VIDYA VIKAS EDUCATION TRUST

COURSE OUTCOMES_Academic year 2018-19

NAME OF THE COLLEGE:	Vidya Vikas Institute of Engineering and Technology, Mysore			
DEPARTMENT :	Civil Engineering			
PROGRAM:	UG :	✓	PG :	

1st SEMESTER

C 104: ***Elements of Civil Engineering and Mechanics***

C104	C 104.1	Explain the basics of Civil Engineering and its different fields.
	C 104.2	Apply the knowledge of basic science and mathematics for computation of static and dynamic effect of forces on rigid bodies
	C 104.3	Analyze the geometrical properties of various built up sections and compute centroids and moment of inertia of the same.
	C 104.4	Analyze the effects of various types of external loads on structural members (beams and trusses)
	C 104.5	Analyze the dynamic properties of rigid bodies on the application of forces.

3rd SEMESTER

C 202: ***Strength of Materials***

C202	C 202.1	Apply the knowledge of basic science and mathematics to compute stresses and strain in deformable bodies.
	C 202.2	Analyze shear force, bending moment and sketch their variations in the beams.
	C 202.3	Analyze shear stress and flexural stresses and sketch their variations in the beams.
	C 202.4	Analyze and apply Euler's and Rankin's theories to compute stresses in columns.
	C 202.5	Design simple bars, beams , shafts (Torsional rigidity) and pressure vessels for allowable stresses loads and FOS.

C 203: ***Fluid Mechanics***

C203	C 203.1	Identify the basic properties static and dynamic properties of fluids and apply concept of static pressure to measure using different devices.
	C 203.2	Analyse the kinematic and dynamic properties of fluid flow and apply the same to solve fluid flow problems through open channels and pipes and pipe networks.
	C 203.3	Illustrate various instruments used for discharge measurements and apply the techniques to solve flow measurement problems.

C 204: ***Basic Surveying***

C204	C 204.1	Illustrate basic principle of surveying, determine the angle and distance using different survey instruments.
	C 204.2	Interpret the compass survey data, identify local attraction and apply corrections.
	C 204.3	Analyze geodetic data to process and perform analysis for survey problems
	C 204.4	Analyze the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours.

C 205: ***Engineering Geology***

C205	C 205.1	Understand the importance of knowledge of Geology in civil engineering and identify the different types of minerals generally encountered, concept of pressure and methods to measure them
	C 205.2	Classify the rocks based on their petrology and select the appropriate type for engineering use in allied applications
	C 205.3	Understand about Geomorphology, characteristics of earthquake, coastal zones, causes and effects of landslides and possible remedial measures
	C 205.4	Utilize the knowledge of hydrogeology to Interpret the results of different geological investigations in engineering projects
	C 205.5	Assess the use of topographic maps, contour maps and, the knowledge of natural disasters and their mitigation

C 206: *Building Materials and Construction*

C206	C 206.1	Select suitable materials and construction techniques for building.
	C 206.2	Identify suitable type of foundation and masonry suitable for buildings based on parameters contributing to the selection.
	C 206.3	Plan doors, windows, staircases and adopt appropriate support system for construction and repair of building components.
	C 206.4	Identify the necessity of protecting building components and suggest suitable protection methods.
	C 206.5	Apply the knowledge of building materials & construction techniques as per current trends & practices.

C 207: *Building Materials Testing Laboratory*

C207	C 207.1	Make use of properequipments and instruments to establish mechanical properties of engineering interest of ferrous, nonferrous and basic materials generally used in civil engineering practice.
	C 207.2	Select the appropriate procedure and BIS code of practice to perform tests.
	C 207.3	Interpret the test results and conclude about the acceptance of the material for engineering use.

C 208: *Basic Surveying Practice*

C208	C 208.1	Apply the basic principles of engineering surveying and for linear and angular measurements.
	C 208.2	Comprehend effectively field procedures required for a professional surveyor
	C 208.3	Use techniques, skills and conventional surveying instruments necessary for engineering practice.

4th SEMESTER

C 210: *Analysis of Determinate Structures*

C210	C 210.1	Understand basic concepts, terms used in structural analysis and apply the principles to determine axial forces in trusses.
	C 210.2	Compare different methods used for calculating deflections; understand the energy concept and its use in structural analysis to determine the stress resultants and deflection in 2D structural systems.
	C 210.3	Understand the behaviour of arches and cables and evaluate their capacity.
	C 210.4	Explain the concepts of influence lines and determine the BM and SF in determinate beams using influence line diagrams.

C 211: *Applied Hydraulics*

C211	C 211.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
	C 211.2	Design the open channels of various cross sections including economical channel sections
	C 211.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation, Compute water surface profiles at different conditions
	C 211.4	Design hydraulic machines including turbines and pumps for the given data, and to know their operation characteristics under different operating conditions

C 212: *Concrete Technology*

C212	C 212.1	Select suitable ingredient for concrete mixes as per sit requirements.
	C 212.2	Evaluate the fresh and hardened properties of concrete and effects of environment on the service life performance
	C 212.3	Design a suitable concrete mix as per requirements based on IS
	C 212.4	Recognize the characteristics of special types of concrete.

C 213: *Basic Geotechnical Engineering*

C213	C 213.1	Determine the index properties and classify the soils
	C 213.2	Draw compaction curve of soil and apply the knowledge of compaction in field.
	C 213.3	Compute the flow of water through soils.
	C 213.4	Determine shear strength and Consolidation parameters of soil

C 214: *Advanced Surveying*

C214	C 214.1	Apply geometric and trigonometric principles to arrive at solutions to surveying problems
	C 214.2	Analyze spatial data using appropriate computational and analytical techniques
	C 214.3	Use the concepts of advanced data capturing methods necessary for engineering practice

C 215: *Fluid Mechanics and Hydraulic Machines Laboratory*

C215	C 215.1	Compute the fluid flow measurements through pipes and channels
	C 215.2	Operate, assess and analyse the main characteristics of hydraulic machines

C 216: *Engineering Geology Laboratory*

C216	C 216.1	Select the appropriate parameters to identify minerals
	C 216.2	Infer from geological maps and their sections and from geological formations about the site selection for various civil engineering projects.

5th SEMESTER

C 301: *Design of RC Structural Elements*

C301	C 301.1	Understand the basic principles of design of RC elements commonly used in civil engineering and evaluate the capacity of RC sections in flexure.
	C 301.2	Outline the general compliance requirements with respect to design parameters for slabs, beams, columns and footings as per IS 456-2000.
	C 301.3	Demonstrate the knowledge and the ability to design and detail commonly used structural elements mentioned above as per IS456-2000, for flexure, shear, torsion and axial compression as per strength and serviceability requirements.

C 302: *Analysis of Indeterminate Structures*

C302	C 302.1	Analyse the indeterminate beams having variable moment of inertia with and without subsidence using Displacement and Force Method .
	C 302.2	Analyse the Rigid joined frames with and without sway having variable moment of inertia using Displacement and Force Method
	C 302.3	Analyse the Pin joined frames using Displacement and Force Method

C 303: *Applied Geotechnical Engineering*

C303	C 303.1	Plan and execute geotechnical site investigation program for different civil engineering projects
	C 303.2	Assess the stress distribution and resulting settlement beneath the loaded footings on soils
	C 303.3	Analyse stability of slopes and lateral earth pressure distribution behind retaining structures
	C 303.4	Evaluate bearing capacity of soil and propose shallow and deep foundations

C 304: *Computer Aided Building Planning and Drawing*

C304	C 304.1	Understand the technical details, specifications and Develop detailed drawings for different building elements generally used in construction.
	C 304.2	Outline the functional requirements of a building, organize spaces to meet such requirements, Develop detailed engineering drawings of residential, institutional and commercial buildings

C 3051: *Air pollution and Control*

C3051	C 3051.1	Classify air pollutants, identify sources, assess effects of air pollution on habitats.
	C 3051.2	Assess the influence of meteorological variables, wind rose and meteorological models
	C 3051.3	Develop proper sampling procedures, analyze the air quality as per norms and standards and suggest appropriate methods for control of air pollution, aware of their impact on environmental issues and policies and regulatory measures in the form of legislations formed by national bodies.

C 3052: *Railways, Harbours, tunneling and Airports*

C3052	C 3052.1	Design and detail various elements of permanent way, runway and taxiways, harbours and tunnels and airport to comply with the functional and strength requirements.
	C 3052.2	Detail the suitable constructional and maintenance methods of permanent-way and tunnel.
	C 3052.3	Classify the different types of railway stations, yards harbours, tunnels and airports, and explain their layouts with components and select suitable layouts as per the requirements.

C 3061: *Traffic Engineering*

C3061	C 3061.1	Understand fundamental knowledge of traffic engineering, scope and its importance.
	C 3061.2	Describe basic techniques for collecting and analysing traffic data, diagnosing problems, designing appropriate remedial treatment, and assessing its effectiveness.
	C 3061.3	Apply probabilistic and queuing theory techniques for the analysis of traffic flow situations and emphasis the interaction of flow efficiency and traffic safety.

	C 3061.4	Understand and analyse traffic issues including safety, planning, design, operation and control.
	C 3061.5	Apply intelligent transport system and its applications in the present traffic scenario

C 3064: *Occupational Health and Safety*

C3064	C 3064.1	Identify hazards in the workplace that pose a danger to safety and health.
	C 3064.2	Assess current occupational safety and health problems and solutions.
	C 3064.3	Identify the factors that influence occupational safety and health.
	C 3064.4	Demonstrate the knowledge and skills needed to identify workplace problems and safe work practice.

C 307: *Geotechnical Engineering Laboratory*

C307	C 307.1	Identify the different types of soil.
	C 307.2	Determine the index properties to classify the soil.
	C 307.3	Assess the strength properties of soil.
	C 307.4	Demonstrate auger samplers, rapid moisture meter, swell pressure test and standard penetration test.

C 308: *Concrete and Highway Materials Laboratory*

C308	C 308.1	List the important properties of cement and concrete that are to be established, select appropriate procedures and instruments to determine them, evaluate the results for acceptance to build safe and durable structures.
	C 308.2	List the important properties of soil, aggregates and bituminous materials and their mixes that are to be established, select appropriate procedures and instruments to determine them, evaluate the results for acceptance to build high performance and durable highways.

C 402: *Design of RCC and Steel Structures*

C402	C 402.1	Design combined footings, earth and water retaining structures as per norms and IS standards.

	C 402.2	Analyse & design the elements of portal frames as per norms and standards.
	C 402.3	Design plate girders, roof trusses and gantry girders as per norms and standards.
	C 402.4	Apply the knowledge of limit state method of design to understand the problem & design steel structural elements as per societal requirements.

C 403: ***Hydrology and Irrigation Engineering***

C403	C 403.1	Interpret the fundamental hydrologic cycle forms, types and common measurement techniques of precipitation, methods to estimate average rainfall with necessary corrections and losses.
	C 403.2	Construct unit hydrographs from hydrographs and apply the concept to estimate the Runoff in a stream.
	C 403.3	Explain the needs of irrigation, types and impact on environment and estimate water requirements of crops.
	C 403.4	Classify the canals and apply suitable theory for the design the canals. Classify the reservoirs and interpret various aspects of a reservoir.

C 4041: ***Design of Bridges***

C4041	C 4041.1	Understand the load distribution and IRC standards.
	C 4041.2	Design the slab and T beam bridges.
	C 4041.3	Design Box culvert and pipe culvert
	C 4041.4	Use bearings, hinges and expansion joints and Design Piers and Abutments

C 4043: ***Design Concept of Building Services***

C4043	C 4043.1	Describe the basics of plumbing, waste-water collection, rainwater harvesting and solid waste disposal methods
	C 4043.2	Understand and implement the requirements of thermal comfort in buildings using various methods
	C 4043.3	Discuss the safety guidelines with respect to electricity and fire-fighting systems
	C 4043.4	Sketch basic plumbing and firefighting layouts of various buildings
	C 4043.5	Explain various engineering services in buildings such as pumps, lifts, generators and the concept of preventive and protective maintenance of buildings

C 4053: *Rehabilitation and Retrofitting of Structures*

C4053	C 4053.1	Enumerate the causes of deterioration of concrete structures.
	C 4053.2	Assess the damage for different type of structures
	C 4053.3	Outline the importance of maintenance and elucidate the various retrofitting techniques of beams and column.
	C 4053.4	Outline the materials used for different types of repair and retrofitting.

C 406: *Environmental Engineering Laboratory*

C406	C 406.1	Assess the quality of water and wastewater based on constituent levels of different parameters, outline the norms, and methods to determine them as per codes and make use of equipment's available to conduct tests.
	C 406.2	Assess percentage distribution of physical and chemical parameters in water and wastewater by testing as per norms and codes.

C 407: *Computer Aided Detailing of Structures*

C407	C 407.1	Develop detailed structural drawings based on given design details for slabs, beams, staircases, retaining walls and water tanks as per detailing standards.
	C 407.2	Develop detailed structural drawings based on given design details for different types of connections between beams, columns and foundation as per detailing standards.
	C 407.3	Develop detailed structural drawings based on given design details for plate girders, roof trusses and gantry girders as per detailing standards.

C 408: *Project Phase I +Project Seminar*

C408	C 408.1	Choose a relevant topic to pursue project work, conduct literature review and recognize the scope of the work
	C 408.2	Collect primary/secondary data for the selected project work in a group and to rationally analyse the results.

8th SEMESTER

C 409: *Quantity Surveying and Contracts Management*

C409	C 409.1	Understand the engineering drawings outline the methods of taking out quantities and develop the detailed and abstract estimates for buildings, roads, steel truss, manhole and septic tanks and Prepare their bar bending schedule for different components of RCC structures.
	C 409.2	Outline the objectives of writing in general and detail specification of different items of works in buildings, develop procedures for rate analysis for standard items of works of common occurrence in building engineering projects.
	C 409.3	Classify types of contracts and essentials of contract agreement terms explain the terms and procedures used in tendering process, understand the procedure for recording and checking measurements and prepare bills, evaluate assets as per norms and procedures.
	C 409.4	Prepare valuation reports of buildings, interpret Contracts documents of domestic and international construction works

C 410: *Design of Pre Stressed Concrete Elements*

C410	C 410.1	Analyse the stresses encountered in PSC element during transfer and at working.
	C 410.2	Analyse and evaluate the losses and deflection in prestressed concrete structures
	C 410.3	Apply the provisions of IS 1343 code to design prestressed concrete structures in flexure and shear
	C 410.4	Analyse composite sections and design anchorages

C 4112: *Hydraulic Structures*

C4112	C 4112.1	Check the stability of gravity dams and design the dam.
	C 4112.2	Estimate the quantity of seepage through earth dams.
	C 4112.3	Design spillways and aprons for various diversion works.
	C 4112.4	Select particular type of canal regulation work for canal network.

