Processes	21ME32	CO1	Select appropriate primary manufacturing process and related parameters for obtaining initial shape and size ofcomponents.
			CO2	Design and develop adequate tooling linked with casting, welding and forming operations.
			CO3	Appreciate the effect of process parameters on quality of manufactured components
			CO4	Demonstrate various skills in preparation of molding sand for conducting tensile, shear and compression
			CO5	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending operations.
3	Material Science and Engineering	21ME33	CO1	Understand the mechanical properties of metals and their alloys.
			CO2	Analyze the various modes of failure and understand the microstructures of ferrous and nonferrous materials.
			CO3	Describe the processes of heat treatment of various alloys.
			CO4	Acquire the Knowledge of composite materials and their production process as well as
			CO5	Understand the properties and potentialities of various materials available and material selection procedures.
4	Thermodynamics	21ME34	CO1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems
			CO2	
			CO3	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics.
			CO4	Apply the knowledge of entropy, reversibility and irreversibility to solve numerical problems and apply 1st law of thermodynamics to closed and open systems and determine quantity of energy
			CO5	

5	Machine Drawing and GD & T	21MEL35	CO1	Explain the construction & specification of various machine tools.
			CO2	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost
			CO3	Apply mechanics of machining process to evaluate machining time.
			CO4	Understand the concepts of different metal forming processes.
			CO5	Apply the concepts of design of sheet metal dies to design different dies for simple sheet metal components.
6	Social Connect and Responsibility	21UH36	CO1	Understand social responsibility 2. 3.
			CO2	Practice sustainability and creativity
			CO3	Showcase planning and organizational skills
7	Samskrutika Kannada	21KSK37/47	CO1	To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
			CO2	To enable learners to Listen and understand the Kannada language properly.
			CO3	To speak, read and write Kannada language as per requirement.
			CO4	To train the learners for correct and polite conservation.
8	Introduction to Python	21ME381	CO1	Demonstrate proficiency in handling of loops and creation of functions
			CO2	Identify the methods to create and manipulate lists, tuples and dictionaries.
			CO3	Discover the commonly used operations involving regular expressions and file system
			CO4	Examine working of PDF and word file formats
Sl. No	**Subject Name**	**Subject Code**	**2018 scheme COURSE OUTCOMES of 5th SEM**	
1	Management and Economics	18ME51	CO1	To help the students to understand the fundamental concepts and principles of management; the basic roles, skills, functions of management, various organizational structures and basic knowledge of marketing.
			CO2	To impart knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions
2	Design of Machine Elements I	18ME52	CO1	To understand the various steps involved in the Design Process.
			CO2	To explain the principles involved in design of machine elements, subjected to different kinds of forces, from the considerations of strength, rigidity, functional and manufacturing requirements.
			CO3	Develop the capability to design elements like shafts, couplings, welded joints, screwed joints, and power screws.
			CO4	To learn to use national and international standards, standard practices, standard data, catalogs, and standard components used in design of machine elements
			CO5	To understand and interpret different failure modes and application of appropriate criteria for design of machine elements. .

3	Dynamics of Machines	18ME53	CO1	To understand the force-motion relationship in components subjected to external forces and analysis of standard mechanisms.
			CO2	To understand the undesirable effects of unbalances resulting from prescribed motions in mechanism.
			CO3	To understand the effect of Dynamics of undesirable vibrations.
			CO4	To understand the principles in mechanisms used for speed control and stability control.
			CO5	To know the concepts of modelling mechanical systems using spring, mass and damper elements.
			CO6	To compute the natural and damped frequencies of free 1-DOF mechanical systems
4	Turbo Machines	18ME54	CO1	Understand typical design of Turbo machine, their working principle, application and thermodynamics process involved.
			CO2	Study the conversion of fluid energy to mechanical energy in Turbo machine with utilization factor and degree of reaction.
			CO3	Analyse various designs of steam turbine and their working principle
			CO4	Study the various designs of hydraulic turbine based on the working principle.
			CO5	Understand the various aspects in design of power absorbing machine.
5	Fluid Power Engineering	18ME55	CO1	To provide an insight into the capabilities of hydraulic and pneumatic fluid power.
			CO2	To understand concepts and relationships surrounding force, pressure, energy and power in fluid power systems
			CO3	Exposure to build and interpret hydraulic and pneumatic circuits related to industrial applications.
			CO4	To examine concepts cantering on sources of hydraulic power, rotary and linear actuators,
			CO5	To familiarize with logic controls and trouble shooting
6	Operations Management	18ME56	CO1	To get acquainted with the basic aspects of Production Management.
			CO2	The expose the students to various aspects of planning, organising and controlling operations Management.
			CO3	To understand different problem-solving methodologies and Production Management techniques
7	Fluid Mechanics and Machines Lab	18MEL57	CO1	Perform experiments to determine the coefficient of discharge of flow measuring devices.
			CO2	Conduct experiments on hydraulic turbines and pumps to draw characteristics.
			CO3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.
			CO4	Determine the energy flow pattern through the hydraulic turbines and pumps
8	Energy Lab	18MEL58	CO1	Perform experiments to determine the properties of fuels and oils
			CO2	Conduct experiments on engines and draw characteristics
			CO3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry.
			CO4	Identify exhaust emission, factors affecting them and report the remedies. Determine the energy flow pattern through the I C Engine
			CO5	Exhibit his competency towards preventive maintenance of IC engines.