C 4113: *Pavement Design*

C4113	C 4113.1	Outline the characteristics of different types of pavements; understand the terms, fundamental concepts and influencing factors in pavement design.
	C 4113.2	Assess the behaviour of flexible and rigid pavements and design as per different procedures and IRC standards.
	C 4113.3	Identify possible failure types, causes, formulate suitable maintenance schedule and evaluate the pavement condition using visual and instrumental techniques and through measurements.

C 413: *Project Work*

C413	C 413.1	Choose a relevant topic to pursue project work, conduct literature review and recognize the scope of the work.
	C 413.2	Collect primary/secondary data for the selected project work in a group and to rationally analyze the results.
	C 413.3	Prepare presentation and report of the project work.

C 413: *Seminar on current trends in Engineering and Technology*

C414	C 414.1	Select appropriate technical topic for presentation.
	C 414.2	Compile the presentation material.
	C 414.3	Develop multimedia presentation and communicate the topic effectively.
	C 414.4	Prepare the seminar report

COURSE OUTCOMES

3-sem 2015- scheme-CSE

15MAT31 Engineering Mathematics – III

- Use of periodic signals and Fourier series to analyze circuits
- Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
- Analyze discrete-time systems using convolution and the z-transform
- Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
- Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications
- Solve the simple problem of the calculus of variations

15CS32 Analog and Digital Electronics

- Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
- Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
- Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
- Design of Counters, Registers and A/D & D/A converters

15CS33 Data Structures and Applications

- Use different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Use stack, Queue, Lists, Trees and Graphs in problem solving.
- Implement all data structures in a high-level language for problem solving.

15CS34 Computer Organization

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
- Design and Analyse simple arithmetic and logical units.

15CS35 Unix and Shell Programming

- Explain UNIX system and use different commands.
- Write Shell scripts for certain functions on different subsystems.
- Demonstrate use of editors and Perl script writing

15CS36 Discrete Mathematical Structures

- Use of propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Application of different mathematical proofs, techniques in proving theorems.
- Compare graphs, trees and their applications.

15CSL37Analog and Digital Electronics Laboratory

- Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
- Design and demonstrate various combinational logic circuits.
- Design and demonstrate various types of counters and Registers using Flip-flops
- Make use of simulation package to design circuits.
- Understand the working and implementation of ALU.

15CSL38 Data Structures Laboratory

- Analyze and Compare various linear and non-linear data structures
- Code, debug and demonstrate the working nature of different types of data structures and their applications
- Implement, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems.

4TH SEM

15MAT41 (ENGINEERING MATHEMATICS-IV)

- Use appropriate numerical methods to solve first and second order ordinary differential equations.
- Use Bessel's and Legendre's function which often arises when a problem possesses axial and spherical symmetry, such as in quantum mechanics, electromagnetic theory, hydrodynamics and heat conduction. ·
- State and prove Cauchy's theorem and its consequences including Cauchy's integral formula. ·
- Compute residues and apply the residue theorem to evaluate integrals. ·
- Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.

15CS42 (SOFTWARE ENGINEERING)

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility ·
- Function on multi-disciplinary teams ·
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

15CS43 (DESIGN AND ANALYSIS OF ALGORITHMS)

- Describe computational solution to well known problems like searching, sorting etc.

- Estimate the computational complexity of different algorithms.
- Develop an algorithm using appropriate design strategies for problem solving.

15CS44 (MICROPROCESSORS AND MICROCONTROLLERS)

- Differentiate between microprocessors and microcontrollers
- Design and develop assembly language code to solve problems
- Gain the knowledge for interfacing of various devices to x86 family and ARM processor
- Demonstrate interrupt routines for interfacing devices

15CS45 (OBJECT ORIENTED CONCEPTS)

- Explain the object-oriented concepts and JAVA. ·
- Develop computer programs to solve real world problems in Java. ·
- Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.

15CS46 (DATA COMMUNICATION)

- Illustrate basic computer network technology.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP model.
- Make out the different types of network devices and their functions within a network
- Demonstrate the skills of subnetting and routing mechanisms.

15CSL47 (DESIGN AND ANALYSIS OF ALGORITHM LABORATORY

- Design algorithms using appropriate design techniques (brute-force, greedy,dynamic programming, etc.)

- Implement variety of algorithms such as sorting, graph related, combinatorial, etc.,in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

15CSL48 (MICROPROCESSOR AND MICROCONTROLLER LABORATORY)

- Learn 80x86 instruction sets and comprehend the knowledge of how assembly language works.
- Design and implement assembly programs using 80x86 assembly language instructions
- Know functioning of hardware devices and interfacing them to x86 family
- Choose processors for various kinds of applications.

5TH SEM

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY(15CS51)

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS (15CS52)

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

DATABASE MANAGEMENT SYSTEM(15CS53)

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

AUTOMATA THEORY AND COMPUTABILITY(15CS54)

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

OBJECT ORIENTED MODELING AND DESIGN (15CS551)

- Describe the concepts of object-oriented and basic class modelling.
- Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
- Choose and apply a befitting design pattern for the given problem.

ADVANCED JAVA AND J2EE (15CS553)

- Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

COMPUTER NETWORK LABORATORY (15CSL57)

- Analyze and Compare various networking protocols.
- Demonstrate the working of different concepts of networking.
- Implement, analyze and evaluate networking protocols in NS2 / NS3

DBMS LABORATORY WITH MINI PROJECT (15CSL58)

- Create, Update and query on the database.
- Demonstrate the working of different concepts of DBMS
- Implement and test the project developed for an application.

6TH SEM

15CS61 CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW

- Discuss cryptography and its need to various applications
- Design and develop simple cryptography algorithms
- Understand cyber security and need cyber Law

15CS62 COMPUTER GRAPHICS AND VISUALIZATION

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

15CS63 SYSTEM SOFTWARE AND COMPILER DESIGN

- Explain system software such as assemblers, loaders, linkers and macroprocessors
- Design and develop lexical analyzers, parsers and code generators
- Utilize lex and yacc tools for implementing different concepts of system software.

15CS64 OPERATING SYSTEMS

- Demonstrate need for OS and different types of OS
- Apply suitable techniques for management of different resources
- Use processor, memory, storage and file system commands
- Realize the different concepts of OS in platform of usage through case studies

15CS651 DATA MINING AND DATA WAREHOUSING

- Identify data mining problems and implement the data warehouse
- Write association rules for a given data pattern.
- Choose between classification and clustering solutions.

15CS653 OPERATIONS RESEARCH

- Select and apply optimization techniques for various problems.
- Model the given problem as transportation and assignment problem and solve.
- Apply game theory for decision support system.

15CSL67 SYSTEM SOFTWARE AND OPERATING SYSTEM LABORATORY

- Implement and demonstrate Lexer's and Parser's
- Evaluate different algorithms required for management, scheduling, allocation and communication used in operating system.

15CSL68 COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT

- Apply the concepts of computer graphics
- Implement computer graphics applications using OpenGL
- Animate real world problems using OpenGL

7TH SEM

15CS71 WEB TECHNOLOGY AND ITS APPLICATIONS

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

15IS72 ADVANCED COMPUTER ARCHITECTURE

- Explain the concepts of parallel computing and hardware technologies
- Compare and contrast the parallel architectures
- Illustrate parallel programming concepts

15CS73 MACHINE LEARNING

- Identify the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
- Explain theory of probability and statistics related to machine learning
- Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

15CS741 NATURAL LANGUAGE PROCESSING

- Analyze the natural language text.
- Generate the natural language.
- Do Text mining.
- Apply information retrieval techniques

15CS742 CLOUD COMPUTING AND ITS APPLICATIONS

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

15CS743 INFORMATION AND NETWORK SECURITY

- Analyze the Digitals security lapses
- Illustrate the need of key management

15CS744 UNIX SYSTEM PROGRAMMING

- Ability to understand and reason out the working of Unix Systems
- Build an application/service over a Unix system

15CS751 SOFT AND EVOLUTIONARY COMPUTING

- Understand soft computing techniques
- Apply the learned techniques to solve realistic problems
- Differentiate soft computing with hard computing techniques

15CS752 COMPUTER VISION AND ROBOTICS

- Implement fundamental image processing techniques required for computer vision
- Perform shape analysis
- Implement boundary tracking techniques
- Apply chain codes and other region descriptors
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques.
- Implement motion related techniques.
- Develop applications using computer vision techniques

15CS753 DIGITAL IMAGE PROCESSING

- Explain fundamentals of image processing
- Compare transformation algorithms
- Contrast enhancement, segmentation and compression techniques

15CS754 STORAGE AREA NETWORKS

- Identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Explain components and the implementation of NAS

- Describe CAS architecture and types of archives and forms of virtualization
- Illustrate the storage infrastructure and management activities

15CSL76 MACHINE LEARNING LABORATORY

- Understand the implementation procedures for the machine learning algorithms.
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms.
- Identify and apply Machine Learning algorithms to solve real world problems.

15CSL77 WEB TECHNOLOGY LABORATORY WITH MINI PROJECT

- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Have a good understanding of Web Application Terminologies, Internet Tools other web services.
- Learn how to link and publish web sites

8TH SEM

15CS81INTERNET OF THINGS TECHNOLOGY

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry

15CS82 BIG DATA ANALYTICS

- Master the concepts of HDFS and MapReduce framework
- Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
- Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
- Infer the importance of core data mining techniques for data analytics
- Compare and contrast different Text Mining Technique

15CS831 HIGH PERFORMANCE COMPUTING

- Illustrate the key factors affecting performance of CSE applications
- Make mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

15IS832 INTERFACE DESIGN

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

15IS833 VIRTUAL REALITY

- Illustrate technology, underlying principles, its potential and limits and to learn about the criteria for defining useful applications.
- Explain process of creating virtual environments

15CS834 SYSTEM MODELLING AND SIMULATION

- Explain the system concept and apply functional modeling method to model the activities of a static system
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Simulate the operation of a dynamic system and make improvement according to the simulation results.

15CS84 INTERNSHIP / PROFESSIONAL PRACTISE

- Adapt easily to the industry environment
- Take part in team work
- Make use of modern tools
- Decide upon project planning and financing.
- Adapt ethical values.
- Motivate for lifelong learning

15CSP85 PROJECT WORK PHASE II

- Identify a issue and derive problem related to society, environment, economics, energy and technology
- Formulate and Analyze the problem and determine the scope of the solution chosen
- Determine , dissect, and estimate the parameters, required in the solution.
- Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
- Compile the report and take part in present / publishing the finding in a reputed conference / publications
- Attempt to obtain ownership of the solution / product

15CSS86 SEMINAR

- Survey the changes in the technologies relevant to the topic selected
- Discuss the technology and interpret the impact on the society, environment and domain.
- Compile report of the study and present to the audience, following the ethics

COURSE OUTCOMES

3-sem 2017- scheme-CSE

17MAT31 Engineering Mathematics – III

- Know the use of periodic signals and Fourier series to analyze circuits and system communications.
- Explain the general linear system theory for continuous-time signals and digital signal processing using
- the Fourier Transform and z-transform.
- Employ appropriate numerical methods to solve algebraic and transcendental equations.
- Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
- Determine the extremals of functionals and solve the simple problems of the calculus

  Of variations.

17CS32 Analog and Digital Electronics

- Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
- Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky
- technique.
- Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches,
- Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
- Design of Counters, Registers and A/D & D/A converters

17CS33 Data Structures and Applications

- Explain different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
- Develop all data structures in a high-level language for problem solving.

17CS34 Computer Organization

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
- Build simple arithmetic and logical units.

17CS35 Unix and Shell Programming

- Explain UNIX system and use different commands.
- Compile Shell scripts for certain functions on different subsystems.
- Demonstrate use of editors and Perl script writing

17CS36 Discrete Mathematical Structures

- Make use of propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Apply different mathematical proofs, techniques in proving theorems.
- Compare graphs, trees and their applications.

17CSL37Analog and Digital Electronics Laboratory

- Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors,
- Op amp and Integrated Circuit.
- Design and demonstrate various combinational logic circuits.
- Design and demonstrate various types of counters and Registers using Flip-flops
- Make use of simulation package to design circuits.
- Infer the working and implementation of ALU.

17CSL38 Data Structures Laboratory

- Analyze and Compare various linear and non-linear data structures
- Demonstrate the working nature of different types of data structures and their applications
- Develop, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems· Analyze and Compare various linear and non-linear data structures
- 17KL/CPH39/49 Kannada
- The course will enable the students to understand Kannada and communicate in Kannada language.

4TH SEM

17MAT41 (ENGINEERING MATHEMATICS-IV)

- Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
- Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
- Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
- Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
- Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

17CS42 (OBJECT ORIENTED CONCEPTS)

- Explain the object-oriented concepts and JAVA.
- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.

17CS43 (DESIGN AND ANALYSIS OF ALGORITHMS)

- Describe computational solution to well known problems like searching, sorting etc.
- Estimate the computational complexity of different algorithms.
- Develop an algorithm using appropriate design strategies for problem solving.

17CS44 (MICROPROCESSORS AND MICROCONTROLLERS

- Differentiate between microprocessors and microcontrollers
- Develop assembly language code to solve problems
- Explain interfacing of various devices to x86 family and ARM processor
- Demonstrate interrupt routines for interfacing devices

17CS45 (SOFTWARE ENGINEERING)

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Make use of techniques, skills, and modern engineering tools necessary for engineering practice
- Comprehend software systems or parts of software systems.

17CS46 (DATA COMMUNICATION)

- Illustrate basic computer network technology.
- Identify the different types of network topologies and protocols.
- List and explain the layers of the OSI model and TCP/IP model.
- Comprehend the different types of network devices and their functions within a network
- Demonstrate subnetting and routing mechanisms.

17CSL47 (DESIGN AND ANALYSIS OF ALGORITHM LABORATORY

- Design algorithms using appropriate design techniques (brute-force, greedy,dynamic programming, etc.)
- Develop variety of algorithms such as sorting, graph related, combinatorial, etc.,in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

17CSL48 (MICROPROCESSOR AND MICROCONTROLLER LABORATORY)

- Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.
- Design and develop assembly programs using 80x86 assembly language instructions
- Infer functioning of hardware devices and interfacing them to x86 family
- Choose processors for various kinds of applications.

5TH SEM

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY(17CS51)

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their
  importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS (17CS52)

- Explain principles of application layer protocols
- Outline transport layer services and infer UDP and TCP protocols
- Classify routers, IP and Routing Algorithms in network layer
- Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
- Define Multimedia Networking and Network Management

DATABASE MANAGEMENT SYSTEM(17CS53)

- Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
- Use Structured Query Language (SQL) for database manipulation.
- Design simple database systems
- Design code for some application to interact with databases.

AUTOMATA THEORY AND COMPUTABILITY(17CS54)

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

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ADVANCED JAVA AND J2EE (17CS553)

- Interpret the need for advanced Java concepts like enumerations and collections in
- Developing modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

ARTIFICIAL INTELLIGENCE (17CS562)

- Identify the AI based problems
- Apply techniques to solve the AI problems
- Define learning and explain various learning techniques
- Discuss expert systems

COMPUTER NETWORK LABORATORY (17CSL57)

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

DBMS LABORATORY WITH MINI PROJECT (17CSL58)

- Use Structured Query Language (SQL) for database Creation and manipulation.
- Demonstrate the working of different concepts of DBMS
- Implement and test the project developed for an application.

6TH SEM

17CS61 CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW

- Discuss cryptography and its need to various applications
- Design and develop simple cryptography algorithms
- Understand cyber security and need cyber Law

17IS62 FILE STRUCTURES

- Discuss appropriate file structure for storage representation.
- Illustrate a suitable sorting technique to arrange the data.
- Explain indexing and hashing techniques for better performance to a given problem.

17IS63 SOFTWARE TESTING

- Discuss test cases for any given problem
- Compare the different testing techniques
- Illustrate the problem into suitable testing model
- Understand the appropriate technique for the design of flow graph.
- Design and Develop appropriate document for the software artefact.

17CS64 OPERATING SYSTEMS

- Demonstrate need for OS and different types of OS
- Discuss suitable techniques for management of different resources
- Illustrate processor, memory, storage and file system commands
- Explain the different concepts of OS in platform of usage through case studies

17CS661 MOBILE APPLICATION DEVELOPMENT

- Design and Develop Android application by setting up Android development environment

- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Explain long running tasks and background work in Android applications
- Demonstrate methods in storing, sharing and retrieving data in Android applications
- Discuss performance of android applications and understand the role of permissions and security
- Describe the steps involved in publishing Android application to share with the world

17CS664 PYTHON APPLICATION PROGRAMMING

- Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

17ISL67 SOFTWARE TESTING LABORATORY

- Understand requirements for the given problem
- Design and implement the solution for given problem in any programming language(C, C++, JAVA)
- Discuss test cases for any given problem
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact.

17ISL68 FILE STRUCTURES LABORATORY WITH MINI PROJECT

- Implement operations related to files
- Apply the concepts of file system to produce the given application.
- Evaluate performance of various file systems on given parameters.

7TH SEM

17CS71 WEB TECHNOLOGY AND ITS APPLICATIONS

- Define HTML and CSS syntax and semantics to build web pages.
- Understand the concepts of Construct , visually format tables and forms using HTML using CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- List the principles of object oriented development using PHP
- Illustrate JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

17IS72 SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

- Design and implement codes with higher performance and lower complexity
- Illustrate the code qualities needed to keep code flexible
- Define core design principles and understand the importance to assess the quality of a design with respect to these principles.
- List the capabilities of applying these principles in the design of object oriented systems.
- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Recall the suitable select and apply patterns in specific contexts

17CS73 MACHINE LEARNING

- Recall the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
- Understand theory of probability and statistics related to machine learning
- Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

17CS743 INFORMATION AND NETWORK SECURITY

- Analyze the Digitals security lapses
- Illustrate the need of key management

17IS753 INFORMATION MANAGEMENT SYSTEM

- Understand the role of information technology and information systems in business
- Illustrate the current issues of information technology and relate those issues to the firm
- Interpret how to use information technology to solve business problems

17CSL76 MACHINE LEARNING LABORATORY

- Understand the implementation procedures for the machine learning algorithms.
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms.
- Identify and apply Machine Learning algorithms to solve real world problems.

17CSL77 WEB TECHNOLOGY LABORATORY WITH MINI PROJECT

- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Understand the concepts of Web Application Terminologies, Internet Tools other web services.

8TH SEM

17CS81INTERNET OF THINGS TECHNOLOGY

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry

17CS82 BIG DATA ANALYTICS

- Explain the concepts of HDFS and MapReduce framework
- Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
- Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
- Infer the importance of core data mining techniques for data analytics
- Compare and contrast different Text Mining Techniques

17CS831 HIGH PERFORMANCE COMPUTING

- Illustrate the key factors affecting performance of CSE applications
- Illusrate mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

17CS832 USER INTERFACE DESIGN

- Course outcomes: The Students should be able to:
- Design the User Interface, design, menu creation ,windows creation and connection between menus and windows

NETWORK MANAGEMENT

- Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
- Apply network management standards to manage practical networks
- Formulate possible approaches for managing OSI network model.
- Infer SNMP for managing the network
- Infer RMON for monitoring the behavior of the network
- Identify the various components of network and formulate the scheme for the managing them

17CS834 SYSTEM MODELLING AND SIMULATION

- Explain the system concept and apply functional modeling method to model the activities of a static system
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Illustrate the operation of a dynamic system and make improvement according to the simulation results.

17IS84 INTERNSHIP / PROFESSIONAL PRACTISE

- Adapt easily to the industry environment
- Take part in team work
- Make use of modern tools
- Decide upon project planning and financing.
- Adapt ethical values.
- Motivate for lifelong learning

17ISP85 PROJECT WORK PHASE II

- Identify a issue and derive problem related to society, environment, economics, energy and technology
- Formulate and Analyze the problem and determine the scope of the solution chosen
- Determine , dissect, and estimate the parameters, required in the solution.
- Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
- Compile the report and take part in present / publishing the finding in a reputed conference / publications
- Attempt to obtain ownership of the solution / product developed

17ISS86 SEMINAR

- Survey the changes in the technologies relevant to the topic selected
- Discuss the technology and interpret the impact on the society, environment and domain.
- Compile report of the study and present to the audience, following the ethics

COURSE OUTCOME

3rd Sem 2018- Scheme-CSE

Transform Calculus, Fourier Series and Numerical Techniques (18MAT31)

Course outcomes:

At the end of the course the student will be able to:

- CO1: Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
- CO2: Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
- CO3: Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
- CO4: Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
- CO5: Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Data Structures and Applications (18CS32)

Course outcomes:

- Use different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Use stack, Queue, Lists, Trees and Graphs in problem solving
- Implement all data structures in a high-level language for problem solving.

Analog and Digital Electronics (18CS33)

Course outcomes:

- Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
- Explain the basic principles of A/D and D/A conversion circuits and develop the same.
- Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods
- Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
- Develop simple HDL programs

Computer Organization (18CS34)

Course outcomes:

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output,and memory.
- Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
- Design and analyse simple arithmetic and logical units.

Software Engineering (18CS35)

Course outcomes:

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Discrete Mathematical Structures (18CS36)

Course outcomes:

- Use propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Application of different mathematical proofs techniques in proving theorems in the courses.
- Compare graphs, trees and their applications.

Analog and Digital Electronics Laboratory (18CSL37)

Course outcomes:

This laboratory course enable students to get practical experience in design, assembly and evaluation/testing of

- Analog components and circuits including Operational Amplifier, Timer, etc.
- Combinational logic circuits.
- Flip - Flops and their operations
- Counters and registers using flip-flops.
- Synchronous and Asynchronous sequential circuits.
- A/D and D/A converters

Data Structures Laboratory (18CSL38)

Course outcomes:

This laboratory course enable students to get practical experience in design, develop, implement, analyze and evaluation/testing of

- Asymptotic performance of algorithms.
- Linear data structures and their applications such as stacks, queues and lists
- Non-Linear data structures and their applications such as trees and graphs
- Sorting and searching algorithms

Vyavaharika Kannada (Kannada for communication) (18KVK39)

Course outcomes:

- The course will enable the students to understand Kannada and communicate in Kannada language.

Aadalitha Kannada (Kannada for Administration) (18KAK39)

Course outcomes:

- The course will enable the students to understand Kannada and communicate in Kannada language

Constitution of India, Professional Ethics and Cyber Law (18CPC39)

Course outcomes:

Course Learning Objectives:

- know the fundamental political codes, structure, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens
- Understand engineering ethics and their responsibilities; identify their individual roles and ethical responsibilities towards society.
- Know about the cybercrimes and cyber laws for cyber safety measures.

4TH SEMESTER

COMPLEX ANALYSIS, PROBABLITY AND STATISTICAL METHODS (18MAT41)

Course Outcomes:

At the end of the course the student will be able to:

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

DESIGN AND ANALYSIS OF ALGORITHMS (18CS42)

Course Outcomes:

The student will be able to :

- Describe computational solution to well known problems like searching, sorting etc.
- Estimate the computational complexity of different algorithms.
- Devise an algorithm using appropriate design strategies for problem solving.

OPERATING SYSTEMS (18CS43)

Course Outcomes:

The student will be able to :

- Demonstrate need for OS and different types of OS
- Apply suitable techniques for management of different resources

- Use processor, memory, storage and file system commands
- Realize the different concepts of OS in platform of usage through case studies

MICROCONTROLLER AND EMBEDDED SYSTEMS (18CS44)

Course Outcomes:

The student will be able to :

- Describe the architectural features and instructions of ARM microcontroller
- Apply the knowledge gained for Programming ARM for different applications.
- Interface external devices and I/O with ARM microcontroller.
- Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
- Develop the hardware /software co-design and firmware design approaches.
- Demonstrate the need of real time operating system for embedded system applications

OBJECT ORIENTED CONCEPTS (18CS45)

Course Outcomes:

The student will be able to :

- Explain the object-oriented concepts and JAVA.
- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

DATA COMMUNICATION (18CS46)

Course Outcomes:

The student will be able to :

- Explain the various components of data communication.
- Explain the fundamentals of digital communication and switching.
- Compare and contrast data link layer protocols.

- Summarize IEEE 802.xx standards

DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY (18CSL47)

Laboratory Outcomes:

The student should be able to:

- Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
- Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply

MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY (18CSL48)

Laboratory Outcomes:

The student should be able to:

- Develop and test program using ARM7TDMI/LPC2148
- Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool/compiler

5TH SEMESTER

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY (18CS51)

Course outcomes:

The students should be able to:

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their
  importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS AND SECURITY (18CS52)

Course Outcomes:

The student will be able to :

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

DATABASE MANAGEMENT SYSTEM (18CS53)

Course Outcomes:

The student will be able to :

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

AUTOMATA THEORY AND COMPUTABILITY (18CS54)

Course Outcomes:

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

APPLICATION DEVELOPMENT USING PYTHON (18CS55)

Course Outcomes:

After studying this course, students will be able to :

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

UNIX PROGRAMMING (18CS56)

Course Outcomes:

The student will be able to :

- Explain Unix Architecture, File system and use of Basic Commands

- Illustrate Shell Programming and to write Shell Scripts
- Categorize, compare and make use of Unix System Calls
- Build an application/service over a Unix system.

COMPUTER NETWORK LABORATORY (18CSL57)

Laboratory Outcomes:

The student should be able to:

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

DBMS LABORATORY WITH MINI PROJECT (18CSL58)

Laboratory Outcomes:

The student should be able to:

- Create, Update and query on the database.
- Demonstrate the working of different concepts of DBMS
- Implement, analyze and evaluate the project developed for an application

ENVIRONMENTAL STUDIES (18CIV59)

Course Outcomes:

At the end of the course, students will be able to:

- 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

6TH SEMESTER

WEB TECHNOLOGY AND ITS APPLICATIONS (18CS63)

Course Outcomes:

The student will be able to :

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

SYSTEM SOFTWARE AND COMPILERS (18CS61)

Course Outcomes:

The student will be able to :

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

COMUTER GRAPHICS AND VISUALIZATION (18CS62)

Course Outcomes:

The student will be able to :

- Design and implement algorithms for 2D graphics primitives and attributes
- . Illustrate Geometric transformations on both 2D and 3D objects.
- Apply concepts of clipping and visible surface detection in 2D and 3D viewing, and Illumination

- Models.
- Decide suitable hardware and software for developing graphics packages using OpenGL

CLOUD COMPUTING AND ITS APPLICATIONS (18CS643)

Course Outcomes:

The student will be able to :

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

DATA MINING AND DATA WAREHOUSING(18CS641)

Course Outcomes:

The student will be able to :

- Identify data mining problems and implement the data warehouse
- Write association rules for a given data pattern
- Choose between classification and clustering solution

OBJECT ORIENTED MODELING AND DESIGN (18CS642)

Course Outcomes:

The student will be able to :

- Describe the concepts of object-oriented and basic class modelling.
- Draw class diagrams, sequence diagrams and interaction diagrams to solve problems
- Choose and apply a befitting design pattern for the given problem

ADVANCED JAVA AND J2EE(18CS644)

Course Outcomes:

The student will be able to :

- Interpret the need for advanced Java concepts like enumerations and collections in developing• modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

SYSTEM MODELLING AND SIMULATION (18CS645)

Course Outcomes:

The student will be able to :

- Explain the system concept and apply functional modeling method to model the activities of a static system
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Simulate the operation of a dynamic system and make improvement according to the simulation• results.

MOBILE APPLICATION DEVELOPMENT(18CS651)

Course outcome**s**:

The students should be able to:

- Create, test and debug Android application by setting up Android development environment
- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications
- Demonstrate methods in storing, sharing and retrieving data in Android applications

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

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

INTRODUCTION TO DATA SRUCTURES AND ALGORITHM (18CS652)

Course Outcomes:

The student will be able to :

- Identify different data structures in C programming language
- Appraise the use of data structures in problem solving
- Implement data structures using C programming language

PROGRAMMING IN JAVA (OPEN ELECTIVE) (18CS653)

Course outcomes:

The students should be able to:

- Explain the object-oriented concepts and JAVA

.• Develop computer programs to solve real world problems in Java.