No	Subject Name	Subject Code	2018 scheme COURSE OUTCOMES of 7th SEM Course Outcomes(CO)	
1	Control Engineering	18ME71	CO1	Modeling of mechanical, hydraulic, pneumatic and electrical systems.
			CO2	Representation of system elements by blocks and its reduction
			CO3	Transient and steady state response analysis of a system.Frequency response analysis using bode plot.
			CO4	Frequency response analysis using polar plot.
			CO5	Different system compensators and variable characteristics of linear systems.
2	Computer Aided Design and Manufacturing	18ME72	CO1	Able to define Automation, CIM, CAD, CAM and explain the differences between these concepts. Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing
			CO2	Solve simple problems of transformations of entities on computer screen.
			CO3	Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines.
			CO4	Analyze the automated flow linesto reduce down time and enhance productivity.
3	Total Quality Management	18ME734	CO1	Explain the various approaches of TQM
			CO2	Infer the customer perception of quality
			CO3	Analyze customer needs and perceptions to design feedback systems.
			CO4	Apply statistical tools for continuous improvement of systems
			CO5	Apply the tools and technique for effective implementation of TQM
4	Additive Manufacturing	18MEL741	CO1	Understand the additive manufacturing process, polymerization and powder metallurgy process
			CO2	Understand characterisation techniques in additive manufacturing.
			CO3	Acquire knowledge on CNC and Automation
5	Electric vehicales	18EE753	CO1	Analyze and model the power management systems for electric and hybrid vehicles
			CO2	Devise power electronics based control strategies for electric and hybrid vehicles
			CO3	Analyze and design various components of electric and hybrid vehicles with environment concern.
6	Design Lab	18MEL76	CO1	To understand the working principles of machine elements such as Governors, Gyroscopes etc.,
			CO2	To identify forces and couples in rotating mechanical system components.
			CO3	To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft.
			CO4	To measure strain in various machine elements using strain gauges.
			CO5	To determine the minimum film thickness, load carrying capacity, frictional torque and pressure distribution of journal bearing.

7	CIM Lab	18MEL77	CO1	Generate CNC Lathe part program for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation etc.
			CO2	Generate CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling- circular, rectangular, Mirror commands etc
			CO3	Use Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting etc.
			CO4	Simulate Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine.
			CO5	Use high end CAM packages for machining complex parts; use state of art cutting tools and related cutting parameters; optimize cycle time.

H O D Signature

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DON BOSCO INSTITUTE OF TECHNOLOGY
Department of Mechanical Engineering

COs 2022-23 Even Semester

2021 scheme COURSE OUTCOMES 4th SEM				
Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
1	COMPLEX ANALYSIS, PROBABILITY AND STATISTICAL METHODS	21MAT41	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
2	MACHINING SCIENCE AND JIGS & FIXTURES (IPCC)	21ME42	CO1	Demonstrate the Conventional CNC machines and advanced manufacturing process operations
			CO2	Determine tool life, cutting force, and economy of the machining process
			CO3	Analyze the influence of various parameters on machine tools' performance.
			CO4	Select the appropriate machine tools and process, the Jigs, and fixtures for various applications.
3	FLUID MECHANICS	21ME43	CO1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.
			CO2	Explain the principles of pressure, buoyancy and floatation
			CO3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.
			CO4	Describe the principles of fluid kinematics and dynamics.
			CO5	Explain the concept of boundary layer in fluid flow and apply dimensional analysis to form
4	MECHANICS OF MATERIALS	21ME44	CO1	Understand simple, compound, thermal stresses and strains their relations and strain energy.
			CO2	Analyse structural members for stresses, strains and deformations
			CO3	Analyse the structural members subjected to bending and shear loads
			CO4	Analyse shafts subjected to twisting loads.
			CO5	Analyse the short columns for stability.

Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
5	BIOLOGY FOR ENGINEERS	21BE45	CO1	Elucidate the basic biological concepts via relevant industrial applications and case studies.
			CO2	Evaluate the principles of design and development, for exploring novel bioengineering projects.
			CO3	Corroborate the concepts of biomimetics for specific requirements.
			CO4	Think critically towards exploring innovative biobased solutions for socially relevant problems.
6	MECHANICAL MEASUREMENTS AND METROLOGY	21ME46B	CO1	Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters
			CO2	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design
			CO3	Understand the working principle of different types of comparators
			CO4	Describe measurement of major & minor diameter, pitch, angle and effective diameter of screw threads.
7	BALAKE KANNADA	21MEL47	CO1	To Create the awareness regarding the necessity of learning local language for comfortable and healthy life.
			CO2	To enable learners to Listen and understand the Kannada language properly.
			CO3	To speak, read and write Kannada language as per requirement.
			CO4	To train the learners for correct and polite conservation.
8	SPREAD SHEETS FOR ENGINEERS	21MT481	CO1	To read working drawings, understand operational symbols and execute machining operations.
			CO2	Prepare fitting models according to drawings using hand tools- V-block, marking gauge, files, hack saw, drills etc
			CO3	Understand integral parts of lathe, shaping and milling machines and various accessories and attachments used.
			CO4	Select cutting parameters like cutting speed, feed, depth of cut, and tooling for various machining
				2018 scheme COURSE OUTCOMES of 6th SEM
1	FINITE ELEMENT ANALYSIS	18ME61	CO1	To learn basic principles of finite element analysis procedure.
			CO2	To learn the theory and characteristics of finite elements that represent engineering structures
			CO3	To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses

Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
2	COMPUTER INTEGRATED MANUFACTURING	18ME62	CO1	To impart knowledge of CIM andAutomation and different concepts of automation by developing mathematical models
			CO2	To make students to understand the Computer Applications in Design and Manufacturing [CAD / CAM) leading to Computer integrated
			CO3	systems. Enable them to perform various transformations of entities on display devices.
			CO4	To expose students to automated flow lines,assemblylines,Line Balancing Techniques,and Flexible Manufacturing Systems.
			CO5	To expose students to computer aided process planning, material requirement planning, capacity planning etc
			CO6	To introduce the students to concepts of Additive Manufacturing, Internet of Things, and Industry 4.0leading to Smart Factory.
			CO7	To expose the students to CNC Machine Tools,CNC part programming, and industrial robots.
3	HEAT TRANSFER	18ME63	CO1	Study the modes of heat transfer.
			CO2	Learn how to formulate and solve 1-D steady and unsteady heat conduction problems.
			CO3	Apply empirical correlations for fully-developed laminar, turbulent internal flows and external boundary layer convective flowproblems
			CO4	Study the basic principles of heat exchanger analysis and thermal design
			CO5	Understand the principles of boiling and condensation including radiation heat transfer related engineering problems.
4	DESIGN OF MACHINE ELEMENTS II	18ME64	CO1	To understand various elements involved in a mechanical system.
			CO2	To analyze various forces acting on the elements of a mechanical system and design them using appropriate techniques, codes, and standards.
			CO3	To select transmission elements like gears, belts, pulleys,bearings from the manufacturers" catalogue.
			CO4	To design completely a mechanical system integrating machine elements.
			CO5	To produce assembly and working drawings of various mechanical systems involving machine elements like belts, pulleys, gears,springs, bearings, clutches and brakes.
5	NON-TRADITIONAL MACHINING	18ME641	CO1	Understand the compare traditional and non-traditional machining process and recognize the need for Non- traditional machining process.
			CO2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.
			CO3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations
			CO4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.
			CO5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.