• Develop simple GUI interfaces for a computer program to interact with users

INTRODUCTION TO OPERATING SYSTEM (OPEN ELECTIVE) (18CS654)

Course outcomes:

The students should be able to:

- Explain the fundamentals of operating system

• Comprehend process management, memory management and storage management.
• Familiar with various types of operating systems

SYSTEM SOFTWARE LABORATORY(18CSL66)

Laboratory Outcomes:

The student should be able to:

- Implement and demonstrate Lexer‟s and Parser‟s

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

COMPUTER GRAPHICS LABORATORY WITH MINI PROJECT (18CSL67)

Laboratory Outcomes:

The student should be able to:

- Apply the concepts of computer graphics
- Implement computer graphics applications using OpenGL Animate real world problems using OpenGL

MOBILE APPLICATION DEVELOPMENT(18CSMP68)

Laboratory Outcomes:

After studying theselaboratory programs, students will be able to

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

- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications.
- Demonstrate methods in storing, sharing and retrieving data in Android applications

Infer the role of permissions and security for Android applications.•

7TH SEMESTER

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (18CS71)

Course outcomes:

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

BIG DATA AND ANALYTICS (18CS72)

Course outcomes:

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

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (18CS731)

Course outcomes:

- Design and implement codes with higher performance and lower complexity
- Be aware of code qualities needed to keep code flexible
- Experience core design principles and be able to assess the quality of a design with respect to these principles.
- Capable of applying these principles in the design of object oriented systems.

- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Be able to select and apply suitable patterns in specific contexts

HIGH PERFORMANCE COMPUTING (18CS732)

Course outcomes:

- Illustrate the key factors affecting performance of CSE applications
- Illusrate mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

ADVANCED COMPUTER ARCHITECTURES (18CS733)

Course outcomes:

- Explain the concepts of parallel computing and hardware technologies
- Compare and contrast the parallel architectures
- Illustrate parallel programming concepts

USER INTERFACE DESIGN (18CS734)

Course outcomes:

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

DIGITAL IMAGE PROCESSING (18CS741)

Course outcomes:

- Explain fundamentals of image processing
- Compare transformation algorithms
- Contrast enhancement, segmentation and compression techniques

NETWORK MANAGEMENT (18CS742)

Course outcomes:

- Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
- Apply network management standards to manage practical networks
- Formulate possible approaches for managing OSI network model.
- Use on SNMP for managing the network
- Use RMON for monitoring the behavior of the network
- Identify the various components of network and formulate the scheme for the managing them

NATURAL LANGUAGE PROCESSING (18CS743)

Course outcomes:

- Analyze the natural language text.
- Define the importance of natural language.
- Understand the concepts Text mining.
- Illustrate information retrieval techniques.

CRYPTOGRAPHY (18CS744)

Course outcomes:

- Define cryptography and its principles
- Explain Cryptography algorithms
- Illustrate Public and Private key cryptography
- Explain Key management, distribution and ceritification
- Explain authentication protocols
- Tell about IPSec

ROBOTIC PROCESS AUTOMATION DESIGN & DEVELOPMENT (18CS745)

Course outcomes:

- To understand Basic Programming concepts and the underlying logic/structure
- To Describe RPA , where it can be applied and how its implemented
- To Describe the different types of variables, Control Flow and data manipulation techniques
- To Understand Image, Text and Data Tables Automation
- To Describe automation to Email and various types of Exceptions and strategies to handle

INTRODUCTION TO BIG DATA ANALYTICS (18CS751)

Course outcomes:

- Explain the importance of data and data analysis
- Interpret the probabilistic models for data
- Define hypothesis, uncertainty principle

- Evaluate regression analysis

PYTHON APPLICATION PROGRAMMING(18CS752)

Course outcomes:

Course Outcomes:After studying this course, students will be able to

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python

INTRODUCTION TO ARTIFICIAL INTELLIGENCE (18CS753)

Course outcomes:

- Identify the AI based problems
- Apply techniques to solve the AI problems
- Define learning and explain various learning techniques
- Discuss on expert systems

INTRODUCTION TO DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT (18CS754)

Course outcomes:

- Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
- Demonstrate Object Oriented Programming concepts in C# programming language
- Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
- Illustrate the use of generics and collections in C#
- Compose queries to query in-memory data and define own operator behaviour

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATORY (18CSL76)

Laboratory Outcomes:

- Implement and demonstrate AI and ML algorithms.
- Evaluate different algorithms

8TH SEMESTER

INTERNET OF THINGS(18CS81)

Course Outcomes:

The student will be able to :

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

MOBILE COMPUTING(18CS821)

Course Outcomes:

The student will be able to :

- Explain state of art techniques in wireless communication.
- Discover CDMA, GSM. Mobile IP, WImax
- Demonstrate program for CLDC, MIDP let model and security concerns

NOSQL DATABASE(18CS823)

Course Outcomes:

The student will be able to :

- Define, compare and use the four types of NoSQL Databases (Document-oriented, KeyValue Pairs, Column-oriented and Graph).
- Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.
- Explain the detailed architecture, define objects, load data, query data and performance tunevDocument-oriented NoSQL databases.

MULTICORE ARCHITECTURE AND PROGRAMMING(18CS824)

Course Outcomes:

The student will be able to :

- Identify the limitations of ILP and the need for multicore architectures
- Define fundamental concepts of parallel programming and its design issues
- Solve the issues related to multiprocessing and suggest solutions
- Make out the salient features of different multicore architectures and how they exploit parallelism
- Demonstrate the role of OpenMP and programming concept

STORAGE AREA NETWORKS(18CS822)

Course Outcomes:

The student will be able to :

- Identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Explain components and the implementation of NAS
- Describe CAS architecture and types of archives and forms of virtualization
- Illustrate the storage infrastructure and management activities

Course: Electronic Instrumentation **Course Code:** 17EC32

Course Number: C202

C202.1	Acquire knowledge of • Working principles, characteristics and basic applications of BJT and FET, • Single stage, cascaded and feedback amplifier configurations. • Frequency response characteristics of BJT and FET. • Power amplifier classifications such as Class A, Class B, etc.
C202.2	Analyze the performance of • FET amplifier in CS configuration, • Power Amplifiers and Oscillator circuits.
C202.3	Interpretation of performance characteristics of transistors amplifiers, frequency Response and Oscillators.
C202.4	Apply the knowledge gained in the design of transistorized circuits, amplifiers andOscillators.

Course: Analog Electronics **Course Code:** 15EC33

Course Number: C203

CO's	Description
C203.1	Describe the working principle and characteristic of BJT, FET, single stage, cascaded and feedback amplifiers
C203.2	Describe the operation of phase shift, wein bridge, tuned and crystal oscillators using BJT/FET/UJT
C203.3	Calculate the AC gain and impedance for BJT using re and h parameter models for CE and CC configuration
C203.4	Determine the performance characteristics and parameters of BJT and FET amplifier using small signal model.
C203.5	Determine the parameters which affects the low frequency and high frequency response of BJT and FET amplifiers and draw the characteristics
C203.6	Evaluate the efficiency of class a and class B power amplifiers and voltage regulators

Course: Digital Electronics **Course Code:** 17EC34

Course Number: C204

C204.1	Develop Simplified switching equation using Karnaugh map and Quine McCluskey techniques
C204.2	Explain the operation of encoders, decoders, multiplexers, demultiplexers, adders, subtractors and comparators
C204.3	Explain the working of latches and flipflops(SR, D, T and JK)

C204.4	Design synchronous and asynchronous counters and shift registers using flipflops
C204.5	Develop melay/moore models and state diagrams for the given clocked sequential circuits
C204.6	Apply the knowledge gained in the design of counters and registers

Course: Network Analysis **Course Code:** 17EC35

Course Number: C205

C205.1	Apply the basic circuital laws and network theorems to linear circuits
C205.2	Analyze a linear circuit in time and frequency domain
C205.3	Analyze the frequency response of circuits containing passive elements
C205.4	Apply Laplace transform to two port network and find its parameters

Course: Engineering Electro magnetics **Course Code:** 17EC36

Course Number: C206

C206.1	Explain the electric fields using coulomb's law, Gauss's law, Laplace's and Poisson's equations and solve the problems in electric fields.
C206.2	Discuss the electric and magnetic fields using three dimensional vector calculus and interpret the dielectric and magnetic properties of given materials.
C206.3	Analyze the effect of Electromagnetic force near the boundary of different media interface.
C206.4	Analyze time varying fields and electromagnetic waves using Maxwell's equation.

15ECL37-Analog Electronics Laboratory **Course Code: 17ECL 37**

CO307.1	Test circuits of rectifiers, clipping circuits, clamping circuits and voltage regulators
CO307.2	Determine the characteristics of BJT and FET amplifiers and plot its frequency response
CO307.3	Compute the performance parameters of amplifiers and voltage regulators
CO307.4	Design and test the basic BJT/FET amplifiers, BJT Power amplifier and oscillators

Course: Digital Electronics Laboratory **Course Code:** 17ECL38

Course Number: C208

CO Number	CO Description
C208.1	Demonstrate the truth table of various expressions and combinational circuits using logic gates.
C208.2	Design and test various combinational circuits such as adders, subtractors, comparators, multiplexers.
C208.3	Realize Boolean expression using decoders.
C208.4	Construct and test flips-flops, counters and shift registers
C208.5	Simulate full adder and up/down counters.

Course: Signals and Systems **Course Code:** 17EC42

Course Number: C210

CO number	CO Description
C210.1	Apply the knowledge of mathematics to obtain desired parameter of a given signal/system
C210.2	Analyze the given system in time domain and frequency domain to arrive at valid conclusion
C210.3	Simulation and verification of various signal/signal processing operation using modern tool

Course: Control Systems **Course Code:** 17EC43

Course Number: C211

C211.1	Define and discuss control systems & its classifications
C211.2	Derive the transfer function of a control systems by using block diagram reduction technique and signal flow graph method
C211.3	Analyse the responses of a system by using different methodologies both in frequency & time domain.
C211.4	Learn to analyze the control systems using state space analysis

Course: Principle of Communication Systems **Course Code:** 17EC44

Course Number: C212

Subject Name: Principles Of Communication Systems	Subject Code: 17EC44
C212.1	Apply the basic concepts of engineering to understand the performance of analog modulation schemes in time and frequency domains
C212.2	Analyze the performance of system for generation and detection of various modulated analog signals
C212.3	Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms
C212.4	Differentiate various types of noise and predict its effect on various analog communication systems
C212.5	Determine the performance of analog communication systems.
C212.6	Apply the knowledge of communication to understand the concepts of sampling, quantization and modulation in digital transmission.

Course: Linear Integrated Circuits **Course Code:** 17EC45

Course Number: C213

Subject Name: Principles Of Communication Systems	Subject Code: 15EC45
C213.1	Explain Op-Amp circuit and parameters including CMRR, PSRR, Input & Output Impedances and Slew Rate
C213.2	Design Op-Amp based Amplifiers and filters considering suitable conditions.
C213.3	Analyze various Op-Amp based linear and Non Linear circuits.
C213.4	Analyze the working of various applications of Op-amps, regulators and Timers.

Course: Microprocessor **Course Code:** 17EC46

Course Number: C214

C214.1	Explain the History of evaluation of Microprocessors, Architecture and instruction set of 8086, 8088, 8087, CISC & RISC, Von-Neumann & Harvard CPU Architecture, Configuration & Timing diagrams of 8086 and Instruction set of 8086.
C214.2	Write 8086 Assembly level programs using the 8086 instruction set
C214.3	Write modular programs using procedures and macros.

C214.4	Write 8086 Stack and Interrupts programming
C214.5	Interface 8086 to Static memory chips and 8255, 8254, 0808 ADC, 0800 DAC, Keyboard, Display and Stepper motors.
C214.6	Use INT 21 DOS interrupt function calls to handle Keyboard and Display.

Course: Microprocessor Laboratory **Course Code:** 17ECL47

Course Number: C215

CO number	CO Description
C207.1	Write and execute 8086 assembly level programs to perform data transfer, arithmetic and logical operations.
C207.2	Understand assembler directives, branch, loop operations and DOS 21H Interrupts.
C207.3	Write and execute 8086 assembly level programs to sort and search elements in a given array.
C207.4	Perform string transfer, string reversing, searching a character in a string with string manipulation instructions of 8086.
C207.5	Utilize procedures and macros in programming 8086.
C207.6	Demonstrate the interfacing of 8086 with 7 segment display, matrix keyboard, logical controller, stepper motor, ADC, DAC, and LDR for simple applications.

Course: Linear ICs and Communication Laboratory **Course Code:** 17ECL48

Course Number: C216

Subject Name: **LINEAR ICS AND COMMUNICATION LAB**	Subject Code: **15ECL48**
C216.1	Illustrate the pulse and flat top sampling techniques using basic circuits.
C216.2	Demonstrate addition and integration using linear ICs, and 555 timer operations to generate signals/pulses
C216.3	Demonstrate AM and FM operations and frequency synthesis
C216.4	Design and illustrate the operation of instrumentation amplifier, LPF, HPF, DAC and oscillators using linear ICs

Course: Management and Entrepreneurship Development **Course Code:** 15ES51

Course Number: C301

C301.1	Understand the fundamental concepts of Management and Entrepreneurship
C301.2	Select a best Entrepreneurship model for the required domain of establishment
C301.3	Describe the functions of Managers, Entrepreneurs and their social responsibilities
C301.4	Compare various types of Entrepreneurs
C301.5	Analyze the Institutional support by various state and central government agencies

Course: Digital Signal Processing **Course Code:** 15EC52

Course Number: C302

COs	Description
C302.1	Determine response of LTI systems using time domain and DFT Techniques.
C302.2	Compute DFT of real and complex discrete time signals.
C302.3	Computation of DFT using Fast Fourier Transforms Algorithm and linear filtering approach .
C302.4	Solve problems on digital filter design and realize using digital computations.

Course: Verilog HDL **Course Code:** 15EC53

Course Number: C303

CO's	Description
C303.1	Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.
C303.2	Write simple programs in VHDL in different styles.
C303.3	Design and verify the functionality of digital circuit/system using test benches.
C303.4	Identify the suitable Abstraction level for a particular digital design.
C303.5	Write the programs more effectively using Verilog tasks and directives.
C303.6	Perform timing and delay Simulation.

Course: Information Theory and Coding **Course Code:** 15EC54

Course Number: C304

CO Number	Description
C304.1	Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source
C304.2	Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms

C304.3	Model the continuous and discrete communication channels using input, output and joint probabilities
C304.4	Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes
C304.5	Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes.

Course: Operating Systems **Course Code:** 15EC553

Course Number: C305

C305.1	Explain the goals, structure, operation and types of operating systems.
C305.2	Apply scheduling techniques to find performance factors.
C305.3	Apply suitable techniques for contiguous and non-contiguous memory allocation.
C305.4	Explain organization of file systems and IOCS.
C305.5	Describe message passing, deadlock detection and prevention methods.

Course: Object Oriented Programming using C++ **Course Code:** 15EC562

Course Number: C306

CO306.1	Explain the basics of Object Oriented Programming concepts.
CO306.2	Apply the object initialization and deploy concept using constructors and destructors.
CO306.3	Apply the concept of polymorphism to implement compile time polymorphism in programs by using overloading methods and operators.
CO306.4	Use the concept of inheritance to reduce the length of code and evaluate the usefulness.
CO306.5	Apply the concept of run time polymorphism by using virtual functions, overriding functions and abstract class in programs.
CO306.6	Use I/O operations and file streams in programs.

Course: Digital Signal Processing Laboratory **Course Code:** 15ECL57

Course Number: C307

COs	Description
C307.1	Understand the concepts of analog to digital conversion of signals and Frequency domain sampling of signals.
C307.2	Modelling of discrete time signals and systems and verification of its Properties and results.
C307.3	Implementation of discrete computations using DSP processor and verify the results.
C307.4	Realize the digital filters using a simulation tool and a DSP processor and verify the frequency and phase response.

Course: HDL Laboratory **Course Code:** 15ECL58
Course Number: C308

C308.1	Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.
C308.2	Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms.
C308.3	Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.
C308.4	Interface the hardware to the programmable chips and obtain the required output.

Course: Digital Communication **Course Code:** 15EC61
Course Number: C309

Subject Name: Digital Communication	Subject Code:15EC61
C309.1	Associate and apply the concepts ofBandpass sampling to well specified signals and channels.
C309.2	Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels.
C309.3	Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels
C309.4	Demonstrate by simulation and emulation that bandpass signals subjected to corrupted and distorted symbols in a bandlimited channel, can be demodulated and estimated at receiver to meet specified performance criteria

Course: ARM Microcontroller and Embedded Systems **Course Code:** 15EC62
Course Number: C310

CO number	CO Description
C310.1	Describe the architectural features and instructions of 32-bit microcontroller ARM Cortex M3
C310.2	Apply the knowledge gained for Programming ARM Cortex M3 for different applications
C310.3	Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system
C310.4	Develop the hardware /software co-design and firmware design approaches
C310.5	Explain the need of real time operating system for embedded system applications

Course: VLSI Design **Course Code:** 15EC63
Course Number: C311

CO No	CO Description
C311.1	Demonstrate understanding of MOS transistor theory, CMOS fabrication

	flow and technology scaling.
C311.2	Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.
C311.3	Interpret Memory elements along with timing considerations
C311.4	Demonstrate knowledge of FPGA based system design
C311.5	Interpret testing and testability issues in VLSI Design
C311.6	Examine CMOS subsystems and architectural issues with the design

Course: Computer Communication Networks **Course Code:** 15EC64

Course Number: C312

CO number	CO Description
C312.1	Identify the protocols and services of Data link layer
C312.2	Identify the protocols and functions associated with the transport layer services.
C312.3	Describe the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
C312.4	Distinguish the basic network configurations and standards associated with each network.
C312.5	Construct a network model and determine the routing of packets using different routing algorithms.

Course: Digital Switching Systems **Course Code:** 15EC654

Course Number: C313

CO Number	Description
C313.1	Describe the electromechanical switching systems and its comparison with the digital switching
C313.2	Determine the telecommunication traffic and its measurements
C313.3	Define the technologies associated with the data switching operations
C313.4	Describe the software aspects of switching systems and its maintenance

Course: Microelectronics **Course Code:** 15EC655

Course Number: C314

COs	Description
C314.1	Explain the underlying physics and principles of operation of Metal oxide-semiconductor (MOS) capacitors and MOS field effect transistors

	(MOSFETs).
C314.2	Describe and apply simple large signal circuit models for MOSFETs.
C314.3	Analyze and design microelectronic circuits for linear amplifier for digital applications.
C314.4	Use of discrete MOS circuits to design Single stage and Multistage amplifiers to meet stated operating specifications.

Course: Digital System Design using Verilog **Course Code:** 15EC663

Course Number: C315

C314.1	Construct the combinational circuits, using discrete gates and programmable logic devices.
C314.2	Describe Verilog model for sequential circuits and test pattern generation.
C314.3	Design a semiconductor memory for specific chip design.
C314.4	Design embedded systems using small microcontrollers, larger CPUs/DSPs, or hard or soft processor cores.
C314.5	Synthesize different types of processor and I/O controllers that are used in embedded system

Course: Embedded Controller Laboratory **Course Code:** 15ECL67

Course Number: C316

CO number	CO Description
C315.1	Understand the instruction set of 32-bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language.
C315.2	Develop assembly language programs using ARM Cortex M3 for different applications.
C315.3	Interface external devices and I/O with ARM Cortex M3.
C315.4	Develop C language programs and library functions for embedded system applications.

Course: Computer Networks Laboratory **Course Code:** 15ECL68

Course Number: C317

C318.1	Use the network simulator for learning and practice of networking algorithms.
C318.2	Illustrate the operations of network protocols and algorithms using C programming
C318.3	Simulate the network with different configurations to measure the performance Parameters
C318.4	Implement the data link and routing protocols using C programming

Course: Microwave and Antennas **Course Code:** 15EC71

Course Number: C401

Subject Name: **Microwaves and Antennas**	Subject Code: **15EC71**
C401.1	Describe the use and advantages of microwave transmission
C401.2	Analyze various parameters related to microwave transmission lines and waveguides
C401.3	Identify microwave devices for several applications
C401.4	Analyze various antenna parameters necessary for building an RF system
C401.5	Recommend various antenna configurations according to the applications

Course: Digital Image Processing **Course Code:** 15EC72

Course Number: C402

Subject Name: Digital Image Processing	Subject Code:15EC72
C402.1	Understand image formation and the role human visual system plays in perception of gray and color image data.
C402.2	Apply image processing techniques in both the spatial and frequency (Fourier) domains.
C402.3	Design image analysis techniques in the form of image segmentation and to evaluate the Methodologies for segmentation.
C402.4	Conduct independent study and analysis of Image Enhancement techniques.

Course: Power Electronics **Course Code:** 15EC73

Course Number: C403

Subject Name: Power Electronics	Subject Code: 15EC73
C403.1	Describe the characteristics of different power devices and identify the various applications associated with it.
C403.2	Illustrate the working of power circuit as DC-DC converter.
C403.3	Illustrate the operation of inverter circuit and static switches
C403.4	Determine the output response of a thyristor circuit with various triggering options.
C403.5	Determine the response of controlled rectifier with resistive and inductive loads.

Course: Multimedia Communication **Course Code:** 15EC741

Course Number: C404

Subject Name: Multimedia Communication	Subject Code:15EC741
C404.1	Understand basics of different multimedia networks and applications
C404.2	Understand different compression techniques to compress audio and video
C404.3	Describe multimedia Communication across Networks.
C404.4	Analyse different media types to represent them in digital form.
C404.5	Compress different types of text and images using different compression Techniques and analyse DMS.

Course: Satellite Communication **Course Code:** 15EC755
Course Number: C405

COs	Description
C405.1	Describe the satellite orbits and its trajectories with the definitions of parameters associated with it.
C405.2	Describe the electronic hardware systems associated with the satellite subsystem and earth station
C405.3	Compute the satellite link parameters under various propagation conditions with the illustration of multiple access techniques.
C405.4	Describe the various applications of satellite with the focus on national satellite system.

Course: Advanced Communication Laboratory **Course Code:** 15ECL76
Course Number: C406

CO406.1	Determine the characteristics and response of microwave devices and optical waveguide. ·
CO406.2	Determine the characteristics of microstrip antennas and devices and compute the parameters associated with it.
CO406.3	Simulate the digital modulation schemes with the display of waveforms and computation of performance parameters
CO406.4	Design and test the digital modulation circuits/systems and display the waveforms.

Course: VLSI Laboratory **Course Code:** 15ECL77

Course Number: C407

CO number	CO Description
C407.1	Write test bench to simulate various digital circuits.
C407.2	Interpret concepts of DC Analysis, AC Analysis and Transient Analysis in analog circuits.
C407.3	Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.
C407.4	Use basic amplifiers and further design higher level circuits like operational amplifier and analog/digital converters to meet desired parameters.
C407.5	Use transistors to design gates and further using gates realize shift registers and adders to meet desired parameters

Course: Wireless Cellular and LTE 4G Broadband **Course Code:** 15EC81

Course Number: C409

COs	Description
C409.1	Understand the system architecture and the functional standard specified in LTE 4G.
C409.2	Analyze the role of LTE radio interface protocols and EPS Data convergence protocols to set up, reconfigure and release data and voice from users.
C409.3	Demonstrate the UTRAN and EPS handling processes from set up to release including mobility management for a variety of data call scenarios.
C409.4	Test and Evaluate the Performance of resource management and packet data processing and transport algorithms.

Course: Fiber Optics and Networks **Course Code:** 15EC82

Course Number: C410

C413.1	Classification and working of optical fiber with different modes of signal propagation.
C413.2	Describe the transmission characteristics and losses in optical fiber communication.
C413.3	Describe the construction and working principle of optical connectors, multiplexers and amplifiers.
C413.4	Describe the constructional features and the characteristics of optical sources and detectors.
C413.5	Illustrate the networking aspects of optical fiber and describe various standards associated with it.

Course: Micro Electro Mechanical Systems **Course Code:** 15EC831

Course Number: C411

Subject Name: MEMS	Subject Code:15EC831
C411.1	Appreciate the technologies related to Micro Electro Mechanical Systems.
C411.2	Understand design and fabrication processes involved with MEMSdevices.
C411.3	Analyze the MEMS devices and develop suitable mathematical models.
C411.4	Know various application areas for MEMS device.

Course: Internship **Course Code:** 15EC84

Course Number: C412

CO's	Description
C404.1	Build a record of work experience
C404.2	Develop work habits and attitudes necessary for job success
C404.3	Develop communication, interpersonal and team work.

Course: Project Work **Course Code:** 15ECP85
Course Number: C413

C408.1	Identify practical problems, Compare and contrast the several existingsolutions to propose a valid or sustainable solution.
C408.2	Demonstrate skill and knowledge of current information or technological tools and techniques specific to the thrust area of project.
C408.3	Ability to work in teams forproposing a sustainable methodology for project specific problem.
C408.4	Demonstrate the knowledge, skills and attitudes of a professional engineer while Communicating with community at large, in written and oral forms.
C408.5	Practice the project management skills, diligence, and commitment to excellence needed to engage in lifelong learning.

Course: Seminar **Course Code:** 15ECS86
Course Number: C414

CO414.1	Identify, Understand and keep Abreast of continual changes in the field of Electronics and Communication
CO414.2	Analyze and conclude the information gained from the literature
CO414.3	Plan, Organize, and prepare effective Technical report and improve communication skills through effective presentation of the topic.

Sub: Basic Electrical Engineering Sub Code: 15ELE15/25 Sem1 & 2

CO's	Description
C105/C112.1	To predict the behaviour of electrical and magnetic circuits
C105/C112.2	Select the type of generator / motor required for a particular application
C105/C112.3	Realize the requirement of transformers in transmission and distribution of electric power and other applications
C105/C112.4	Practice Electrical Safety Rules & standards
C105/C112.5	To function on multi-disciplinary teams

Course Name: Electric Circuit Analysis -15EE32-C202

CO's	Description
C202.1	Understand the basic concepts, basic laws and methods for analyzing AC and DC networks.
C202.2	Analyze the given AC and DC circuit using network theorems.
C202.3	Understand the concept of Resonance phenomena and initial conditions for RLC circuit.
C202.4	Synthesize waveforms and apply Laplace transform for RL, RC and RLC networks for DC and AC excitation.
C202.5	Solve unbalanced three phase network and evaluate the performance of uni-port and two-port network.

Course Name: Transformers & Generators -15EE33-C203

CO's	Description
C203.1	Explain the construction and operation and performance of transformers
C203.2	Explain different connections for the three phase operations, their advantages and applications
C203.3	Explain the construction and operation of Synchronous machines and evaluate the regulation of synchronous machines by different methods
C203.4	Illustrate the operation of the synchronous machine connected to infinite machine

Course Name: ANALOG ELECTRONIC CIRCUITS -15EE34-C204

CO's	Description
C204.1	Understand basics of diode and transistor characteristics and its applications.
C204.2	Design and analyze biasing circuits for transistor.
C204.3	Analyze and design transistor circuitry as amplifiers and oscillators.

Course Name: DIGITAL SYSTEM DESIGN-15EE35-C205

CO's	Description
C205.1	Understand the principles of combinational and sequential logic circuits
C205.2	Apply Karnaugh maps and Quine-McClusky minimization techniques to simplify Boolean expression
C205.3	Analyze and Design combinational and sequential circuits
C205.4	Understand the basic concepts of HDL & Verilog and its application.

Course Name: ELECTRICAL & ELECTRONIC MEASUREMENT-15EE36-C206

CO's	Description
C206.1	Memorize and apply the concepts of units and dimensions and measure Resistance Inductance and Capacitance using different bridges.
C206.2	Describe the construction, working and calibration of various meters used for measurement of power and energy.
C206.3	Understand the working principle and construction of instrument transformers and magnetic measuring instruments.
C206.4	Explain the working of different digital instruments , display and recording devices

Course Name: EELECTRICAL MACHINES LABORATORY (1)-15EEL37-C207

CO's	Description
C207.1	Conduct different tests on transformers and synchronous generators and evaluate their performance.
C207.2	Evaluate the performance of two dissimilar single phase transformers connected in parallel.
C207.3	Evaluate the performance of single phase transformers for three phase operation and phase conversion.
C207.4	Assess the performance of synchronous generator connected to infinite bus.