Sl. No	Subject Name	Subject Code		Course Outcomes(CO)
6	WORLD CLASS MANUFACTURING	18ME652	CO1	Understand recent trends in manufacturing
			CO2:	Demonstrate the relevance and basics of World Class Manufacturing
			CO3	Understand customization of product for manufacturing
			CO4	Understand the implementation of new technologies
			CO5	Compare the existing industries with WCM industries.
7	HEAT TRANSFER LAB	18MEL67	CO1	Determine the thermal conductivity of a metal rod and overall heat transfer coefficient of composite slabs.
			CO2	Determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.
			CO3	Evaluate temperature distribution characteristics of steady and transient heat conduction through solid cylinder experimentally.
			CO4	Determine surface emissivity of a test plate and Stefan Boltzmann constant
			CO5	Estimate performance of a refrigerator and effectiveness of a fin and Double pipe heat exchanger
8	COMPUTER AIDED MODELLING AND ANALYSIS LAB	18MEL66	CO1	Use the modern tools to formulate the problem, create geometry, descritize, apply boundary conditions to solve problems of bars, truss, beams, and plate to find stresses with different-loading conditions.
			CO2:	Demonstrate the ability to obtain deflection of beams subjected to point, uniformly distributed and varying loads and use the available results to draw shear force and bending moment diagrams.
			CO3	Analyze and solve 1D and 2D heat transfer conduction and convection problems with different boundary conditions
			CO4	Carry out dynamic analysis and finding natural frequencies of beams, plates, and bars for various boundary conditions and also carry out dynamic analysis with forcing functions.

2018 scheme COURSE OUTCOMES of 8th SEM

Sl. No	Subject Name	Subject Code		2018 scheme 8th SEM Course Outcomes(CO)
1	ENERGY ENGINEERING	18ME81	CO1	Understand energy scenario,energy sources and their utilization
			CO2	Learn about energy conversion methods and their analysis
			CO3	Study the principles of renewable energy conversion systems
			CO4	Understand the concept of green energy and zero energy.
2	AUTOMOBILE ENGINEERING	18ME824	CO1	To identify the different parts of an automobile and it's working
			CO2	To understand the working of transmission and braking systems
			CO3	To comprehend the working of steering and suspension systems
			CO4	To learn various types of fuels and injection systems
			CO5	To know the cause of automobile emissions,its effects on environment and methods to reduce

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2.6.1. COs of all the subjects in the academic year 2022 – 2023 – ODD SEM

Semester 1:

21MAT31 (Transform Calculus & Differential Equations)

CO1 Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.
CO2 Learn the notion of partial differentiation to calculate rate of change of multivariate functions and solve problems related to composite functions and Jacobian.
CO3 Solve first-order linear/nonlinear ordinary differential equations analytically using standard methods.
CO4 Demonstrate various models through higher order differential equations and solve such linear ordinary differential equations.
CO5 Test the consistency of a system of linear equations and to solve them by direct and iterative methods

21PHY12 (Engineering Physics)

CO1 Interpret the types of mechanical vibrations and their applications, the role of Shock waves in various fields.
CO2 Demonstrate the quantisation of energy for microscopic system.
CO3 Apply LASER and Optical fibers in opto electronic system.
CO4 Illustrate merits of quantum free electron theory and applications of Hall effect.
CO5 Analyse the importance of XRD and Electron Microscopy in Nano material characterization.

21ELE13 (Basic Electrical Engineering)

CO1 Analyze Basic DC and AC electric circuits.
CO2 Explain the working principles of transformers and electrical machines.
CO3 Explain the concepts of electric power transmission and distribution of power.
CO4 Understand the wiring methods, electricity billing and working principles of circuit protective devices and personal safety measures.

21CIV14 (Elements of Civil Engineering and Mechanics)

CO1 Understand the various fields of civil engineering.
CO2 Compute the resultant of a force system and resolution of a force.
CO3 Comprehend the action for forces, moments, and other types of loads on rigid bodies and compute the reactive forces.
CO4 Locate the centroid and compute the moment of inertia of regular and built-upsections.
CO5 Analyze the bodies in motion

21EVNL15 (Engineering Visualization)

CO1 Understand and visualize the objects with definite shape and dimensions
CO2 Analyze the shape and size of objects through different views
CO3 Develop the lateral surfaces of the object
CO4 4. Create a 3D view using CAD software.
CO5 5. Identify the interdisciplinary engineering components or systems through its graphical representation.

21PHYL16 (Engineering Physics Laboratory)

CO1 Understand the measuring techniques
CO2 Operate different instruments and be capable to analyse the experimental results.
CO3 Construct the circuits and theiranalysis.

21ELEL17 (Basic Electrical Engineering Laboratory)

CO1 Verify KCL and KVL and maximum power transfer theorem for DC circuits.
CO2 Compare power factors of different types of lamps.
CO3 Demonstrate the measurement of the impedance of an electrical circuit and power consumed by a 3-phase load.
CO4 Analyze two-way and three-way control of lamps. CO5:explain the effects of open and short circuits in simple circuits.
CO5 Interpret the suitability of earth resistance measured

21EGH18 (Communicative English)

CO1 Understand and apply the Fundamentals of Communication Skills in their communication skills.
CO2 Identify the nuances of phonetics, intonation and enhance pronunciation skills.
CO3 To impart basic English grammar and essentials of language skills as per present requirement.
CO4 Understand and use all types of English vocabulary and language proficiency.
CO5 Adopt the Techniques of Information Transfer through presentation.

21IDT19 Innovation and Design Thinking

CO1 Appreciate various design process procedure
CO2 Generate and develop design ideas through different technique
CO3 Identify the significance of reverse Engineering to Understand products
CO4 Draw technical drawing for design ideas

Semester 3:

21MAT31 (Transform Calculus, Fourier Series and Numerical Techniques)

CO1 To solve ordinary differential equations using Laplace transform.
CO2 Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
CO3 To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations
CO4 To solve mathematical models represented by initial or boundary value problems involving partial differential equations
CO5 Determine the extremals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

21CS32 (Data Structures & Applications)

CO1 Identify different data structures and their applications.
CO2 Apply stack and queues in solving problems.
CO3 Demonstrate applications of linked list.
CO4 Explore the applications of trees and graphs to model and solve the real-world problem.
CO5 Make use of Hashing techniques & resolve collisions during mapping of key value pairs

21CS323 (ANALOG AND DIGITAL ELECTRONICS)

CO1 Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.

CO2 Explain the basic principles of A/D and D/A conversion circuits and develop the same.

CO3 Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods

CO4 Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.

CO5 Develop simple HDL programs

21CS34 (COMPUTER ORGANIZATION AND ARCHITECTURE)

CO1 Explain the organization and architecture of computer systems with machine instructions and programs

CO2 Analyze the input/output devices communicating with computer system

CO3 Demonstrate the functions of different types of memory devices

CO4 Apply different data types on simple arithmetic and logical unit

CO5 Analyze the functions of basic processing unit, Parallel processing and pipelining

21CS35 (OBJECT ORIENTED PROGRAMMING WITH JAVA LABORATORY)

CO1 Use Eclipse/NetBeans IDE to design, develop, debug Java Projects.

CO2 Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP.

CO3 Demonstrate the ability to design and develop java programs, analyze, and interpret object- oriented data and document results.

CO4 Apply the concepts of multiprogramming, exception/event handling, abstraction to develop robust programs.

CO5 Develop user friendly applications using File I/O and GUI concepts

21CS382 (PROGRAMMING IN C++)

CO1 Able to understand and design the solution to a problem using object-oriented programming concepts.

CO2 Able to reuse the code with extensible Class types, User-defined operators and function Overloading.

CO3 Achieve code reusability and extensibility by means of Inheritance and Polymorphism

CO4 Identify and explore the Performance analysis of I/O Streams.

CO5 Implement the features of C++ including templates, exceptions and file handling for

CO6 providing programmed solutions to complex problems

21SCR36 (SOCIAL CONNECT & RESPONSIBILITIES)

CO1 Understand social responsibility
CO2 Practice sustainability and creativity
CO3 Showcase planning and organizational skills

Semester 5:

18CS51 (MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY)

CO1 Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship

CO2 Utilize the resources available effectively through ERP

CO3 Make use of IPRs and institutional support in entrepreneurship

18CS52 (COMPUTER NETWORKS AND SECURITY)

CO1 Explain principles of application layer protocols Recognize transport layer services and infer UDP and TCP protocols
CO2 Classify routers, IP and Routing Algorithms in network layer
CO3 Understand the Wireless and Mobile Networks covering IEEE 802.11 Standard
CO4 Describe Multimedia Networking and Network Management

18CS53 (DATABASE MANAGEMENT SYSTEM)

CO1 Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.
CO2 Use Structured Query Language (SQL) for database manipulation.
CO3 Design and build simple database systems
CO4 Develop application to interact with databases.