Course Name: ELECTRONIC CIRCUIT LABORATORY-15EEL38-C208

CO's	Description
C208.1	Design and test different diode rectifiers
C208.2	Design and test amplifier and oscillator circuits and analyses their performance.
C208.3	Utilize universal gates and ICs for code conversion and arithmetic operations.
C208.4	Design and verify different counters.

Course Name: POWER GENERATION AND ECONOMICS - 15EE42 -C210

CO's	Description
C210.1	Understand the working principle and functions of major equipment of different power generating plants.
C210.2	Classify various substations and explain substation components
C210.3	Understand the importance of grounding and its types
C210.4	Understand the economic aspects of power system operation and determine various economic factors.

Course Name: TRANSMISSION & DISTRIBUTION-15EE43-C211

CO's	Description
C211.1	Understand the importance of HVAC, EHVAC, UHVAC and HVDC transmission.
C211.2	Explain different types of overhead lines , underground cables and insulators.
C211.3	Analyze the performance of overhead transmission and distribution lines using different techniques.
C211.4	Calculate the parameters of the transmission line for different configurations and assess the performance of line.

Course Name: ELECTRIC MOTORS -15EE44-C212

CO's	Description
C212.1	Analyse and assess the performance characteristics of DC motors and understand methods used for controlling the speed.
C212.2	Evaluate the performance of DC motor using different testing methods
C212.3	Explain the constructional features of Three Phase and Single phase induction Motors and analyze their performance
C212.4	Understand different methods used for starting and controlling the speed of induction motor
C212.5	Explain the operation of Synchronous motor and special motors

Course Name: ELECTROMAGNETIC FIELD THEORY-15EE45-C213

CO's	Description
C213.1	Apply the knowledge of vector analysis, coulomb's law and gauss law to compute electrostatic forces in a system of different charge configurations.
C213.2	Understand the principle of energy and potential to compute the behaviour of electric and magnetic parameters, force expressions and materials.
C213.3	Apply the concept of Poisson's and Laplace law to calculate capacitance and energy stored for practical field computations
C213.4	Access the time varying field and propagation of waves in different media

Course Name: LINEAR INTEGRATED CIRCUITS - 15EE46-C214

CO's	Description
C214.1	Explain the basics of linear Ics
C214.2	Design circuits using linear Ics
C214.3	Demonstrate the application of Linear Ics
C214.4	Use ICs in the electronic projects

Course Name: ELECTRICAL MACHINES LABORATORY 2 -15EEL47-C215

CO's	Description
C215.1	Test dc machines to determine their Characteristics.
C215.2	Control the speed of dc motor
C215.3	Pre-determine the performance characteristics of DC machines by conducting suitable tests
C215.4	Perform load test on single phase and three phase induction motor to assess its performance.
C215.5	Conduct test on induction motor to pre-determine the performance characteristics
C215.6	Conduct test on synchronous motor to draw the performance curves.

Course Name: OP-AMPS AND LINEAR IC's -15EEL48-C216

CO's	Description
C216.1	Conduct experiment to determine the characteristic parameters of OP-Amp
C216.2	Design test the OP-Amp as Amplifier, adder, subtract or, differentiator and integrator
C216.3	Design test the OP-Amp as oscillators and filters
C216.4	Design and study of Linear IC's as multivibrator power supplies.

Course Name: MANAGEMENT AND ENTREPRENEURSHIP-15EE51-C301

CO's	Description	Cognitive Level
C301.1	Explain the concept of management, roles, levels and skills of a manager in brief and functions of management in detail. M1,M2	L1, L2,L3,L4
C301.2	Discuss social responsibilities of business and importance of entrepreneur for economic development. M3	L1, L2, L3,L4
C301.3	Explain the concept of SSI, its importance and institutions supporting business enterprise. M4	L1, L2
C301.4	Discuss the concept of project management and project control techniques. M5	L1, L2

Course Name: MICRCONTROLLER-15EE52-C302

CO's	Description
C302.1	Acquire the knowledge of computer organisation, architecture, various addressing modes of 8051 and I/O port operation
C302.2	Understand the use of assembler, Instruction set and basic principles of programming in ALP and C
C302.3	Understand the Concept of time delay, I/O port programming, Data serialisation and Interrupts
C302.4	Apply logical skill for construction of timer, counter, Serial communication and interrupt programs in C and ALP
C302.5	Analyse the hardware connection using Serial port communication and interface with 8051

Course Name: POWER ELECTRONICS-15EE53-C303

CO's	Description
C303.1	Explain basics of power electronics, its applications and concepts of power diodes and diode rectifiers
C303.2	Explain steady state, switching characteristics and gate control requirements of different power transistors.
C303.3	Discuss different types of thyristors, their operations, gate characteristics and gate control methods.
C303.4	Explain designing analysis techniques & characteristics of thyristor controlled rectifiers & AC voltage controllers.
C303.5	Discuss the principle of operation of single phase and three phase DC-DC, DC-AC.

Course Name: SIGNALS & SYSTEMS -15EE54-C304

CO's	Description
C304.1	Understand classification of signals and systems
C304.2	Apply basic operations on signals and properties of systems to signals
C304.3	Evaluate the response of LTI system
C304.4	Apply Fourier transform and Z transform representation to study Signals and LTI system

Course Name: -ESTIMATING AND COSTING -15EE553-C305

C305.1	Understand and apply the standard rules of electrical design and estimation
C305.2	Design and estimate wiring requirements of domestic and power circuit
C305.3	Design and estimate wiring requirements of service lines
C305.4	Design and estimate wiring requirements of overhead transmission and distribution lines.
C305.5	Design and estimate substation wiring requirements with the aid of single line diagrams.

Course Name: PROGRAMMABLE LOGIC CONTROLLER -15EE562-C306.1

CO's	Description
C306.1.1	Understanding the architecture & operation of PLC.
C306.1.2	Describe the hardware IO devices & understanding the concepts of timers.
C306.1.3	Understanding the concepts of counters & program control instructions.
C306.1.4	Discuss the operation of data manipulation & mathematical instructions
C306.1.5	Understand the concepts of sequence instructions, SCADA and process control networks

Course Name: RENEWABLE ENERGY SOURCE -15EE563- C306.2

CO's	Description
C306.2.1	Explain energy resource, its classification, availability and renewable energy scenario in India and World
C306.2.2	Describe the types and applications of solar thermal systems and solar PV systems
C306.2.3	Discuss generation of energy from hydrogen, wind, geothermal, solid waste, biomass and biogas
C306.2.4	Discuss power generation from tidal, sea wave and ocean thermal energy

Course Name: MICROCONTROLLER LABORATORY-15EEL57-C307

CO's	Description
C307.1	Students will be able to explain the programs in Assembly level language program and C program
C307.2	Students will be able to construct and develop 8051 Assembly language program and interfacing program for the given specification
C307.3	Students will be learning to Generate different waveforms using DAC interface

Course Name: POWER ELECTRONICS LAB -15EEL58-C308

CO's	Description
C308.1	Obtain static characteristics of semiconductor devices to discuss their performance
C308.2	Trigger the SCR by different methods
C308.3	Verify the performance of single phase controlled full wave rectifier and AC voltage controller with R and RL loads
C308.4	Control the speed of a dc motor, universal motor and stepper motors.
C308.5	Verify the performance of single phase full bridge inverter connected to resistive load
C308.6	Perform commutation of SCR by different methods.

Course Name: CONTROL SYSTEMS-15EE61-C309

CO's	Description
C309.1	Understand the basics of control system and concept of transfer function and its application to model linear systems
C309.2	Apply block diagram reduction & Mason's gain formula to obtain transfer function of the systems
C309.3	Understand transient and steady state time response of a simple control system.
C309.4	Analyse the stability of the system by using Routh - Hurwitz criterion, Root locus technique, Bode plots and Nyquist plots.
C309.5	Evaluate the controller or compensator configuration and parameter values for the given design specifications

Course Name: POWER SYSTEM ANALYSIS1-15EE62-C310

CO's	Description
C310.1	Understand the concept of per unit system, one line diagram and it's implementation
C310.2	Perform short circuit analysis on a synchronous machine and simple power system to select the circuit breaker for the system
C310.3	Evaluate symmetrical components of voltage and current in un-balanced three phase circuits and explain the concept of sequence impedance and networks
C310.4	Analyze three phase synchronous machine and simple power systems for different unsymmetrical faults using symmetrical components.
C310.5	Discuss the dynamics of synchronous machine, stability and types of stability and evaluation of stability

Course Name: DIGITAL SIGNAL PROCESSING-15EE63-C311

CO's	Description
C311.1	Evaluate DFT of various signals using properties of DFT.
C311.2	Apply fast and efficient algorithms to evaluate DFT and inverse DFT
C311.3	Design IIR Butterworth & Chebyshev digital filters using impulse invariant and bilinear transformation techniques.

C311.4	Understand and apply windowing & frequency sampling technique to designing FIR filter.
C311.5	Apply different realization technique to realizing a digital IIR and FIR filters.

Course Name: ELECTRICAL MACHINE DESIGN-15EE64-C312

CO's	Description
C312.1	Discuss design factors, limitations, modern trends in design, manufacturing of electrical machines and properties of materials used in the electrical machines.
C312.2	Derive the output equations of transformer, DC machines and AC machine.
C312.3	Discuss the selection of specific loadings and magnetic circuits of different electrical machines.
C312.4	Design stator and rotor circuits of DC and AC machines
C312.5	Estimate the number of cooling tubes, no load current and leakage reactance of core type transformer

Course Name: - Computer Aided Electrical Drawing -15EE651 -C313

CO's	Description
C313.1	Discuss the terminology and types of DC and AC armature windings. Also develop armature winding diagram for DC and AC machines.
C313.2	Develop a layout for substation using the standard symbols for substation equipment.
C313.3	Draw sectional views of core and shell type's transformers using the design data.
C313.4	Draw sectional views of assembled DC machine or its parts using the design data or the sketches.
C313.5	Draw sectional views of assembled alternator or its parts using the design data or the sketches.

Course Name: SENSORS & TRANSDUCERS -15EE662-C314

CO's	Description
C314.1	Understand the working of various types of transducers and sensors.
C314.2	Understand the basics of signal conditioning and its equipments.
C314.3	Understand the Configuration of Data Acquisition System and data conversion.
C314.4	Understand the concept of data transmission & telemetry.
C314.5	Explain measurement of non-electrical quantities -temperature, flow, speed, force, torque, power and Viscosity.

Course Name: CONTROL SYSTEM LABORATORY -15EE67-C315

CO's	Description
C315.1	Use software package or discrete components in assessing the time and frequency domain reposes of a given second order system.
C315.2	Design and analyze 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	Write a script files to plot root locus, bode plot, Nyquist plots to study the stability of the system using a software package.
C315.6	Work with a small team to carryout experiments and prepare reports that present lab work.

Course Name: DIGITAL SIGNAL PROCESSING LABORATORY -15EE68-C316

CO's	Description
C316.1	Understand and interpretation of sampling theorem in time and frequency domains.
C316.2	Evaluate the impulse response of a system
C316.3	Analyse and Provide a solution for a given difference equation.
C316.4	Perform convolution of given sequences to evaluate the response of a system.

C316.5	Analyze and Design various IIR and FIR filters

Course Name: POWER SYSTEM ANALYSIS 2 -15EE71-C401

CO's	Description
C401.1	Formulate network matrices and models for solving load flow problems.
C401.2	Perform steady state power flow analysis of power systems using numerical iterative techniques.
C401.3	Show knowledge of optimal operation of generators on a bus bar, optimal unit commitment, Discuss optimal scheduling for hydro-thermal system, power system security and reliability.
C401.4	Analyse short circuit faults in power system networks using bus impedance matrix.

Course Name: -15EE72- POWER SYSTEM PROTECTION C402

CO's	Description
C402.1	Acquire the knowledge on power system protection and performance of different relays.
C402.2	Discus the working principle of various over current and distance relays
C402.3	Explain pilot protection, Bus Zone Protection, static and rotating machine protection.
C402.4	Understand the operation of fuse and circuit breaker for different types
C402.5	Discuss protection against Over voltages and modern trends in power system

Course Name: HIGH VOLATAGE ENGINEERING-15EE73-C403

CO's	Description
C403.1	Explain conduction and breakdown phenomenon in gases, liquid dielectrics and solid dielectrics.
C403.2	Explain generation and measurement techniques of high voltages and currents.
C403.3	Discuss overvoltage phenomenon and insulation coordination in electric power systems.
C403.4	Discuss non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus.

Course Name: ADVANCED CONTROL SYSTEM -15EE741-C404.1

CO's	Description
C404.1.1	Analyze and design the state model
C404.1.2	Apply matrix algebra to find solution of state equation and test for controllability and observability
C404.1.3	Design pole placement and state observer using state feedback
C404.1.4	Illustrate phase plane methods and liapunov's criterion for non linear system

Course Name: ULITILIZATION OF ELECRICAL POWER -15EE742-C404.2

CO's	Description
C404.2.1	Acquire the knowledge of electric heating, electric welding and its applications, electrolysis laws, electro deposition, extraction and refining of metals.
C404.2.2	Explain the concept of illumination, laws of illumination, electric lamps, design and computation of interior and exterior lighting systems.
C404.2.3	Apply and analyse the systems of electric traction and its control, speed time curves and mechanics of train movement.
C404.2.4	Understand braking of electric motors, traction systems, power supply and its applications.
C404.2.5	Explain the working of electric and hybrid electric vehicles.

Course Name: TESTING AND COMMISSIONING OF POWER SYSTEM -15EE756-C405

CO's	Description
C405.1	Describe the process to plan, control and implement commissioning of electrical equipments
C405.2	Analyze the performance specifications of transformers and induction motor.
C405.3	Demonstrate the routine tests for synchronous machine, induction motor, transformer & switchgears.

C405.4	Apply knowledge for planning, designing & testing of underground cable laying
C405.5	Explain the operation of electrical equipment's such as isolators, circuit breakers.