18CS54 (AUTOMATA THEORY AND COMPUTABILITY)

CO1 Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
CO2 Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
CO3 Design Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
CO4 Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.
CO5 Classify a problem with respect to different models of Computation.

18CS55 (APPLICATION DEVELOPMENT USING PYTHON)

CO1 Demonstrate proficiency in handling of loops and creation of functions.
CO2 Identify the methods to create and manipulate lists, tuples and dictionaries.
CO3 Discover the commonly used operations involving regular expressions and file system.
CO4 Interpret the concepts of Object-Oriented Programming as used in Python
CO5 Determine the need for scraping websites and working with CSV, JSON and other file formats

18CS56 (UNIX PROGRAMMING)

CO1 Explain Unix Architecture, File system and use of Basic Commands
CO2 Illustrate Shell Programming and to write Shell Scripts
CO3 Categorize, compare and make use of Unix System Calls Build an application/service over a Unix system.

18CSL57 (COMPUTER NETWORK LABORATORY)

CO1 Analyze and Compare various networking protocols.
CO2 Demonstrate the working of different concepts of networking.
CO3 Implement, analyze and evaluate networking protocols in NS2 / NS3 and JAVA programming language

18CSL58 (DBMS LABORATORY WITH MINI PROJECT)

CO1 Create, Update and query on the database.
CO2 Demonstrate the working of different concepts of DBMSImplement, analyze and evaluate the project developed for an application

Semester 7:

18CS71 (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

CO1 Appaise the theory of Artificial intelligence and Machine Learning.
CO2 Illustrate the working of AI and ML Algorithms.
CO3 Demonstrate the applications of AI and ML.

18CS72 (BIG DATA ANALYTICS)

CO1 Understand fundamentals of Big Data analytics.
CO2 Investigate Hadoop framework and Hadoop Distributed File system
CO3 Illustrate the concepts of NoSQL using MongoDB and Cassandra for Big Data.
CO4 Demonstrate the MapReduce programming model to process the big data along with Hadoop tools.
CO5 Use Machine Learning algorithms for real world big data.
CO6 Analyze web contents and Social Networks to provide analytics with relevant visualization tools

18CS734 (USER INTERFACE DESIGN)

CO1 Design the User Interface, design, menu creation, windows creation and connection between menus and windows

18CS744 (CRYPTOGRAPHY)

CO2 Define cryptography and its principles
CO3 Explain Cryptography algorithms
CO4 Illustrate Public and Private key cryptography
CO5 Explain Key management, distribution and ceritification
CO6 Explain authentication protocolsTell about IPSec

18CS745 (ROBOTIC PROCESS AUTOMATION DESIGN & DEVELOPMENT)

CO1 To Understand the basic concepts of RPA
CO2 To Describe various components and platforms of RPA
CO3 To Describe the different types of variables, control flow and data manipulation techniques
CO4 To Understand various control techniques and OCR in RPA
CO5 To Describe various types and strategies to handle exceptions

18CIV59 (ENERGY AND ENVIRONMENT / ENVIRONMENTAL PROTECTION AND MANAGEMENT)

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.

18CSL76 (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATORY)

CO1 Implement and demonstrate AI and ML algorithms.
CO2 Evaluate different algorithms.

COs of all the subjects in the academic year 2022 – 2023 – EVEN SEM

Second Semester:

21MAT21 (Advanced Calculus and Numerical Methods)

CO1 Apply the concept of change of order of integration and change of variables to evaluate multiple integrals and their usage in computing the area and volume.
CO2 Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the inter dependence of line, surface and volume integrals.
CO3 Formulate physical problems to partial differential equations and to obtain solution for standard practical PDE's.
CO4 Apply the knowledge of numerical methods in modelling of various physical and engineering phenomena.
CO5 Solve first order ordinary differential equations arising in engineering problems.

21CHE22 (Engineering Chemistry)

CO1 Discuss the electrochemical energy systems such as electrodes and batteries.
CO2 Explain the fundamental concepts of corrosion, its control and surface modification methods namely electroplating and electroless plating
CO3 Enumerate the importance, synthesis and applications of polymers. Understand properties and application of nanomaterials.
CO4 Describe the principles of green chemistry, understand properties and application alternative fuels. Illustrate the fundamental principles of water chemistry, applications of volumetric and analytical instrumentation.