Course Name: POWER SYSTEM ANALYSIS AND SIMULATION LABORATORY -15EEL76-C406

CO's	Description
C406.1	Learn computer techniques of power system to form and analyse Ybus and Zbus using MATLAB SIMULINK software.
C406.2	Develop programs to determine sending/receiving end voltage/ current , efficiency and regulation of different types of transmission lines.
C406.3	Analyse practically the load flow studies using different methods, to analyse the optimal sharing of load in generators for different load conditions and conduct short circuit studies using MIPOWER software package.

Course Name: RELAY & HIGH VOLTAGE LABORATORY-15EEL77-C407

CO's	Description
C407.1	Experimentally verify the characteristics of over current , over voltage ,under voltage and negative sequence relays both electromagnetic and static type
C407.2	Experimentally verify the characteristic of microprocessor based over current, over voltage, under voltage relays and distance relay.
C407.3	Show knowledge of protecting generator ,motor and feeders
C407.4	Analyze the spark over characteristics for both uniform and non-uniform configurations using AC and DC High 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 Name: PROJECT PHASE-1 & SEMINAR -15EEP78-C408

CO's	Description
C408.1	Demonstrate sound technical knowledge and skills on the selected project topic.
C408.2	Undertake problem identification, formulation and solutions.
C408.3	Communicate with engineers & the community at large in written and oral forms.

Course Name: POWER SYSTEM OPERATION AND CONTROL-15EE81-C409

CO's	Description
C409.1	Explain the operating states of power system, fundamentals of SCADA & understand the unit commitment solutions.
C409.2	Explain the concept of hydrothermal scheduling and detailed concepts of automatic generation.
C409.3	Explain the voltage and reactive power control concepts in an interconnected power system.
C409.4	Explain reliability & contingency analysis, state estimation & related issues.

Course Name: INDUSTRIAL DRIVES AND APPLICATION-15EE82-C410

CO's	Description
C410.1	Learn speed torque characteristics of common drive motor and analyse behaviour of electric motor during starting , running and breaking
C410.2	Select a motor for continuous and intermittent duties
C410.3	Analyse performance of induction motor drives and synchronous motor drives under different condition
C410.4	Control Induction motor, Synchronous and stepper motor drive.
C410.5	Suggest a suitable electric drives for specific application in industry

Course Name: OPERATION AND MAINTENANCE OF SOLAR ELECTRIC SYSTEM-15EE832-C411

CO's	Description
C411.1	Discuss solar resource, sun geometry and types of PV cell technologies
C411.2	Analyse PV arrays as modules and cells, its connectivity, types of inverters, connections and mounting systems.
C411.3	Discuss the site requirements, choosing PV system components for grid connection and calculation for sizing of PV systems.
C411.4	Explain installation, testing, commissioning and operation and maintenance of grid connected solar PV systems.
C411.5	Explain the costing, pay back and financial incentives availability.

Course Name: INTERNSHIP-15EE84-C412

CO's	Description	Cognitive Level
C412.1	Gain practical experience within industry in which the internship is done. and acquire knowledge of the industry in which the internship is done.	L1,L2,L3,L4,L5, L6
C412.2	Apply knowledge and skills learned to classroom work and develop a	L1,L2,L3,L4
C412.3	Experience the activities and functions of professionals and develop refine oral and written communication skills.	L1,L2,L3
C412.4	Identify areas for future knowledge and skill development. Expand intellectual capacity, credibility, judgment, intuition. Acquire the	L1,L2,L3

Course Name: PROJECT WORK PHASE -II-15EEP85-C413

CO's	Description
C413.1	Generate, develop and evaluate ideas and information on selected project topic.
C413.2	Habituated to critical thinking and use problem solving skills.
C413.3	Communicate effectively and present ideas clearly and coherently in both written and oral forms.
C413.4	Learn on their own, work in a team to achieve common goal.

Course Name: SEMINAR-15EES86-C414

CO's	Description
C414.1	Analyze a current topic of professional interest and present it before an audience. Identify an engineering problem
C414.2	Identify an engineering problem

COURSE OUTCOMES

3-sem 2015- scheme-ISE

15MAT31 Engineering Mathematics – III

- Use of periodic signals and Fourier series to analyze circuits
- Explain the general linear system theory for continuous-time signals and systems using the Fourier Transform
- Analyze discrete-time systems using convolution and the z-transform
- Use appropriate numerical methods to solve algebraic and transcendental equations and also to calculate a definite integral
- Use curl and divergence of a vector function in three dimensions, as well as apply the Green's Theorem, Divergence Theorem and Stokes' theorem in various applications
- Solve the simple problem of the calculus of variations

15CS32 Analog and Digital Electronics

- Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
- Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
- Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches, Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
- Design of Counters, Registers and A/D & D/A converters

15CS33 Data Structures and Applications

- Use different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Use stack, Queue, Lists, Trees and Graphs in problem solving.
- Implement all data structures in a high-level language for problem solving.

15CS34 Computer Organization

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
- Design and Analyse simple arithmetic and logical units.

15CS35 Unix and Shell Programming

- Explain UNIX system and use different commands.
- Write Shell scripts for certain functions on different subsystems.
- Demonstrate use of editors and Perl script writing

15CS36 Discrete Mathematical Structures

- Use of propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Application of different mathematical proofs, techniques in proving theorems.
- Compare graphs, trees and their applications.

15CSL37Analog and Digital Electronics Laboratory

- Use various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors, Op amp and Integrated Circuit.
- Design and demonstrate various combinational logic circuits.
- Design and demonstrate various types of counters and Registers using Flip-flops
- Make use of simulation package to design circuits.
- Understand the working and implementation of ALU.

15CSL38 Data Structures Laboratory

- Analyze and Compare various linear and non-linear data structures

- Code, debug and demonstrate the working nature of different types of data structures and their applications
- Implement, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems.

4TH SEM

15MAT41 (ENGINEERING MATHEMATICS-IV)

- Use appropriate numerical methods to solve first and second order ordinary differential equations.
- Use Bessel's and Legendre's function which often arises when a problem possesses axial and spherical symmetry, such as in quantum mechanics, electromagnetic theory, hydrodynamics and heat conduction.
- State and prove Cauchy's theorem and its consequences including Cauchy's integral formula.
- Compute residues and apply the residue theorem to evaluate integrals.
- Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous statistical methods.

15CS42 (SOFTWARE ENGINEERING)

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Use the techniques, skills, and modern engineering tools necessary for engineering practice Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems.

15CS43 (DESIGN AND ANALYSIS OF ALGORITHMS)

- Describe computational solution to well known problems like searching, sorting etc.
- Estimate the computational complexity of different algorithms.
- Devise an algorithm using appropriate design strategies for problem solving.

15CS44 (MICROPROCESSORS AND MICROCONTROLLERS)

- Differentiate between microprocessors and microcontrollers
- Design and develop assembly language code to solve problems

- Give the knowledge for interfacing of various devices to x86 family and ARM processor
- Demonstrate interrupt routines for interfacing devices

15CS45 (OBJECT ORIENTED CONCEPTS)

- Explain the object-oriented concepts and JAVA.
- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using Applets and swings.

15CS46 (DATA COMMUNICATION)

- Illustrate basic computer network technology.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP model.
- Make out the different types of network devices and their functions within a network
- Demonstrate the skills of subnetting and routing mechanisms.

15CSL47 (DESIGN AND ANALYSIS OF ALGORITHM LABORATORY

- Design algorithms using appropriate design techniques (brute-force, greedy,dynamic programming, etc.)
- Implement a variety of algorithms such as sorting, graph related, combinatorial, etc.,in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

15CSL48 (MICROPROCESSOR AND MICROCONTROLLER LABORATORY)

- Learn 80x86 instruction sets and comprehend the knowledge of how assembly language works.
- Design and implement programs using 80x86 assembly language instructions

- Know functioning of hardware devices and interfacing them to x86 family
- Choose processors for various kinds of applications.

5TH SEM

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY(15CS51)

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS (15CS52)

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

DATABASE MANAGEMENT SYSTEM(15CS53)

- Identify, analyze and define database objects; enforce integrity constraints on a database using RDBMS.
- Use Structured Query Language (SQL) for database manipulation.
- Design simple database systems
- Design code for some application to interact with databases.

AUTOMATA THEORY AND COMPUTABILITY(15CS54)

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

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OBJECT ORIENTED MODELLING AND DESIGN (15CS551)

- Describe the concepts of object-oriented and basic class modelling.
- Draw class diagrams, sequence diagrams and interaction diagrams to solve problems.
- Choose and apply a befitting design pattern for the given problem.

SOCIAL NETWORK ANALYSIS (15IS552)

- Define notation and terminology used in network science.
- Demonstrate, summarize and compare networks.
- Explain basic principles behind network analysis algorithms.
- Analyzing real world network.

ADVANCED JAVA AND J2EE (15CS553)

- Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

PROGRAMMING LANGUAGES(15IS554)

- Select appropriate languages for given applications
- Demonstrate usage and justification of different languages
- Compare and contrast the strengths and weaknesses of different languages

COMPUTER NETWORK LABORATORY (15CSL57)

- Analyze and Compare various networking protocols.
- Demonstrate the working of different concepts of networking.
- Implement, analyze and evaluate networking protocols in NS2 / NS3

DBMS LABORATORY WITH MINI PROJECT (15CSL58)

- Create, Update and query on database.
- Demonstrate the working of different concepts of DBMS
- Implement and test the project developed for an application.

6TH SEM

15CS61 CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW

- Discuss cryptography and its need to various applications
- Design and develop simple cryptography algorithms
- Understand cyber security and need cyber Law

15IS62 FILE STRUCTURES

- Choose appropriate file structure for storage representation.
- Identify a suitable sorting technique to arrange the data.
- Select suitable indexing and hashing techniques for better performance to a given problem.

15IS63 SOFTWARE TESTING

- Drive test cases for any given problem
- Compare the different testing techniques
- Classify the problem into suitable testing model
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact.

15CS64 OPERATING SYSTEMS

- Demonstrate need for OS and different types of OS
- Apply suitable techniques for management of different resources
- Use processor, memory, storage and file system commands
- Realize the different concepts of OS in platform of usage through case studies

15CS651 DATA MINING AND DATA WAREHOUSING

- Identify data mining problems and implement the data warehouse
- Write association rules for a given data pattern.
- Choose between classification and clustering solution.

15IS652 SYSTEM SOFTWARE

- Explain system software such as assemblers, loaders, linkers and macroprocessors
- Design and develop lexical analyzers, parsers and code generators
- Utilize lex and yacc tools for implementing different concepts of system software

15CS653 OPERATIONS RESEARCH

- Select and apply optimization techniques for various problems.
- Model the given problem as transportation and assignment problem and solve.
- Apply game theory for decision support system.

15CS654 DISTRIBUTED COMPUTING SYSTEM

- Explain the characteristics of a distributed system along with its and design challenges
- Illustrate the mechanism of IPC between distributed objects
- Describe the distributed file service architecture and the important characteristics of SUN NFS.
- Discuss concurrency control algorithms applied in distributed transactions

15ISL67 SOFTWARE TESTING LABORATORY

- List out the requirements for the given problem
- Design and implement the solution for given problem in any programming language(C, C++, JAVA)
- Derive test cases for any given problem
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact.

15ISL68 FILE STRUCTURES LABORATORY WITH MINI PROJECT

- Implement operations related to files
- Apply the concepts of file system to produce the given application.
- Evaluate performance of various file systems on given parameters.

7TH SEM

15CS71 WEB TECHNOLOGY AND ITS APPLICATIONS

- Adapt HTML and CSS syntax and semantics to build web pages.
- Construct and visually format tables and forms using HTML using CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- Appraise the principles of object oriented development using PHP

- Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

15IS72 SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

- Design and implement codes with higher performance and lower complexity
- Be aware of code qualities needed to keep code flexible
- Experience core design principles and understand the importance to assess the quality of a design with respect to these principles.
- Capable of applying these principles in the design of object oriented systems.
- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Recall the suitable select and apply patterns in specific contexts

15CS73 MACHINE LEARNING

- Identify the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
- Explain theory of probability and statistics related to machine learning

Investigate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

15CS741 NATURAL LANGUAGE PROCESSING

- Analyze the natural language text.
- Generate the natural language.
- Do Text mining.
- Apply information retrieval techniques

15CS742 CLOUD COMPUTING AND ITS APPLICATIONS

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

15CS744 UNIX SYSTEM PROGRAMMING

- Ability to understand and reason out the working of Unix Systems
- Build an application/service over a Unix system

15CS751 SOFT AND EVOLUTIONARY COMPUTING

- Understand soft computing techniques
- Apply the learned techniques to solve realistic problems
- Differentiate soft computing with hard computing techniques

15CS752 COMPUTER VISION AND ROBOTICS

- Implement fundamental image processing techniques required for computer vision
- Perform shape analysis
- Implement boundary tracking techniques
- Apply chain codes and other region descriptors
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques.
- Implement motion related techniques.
- Develop applications using computer vision techniques

15IS753 INFORMATION MANAGEMENT SYSTEM

- Describe the role of information technology and information systems in business
- Record the current issues of information technology and relate those issues to the firm
- Interpret how to use information technology to solve business problems

15CS754 STORAGE AREA NETWORKS

- Identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Explain components and the implementation of NAS
- Describe CAS architecture and types of archives and forms of virtualization
- Illustrate the storage infrastructure and management activities

15CSL76 MACHINE LEARNING LABORATORY

- Understand the implementation procedures for the machine learning algorithms.
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms.
- Identify and apply Machine Learning algorithms to solve real world problems.

17CSL77 WEB TECHNOLOGY LABORATORY WITH MINI PROJECT

- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Understand the concepts of Web Application Terminologies, Internet Tools other web services.

8TH SEM

17CS81 INTERNET OF THINGS TECHNOLOGY

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry

17CS82 BIG DATA ANALYTICS

- Explain the concepts of HDFS and MapReduce framework

- Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
- Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
- Infer the importance of core data mining techniques for data analytics
- Compare and contrast different Text Mining Techniques

17IS831 HIGH PERFORMANCE COMPUTING

- Illustrate the key factors affecting performance of CSE applications
- Illusrate mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

17IS832 USER INTERFACE DESIGN

- Course outcomes: The Students should be able to:
- Design the User Interface, design, menu creation ,windows creation and connection between menus and windows

17CS834 SYSTEM MODELLING AND SIMULATION

- Explain the system concept and apply functional modeling method to model the activities of a static system
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Illustrate the operation of a dynamic system and make improvement according to the simulation results.