21PSP23 (Problem-Solving through Programming)

CO1 Elucidate the basic architecture and functionalities of a computer and also recognize the hardware parts.
CO2 Apply programming constructs of C language to solve the real world problem
CO3 Explore user-defined data structures like arrays in implementing solutions to problems like searching and sorting
CO4 Explore user-defined data structures like structures, unions and pointers in implementing solutions
CO5 Design and Develop Solutions to problems using modular programming constructs using functions

21ELN24 (Basic Electronics & Communication Engineering)

CO1 Describe the concepts of electronic circuits encompassing power supplies, amplifiers and oscillators.
CO2 Present the basics of digital logic engineering including data representation, circuits and the microcontroller system with associated sensors and actuators.
CO3 Discuss the characteristics and technological advances of embedded systems.
CO4 Relate to the fundamentals of communication engineering spanning from the frequency spectrum to the various circuits involved including antennas.
CO5 Explain the different modes of communications from wired to wireless and the computing involved.

21EME25 (Elements of Mechanical Engineering)

CO1 Understand basic concepts of mechanical engineering in the fields of energy and its utilization, materials technology, manufacturing techniques, and transmission systems through demonstrations.

CO2 Understand the application of energy sources in Power generation and utilization, Engineering materials, manufacturing, and machining techniques leading to the latest advancements and transmission systems in day to day activities

CO3 Apply the skills in developing simple mechanical elements and processes

21CHEL26 (Engineering Chemistry Laboratory)

CO1 Determine the pKa and coefficient of Viscosity of a given organic liquid.

CO2 Estimate the amount of substance present in the given solution using Potentiometer Conductometric and Colorimetric.

CO3 Determine the total hardness and chemical oxygen demand in the given solution by volumetric analysis method

CO4 Estimate the percentage of Nickel, copper and Iron in the given analyte solution by titration method.

CO5 Demonstrate flame photometric estimation of sodium & potassium and the synthesis of nanomaterials by Precipitation method.

21CPL27 (Computer Programming Laboratory)

CO1 Define the problem statement and identify the need for computer programming

CO2 Make use of C compiler, IDE for programming, identify and correct the syntax and syntactic errors in programming

CO3 Develop algorithm, flowchart and write programs to solve the given problem

CO4 Demonstrate use of functions, recursive functions, arrays, strings, structures and pointers in problem solving.

21EGH28 (Professional Writing Skills in English)

CO1 To understand and identify the Common Errors in Writing and Speaking.

CO2 To Achieve better Technical writing and Presentation skills.

CO3 To read Technical proposals properly and make them to Write good technical reports.

CO4 Acquire Employment and Workplace communication skills.

CO5 To learn about Techniques of Information Transfer through presentation in different level

Semester 4:

21MATCS41 (Mathematical Foundations For Computing)

CO1 To solve ordinary differential equations using Laplace transform.

CO2 Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.

CO3 To use Fourier transforms to analyze problems involving continuous-time signals and to apply Z-Transform techniques to solve difference equations

CO4 To solve mathematical models represented by initial or boundary value problems involving partial differential equations

CO5 Determine the externals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

21CS42 (Design and Analysis Of Algorithms)

CO1 Analyze the performance of the algorithms, state the efficiency using asymptotic notations and analyze mathematically the complexity of the algorithm.

CO2 Apply divide and conquer approaches and decrease and conquer approaches in solving the problems analyze the same

CO3 Apply the appropriate algorithmic design technique like greedy method, transform and conquer approaches and compare the efficiency of algorithms to solve the given problem.

CO4 Apply and analyze dynamic programming approaches to solve some problems, and improve an algorithm time efficiency by sacrificing space.

CO5 Apply and analyze backtracking, branch and bound methods and to describe P, NP and NP-Complete problems.

21CS43 (Microcontroller and Embedded Systems)

CO1 Explain C-Compilers and optimization

CO2 Describe the ARM microcontroller's architectural features and program module

CO3 Apply the knowledge gained from programming on ARM to different applications.

CO4 Program the basic hardware components and their application selection method.

CO5 Demonstrate the need for a real-time operating system for embedded system applications.

21CS44 (Operating Systems)

CO1 Identify the structure of an operating system and its scheduling mechanism.

CO2 Demonstrate the allocation of resources for a process using scheduling algorithm.

CO3 Identify root causes of deadlock and provide the solution for deadlock elimination

CO4 Explore about the storage structures and learn about the Linux Operating system.

CO5 Analyze Storage Structures and Implement Customized Case study

21BE45 (Biology For Engineers)

CO1 Elucidate the basic biological concepts via relevant industrial applications and case studies.

CO2 Evaluate the principles of design and development, for exploring novel bioengineering projects.

CO3 Corroborate the concepts of biomimetics for specific requirements.

CO4 Think critically towards exploring innovative biobased solutions for socially relevant problems.

21CSL46 (Python Programming)

CO1 Demonstrate proficiency in handling of loops and creation of functions.

CO2 Identify the methods to create and manipulate lists, tuples and dictionaries

CO3 Discover the commonly used operations involving regular expressions and file system.

CO4 Interpret the concepts of Object-Oriented Programming as used in Python.

CO5 Determine the need for scraping websites and working with PDF, JSON and other file formats.

21CIP47 (Professional Ethics)

CO1 Demonstrate proficiency in handling of loops and creation of functions.

CO2 Identify the methods to create and manipulate lists, tuples and dictionaries.

CO3 Discover the commonly used operations involving regular expressions and file system.

CO4 Interpret the concepts of Object-Oriented Programming as used in Python.

CO5 Determine the need for scraping websites and working with PDF, JSON and other file

21CS482 (UNIX Shell)

CO1	Know the basics of Unix concepts and commands.
CO2	Evaluate the UNIX file system.
CO3	Apply Changes to file system.
CO4	Understand scripts and programs.
CO5	Analyze Facility with UNIX system process

21UH49 (Human Values)

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. Therefore, the course and further follow up is expected to positively impact common graduate attributes like: 1. Holistic vision of life 2. Socially responsible behaviour 3. Environmentally responsible work 4. Ethical human conduct 5. Having Competence and Capabilities for Maintaining Health and Hygiene 6. Appreciation and aspiration for excellence (merit) and gratitude for all

Semester 6:

18CS61 (System Software & Compilers)

CO1	Explain system software
CO2	Design and develop lexical analyzers, parsers and code generators
CO3	Utilize lex and yacc tools for implementing different concepts of system software

18CS62 (Computer Graphics & Visualization)

CO1	Design and implement algorithms for 2D graphics primitives and attributes. Illustrate Geometric transformations on both 2D and 3D objects.
CO2	Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination Models
CO3	Decide suitable hardware and software for developing graphics packages using OpenGL.

18CS63 (Web Technology & its Applications)

CO1	Adapt HTML and CSS syntax and semantics to build web pages.
CO2	Construct and visually format tables and forms using HTML and CSS
CO3	Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
CO4	Appraise the principles of object oriented development using PHP
CO5	Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features

18CS643 (Cloud Computing & its Applications)

CO1	Explain cloud computing, virtualization and classify services of cloud computing
CO2	Illustrate architecture and programming in cloud
CO3	Describe the platforms for development of cloud applications and List the application of cloud

18CSL66 (System Software Laboratory)

CO1 Implement and demonstrate Lexer"s and Parser"s

CO2 Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.

18CSL67 (Computer Graphics Laboratory with Mini Project)

CO1 Apply the concepts of computer graphics

CO2 Implement computer graphics applications using OpenGL

CO3 Animate real world problems using OpenGL

18CS651 (Mobile Application Development)

CO1 Create, test and debug Android application by setting up Android development environment

CO2 Implement adaptive, responsive user interfaces that work across a wide range of devices.

CO3 Infer long running tasks and background work in Android applications

CO4 Demonstrate methods in storing, sharing and retrieving data in Android applications

CO5 Analyze performance of android applications and understand the role of permissions and security

CO6 Describe the steps involved in publishing Android application to share with the world

Semester 8:

18CS81 (Internet Of Things)

CO1 Interpret the impact and challenges posed by IoT networks leading to new architectural model

CO2 Compare and contrast the deployment of smart objects and the technologies to connect them to network.

CO3 Appraise the role of IoT protocols for efficient network communication.

CO4 Elaborate the need for Data Analytics and Security in IoT

CO5 Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

18CS822 (Storage Area Networks)

CO1 Identify key challenges in managing information and analyze different storage networking technologies and virtualization

CO2 Explain components and the implementation of NAS

CO3 Describe CAS architecture and types of archives and forms of virtualization.

CO4 Illustrate the storage infrastructure and management activities

HOD