17IS84 INTERNSHIP / PROFESSIONAL PRACTISE

- Adapt easily to the industry environment
- Take part in team work
- Make use of modern tools
- Decide upon project planning and financing.
- Adapt ethical values.
- Motivate for lifelong learning

17ISP85 PROJECT WORK PHASE II

- Identify a issue and derive problem related to society, environment, economics, energy and technology
- Formulate and Analyze the problem and determine the scope of the solution chosen
- Determine , dissect, and estimate the parameters, required in the solution.
- Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
- Compile the report and take part in present / publishing the finding in a reputed conference / publications
- Attempt to obtain ownership of the solution / product developed

17ISS86 SEMINAR

- Survey the changes in the technologies relevant to the topic selected
- Discuss the technology and interpret the impact on the society, environment and domain.
- Compile report of the study and present to the audience, following the ethics

COURSE OUTCOMES

3-sem 2017- scheme-ISE

17MAT31 Engineering Mathematics – III

- Know the use of periodic signals and Fourier series to analyze circuits and system communications.
- Explain the general linear system theory for continuous-time signals and digital signal processing using
- the Fourier Transform and z-transform.
- Employ appropriate numerical methods to solve algebraic and transcendental equations.
- Apply Green's Theorem, Divergence Theorem and Stokes' theorem in various applications in the field of electro-magnetic and gravitational fields and fluid flow problems.
- Determine the extremals of functionals and solve the simple problems of the calculus

  Of variations.

17CS32 Analog and Digital Electronics

- Explain the operation of JFETs and MOSFETs , Operational Amplifier circuits and their application
- Explain Combinational Logic, Simplification Techniques using Karnaugh Maps, Quine McClusky technique.
- Demonstrate Operation of Decoders, Encoders, Multiplexers, Adders and Subtractors, working of Latches,
- Flip-Flops, Designing Registers, Counters, A/D and D/A Converters
- Design of Counters, Registers and A/D & D/A converters

17CS33 Data Structures and Applications

- Explain different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Make use of stack, Queue, Lists, Trees and Graphs in problem solving.
- Develop all data structures in a high-level language for problem solving.

17CS34 Computer Organization

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output, and memory.
- Illustrate hardwired control and micro programmed control. pipelining, embedded and other computing systems.
- Build simple arithmetic and logical units.

17CS35 Unix and Shell Programming

- Explain UNIX system and use different commands.
- Compile Shell scripts for certain functions on different subsystems.
- Demonstrate use of editors and Perl script writing

17CS36 Discrete Mathematical Structures

- Make use of propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Apply different mathematical proofs, techniques in proving theorems.
- Compare graphs, trees and their applications.

17CSL37Analog and Digital Electronics Laboratory

- Demonstrate various Electronic Devices like Cathode ray Oscilloscope, Signal generators, Digital Trainer Kit, Multimeters and components like Resistors, Capacitors,
- Op amp and Integrated Circuit.
- Design and demonstrate various combinational logic circuits.
- Design and demonstrate various types of counters and Registers using Flip-flops
- Make use of simulation package to design circuits.
- Infer the working and implementation of ALU.

17CSL38 Data Structures Laboratory

- Analyze and Compare various linear and non-linear data structures
- Demonstrate the working nature of different types of data structures and their applications
- Develop, analyze and evaluate the searching and sorting algorithms
- Choose the appropriate data structure for solving real world problems· Analyze and Compare various linear and non-linear data structures
- 17KL/CPH39/49 Kannada
- The course will enable the students to understand Kannada and communicate in Kannada language.

4TH SEM

17MAT41 (ENGINEERING MATHEMATICS-IV)

- Solve first and second order ordinary differential equation arising in flow problems using single step and multistep numerical methods.
- Illustrate problems of potential theory, quantum mechanics and heat conduction by employing notions and properties of Bessel's functions and Legendre's polynomials.
- Explain the concepts of analytic functions, residues, poles of complex potentials and describe conformal and Bilinear transformation arising in field theory and signal processing.
- Develop probability distribution of discrete, continuous random variables and joint probability distribution occurring in digital signal processing, information theory and design engineering.
- Demonstrate testing of hypothesis of sampling distributions and illustrate examples of Markov chains related to discrete parameter stochastic process.

17CS42 (OBJECT ORIENTED CONCEPTS)

- Explain the object-oriented concepts and JAVA.
- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to comprehend the event-based GUI handling principles using Applets and swings.

17CS43 (DESIGN AND ANALYSIS OF ALGORITHMS)

- Describe computational solution to well known problems like searching, sorting etc.
- Estimate the computational complexity of different algorithms.
- Develop an algorithm using appropriate design strategies for problem solving.

17CS44 (MICROPROCESSORS AND MICROCONTROLLERS

- Differentiate between microprocessors and microcontrollers
- Develop assembly language code to solve problems
- Explain interfacing of various devices to x86 family and ARM processor
- Demonstrate interrupt routines for interfacing devices

17CS45 (SOFTWARE ENGINEERING)

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Make use of techniques, skills, and modern engineering tools necessary for engineering practice
- Comprehend software systems or parts of software systems.

17CS46 (DATA COMMUNICATION)

- Illustrate basic computer network technology.
- Identify the different types of network topologies and protocols.
- List and explain the layers of the OSI model and TCP/IP model.
- Comprehend the different types of network devices and their functions within a network
- Demonstrate subnetting and routing mechanisms.

17CSL47 (DESIGN AND ANALYSIS OF ALGORITHM LABORATORY

- Design algorithms using appropriate design techniques (brute-force, greedy,dynamic programming, etc.)
- Develop variety of algorithms such as sorting, graph related, combinatorial, etc.,in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

17CSL48 (MICROPROCESSOR AND MICROCONTROLLER LABORATORY)

- Summarize 80x86 instruction sets and comprehend the knowledge of how assembly language works.
- Design and develop assembly programs using 80x86 assembly language instructions
- Infer functioning of hardware devices and interfacing them to x86 family
- Choose processors for various kinds of applications.

5TH SEM

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY(17CS51)

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their
  importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS (17CS52)

- Explain principles of application layer protocols
- Outline transport layer services and infer UDP and TCP protocols
- Classify routers, IP and Routing Algorithms in network layer
- Explain the Wireless and Mobile Networks covering IEEE 802.11 Standard
- Define Multimedia Networking and Network Management

DATABASE MANAGEMENT SYSTEM(17CS53)

- Summarize the concepts of database objects; enforce integrity constraints on a database using RDBMS.
- Use Structured Query Language (SQL) for database manipulation.
- Design simple database systems
- Design code for some application to interact with databases.

AUTOMATA THEORY AND COMPUTABILITY(17CS54)

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

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ADVANCED JAVA AND J2EE (17CS553)

- Interpret the need for advanced Java concepts like enumerations and collections in
- Developing modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

ARTIFICIAL INTELLIGENCE (17CS562)

- Identify the AI based problems
- Apply techniques to solve the AI problems
- Define learning and explain various learning techniques
- Discuss expert systems

COMPUTER NETWORK LABORATORY (17CSL57)

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

DBMS LABORATORY WITH MINI PROJECT (17CSL58)

- Use Structured Query Language (SQL) for database Creation and manipulation.
- Demonstrate the working of different concepts of DBMS
- Implement and test the project developed for an application.

6TH SEM

17CS61 CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW

- Discuss cryptography and its need to various applications
- Design and develop simple cryptography algorithms
- Understand cyber security and need cyber Law

17IS62 FILE STRUCTURES

- Discuss appropriate file structure for storage representation.
- Illustrate a suitable sorting technique to arrange the data.
- Explain indexing and hashing techniques for better performance to a given problem.

17IS63 SOFTWARE TESTING

- Discuss test cases for any given problem
- Compare the different testing techniques
- Illustrate the problem into suitable testing model
- Understand the appropriate technique for the design of flow graph.
- Design and Develop appropriate document for the software artefact.

17CS64 OPERATING SYSTEMS

- Demonstrate need for OS and different types of OS
- Discuss suitable techniques for management of different resources
- Illustrate processor, memory, storage and file system commands
- Explain the different concepts of OS in platform of usage through case studies

17CS661 MOBILE APPLICATION DEVELOPMENT

- Design and Develop Android application by setting up Android development environment

- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Explain long running tasks and background work in Android applications
- Demonstrate methods in storing, sharing and retrieving data in Android applications
- Discuss performance of android applications and understand the role of permissions and security
- Describe the steps involved in publishing Android application to share with the world

17CS664 PYTHON APPLICATION PROGRAMMING

- Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

17ISL67 SOFTWARE TESTING LABORATORY

- Understand requirements for the given problem
- Design and implement the solution for given problem in any programming language(C, C++, JAVA)
- Discuss test cases for any given problem
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact.

17ISL68 FILE STRUCTURES LABORATORY WITH MINI PROJECT

- Implement operations related to files
- Apply the concepts of file system to produce the given application.
- Evaluate performance of various file systems on given parameters.

7TH SEM

17CS71 WEB TECHNOLOGY AND ITS APPLICATIONS

- Define HTML and CSS syntax and semantics to build web pages.
- Understand the concepts of Construct , visually format tables and forms using HTML using CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- List the principles of object oriented development using PHP
- Illustrate JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

17IS72 SOFTWARE ARCHITECTURE AND DESIGN PATTERNS

- Design and implement codes with higher performance and lower complexity
- Illustrate the code qualities needed to keep code flexible
- Define core design principles and understand the importance to assess the quality of a design with respect to these principles.
- List the capabilities of applying these principles in the design of object oriented systems.
- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Recall the suitable select and apply patterns in specific contexts

17CS73 MACHINE LEARNING

- Recall the problems for machine learning. And select the either supervised, unsupersvised or reinforcement learning.
- Understand theory of probability and statistics related to machine learning
- Illustrate concept learning, ANN, Bayes classifier, k nearest neighbor, Q,

17IS743 INFORMATION AND NETWORK SECURITY

- Analyze the Digitals security lapses
- Illustrate the need of key management

17IS753 INFORMATION MANAGEMENT SYSTEM

- Understand the role of information technology and information systems in business
- Illustrate the current issues of information technology and relate those issues to the firm
- Interpret how to use information technology to solve business problems

17CSL76 MACHINE LEARNING LABORATORY

- Understand the implementation procedures for the machine learning algorithms.
- Design Java/Python programs for various Learning algorithms.
- Apply appropriate data sets to the Machine Learning algorithms.
- Identify and apply Machine Learning algorithms to solve real world problems.

17CSL77 WEB TECHNOLOGY LABORATORY WITH MINI PROJECT

- Design and develop dynamic web pages with good aesthetic sense of designing and latest technical know-how's.
- Understand the concepts of Web Application Terminologies, Internet Tools other web services.

8TH SEM

17CS81 INTERNET OF THINGS TECHNOLOGY

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry

17CS82 BIG DATA ANALYTICS

- Explain the concepts of HDFS and MapReduce framework
- Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration
- Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making
- Infer the importance of core data mining techniques for data analytics
- Compare and contrast different Text Mining Techniques

17IS831 HIGH PERFORMANCE COMPUTING

- Illustrate the key factors affecting performance of CSE applications
- Illusrate mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

17IS832 USER INTERFACE DESIGN

- Course outcomes: The Students should be able to:
- Design the User Interface, design, menu creation ,windows creation and connection between menus and windows

17CS834 SYSTEM MODELLING AND SIMULATION

- Explain the system concept and apply functional modeling method to model the activities of a static system
- Describe the behavior of a dynamic system and create an analogous model for a dynamic system;
- Illustrate the operation of a dynamic system and make improvement according to the simulation results.

17IS84 INTERNSHIP / PROFESSIONAL PRACTISE

- Adapt easily to the industry environment
- Take part in team work
- Make use of modern tools
- Decide upon project planning and financing.
- Adapt ethical values.
- Motivate for lifelong learning

17ISP85 PROJECT WORK PHASE II

- Identify a issue and derive problem related to society, environment, economics, energy and technology
- Formulate and Analyze the problem and determine the scope of the solution chosen
- Determine , dissect, and estimate the parameters, required in the solution.
- Evaluate the solution by considering the standard data / Objective function and by using appropriate performance metrics.
- Compile the report and take part in present / publishing the finding in a reputed conference / publications
- Attempt to obtain ownership of the solution / product developed

17ISS86 SEMINAR

- Survey the changes in the technologies relevant to the topic selected
- Discuss the technology and interpret the impact on the society, environment and domain.
- Compile report of the study and present to the audience, following the ethics

COURSE OUTCOME

3rd Sem 2018- Scheme-ISE

Transform Calculus, Fourier Series and Numerical Techniques (18MAT31)

Course outcomes:

At the end of the course the student will be able to:

- CO1: Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
- CO2: Demonstrate Fourier series to study the behaviour of periodic functions and their applications in system communications, digital signal processing and field theory.
- CO3: Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
- CO4: Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
- CO5: Determine the externals of functionals using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis.

Data Structures and Applications (18CS32)

Course outcomes:

- Use different types of data structures, operations and algorithms
- Apply searching and sorting operations on files
- Use stack, Queue, Lists, Trees and Graphs in problem solving
- Implement all data structures in a high-level language for problem solving.

Analog and Digital Electronics (18CS33)

Course outcomes:

- Design and analyze application of analog circuits using photo devices, timer IC, power supply and regulator IC and op-amp.
- Explain the basic principles of A/D and D/A conversion circuits and develop the same.
- Simplify digital circuits using Karnaugh Map , and Quine-McClusky Methods
- Explain Gates and flip flops and make us in designing different data processing circuits, registers and counters and compare the types.
- Develop simple HDL programs

Computer Organization (18CS34)

Course outcomes:

- Explain the basic organization of a computer system.
- Demonstrate functioning of different sub systems, such as processor, Input/output,and memory.
- Illustrate hardwired control and micro programmed control, pipelining, embedded and other computing systems.
- Design and analyse simple arithmetic and logical units.

Software Engineering (18CS35)

Course outcomes:

- Design a software system, component, or process to meet desired needs within realistic constraints.
- Assess professional and ethical responsibility
- Function on multi-disciplinary teams
- Use the techniques, skills, and modern engineering tools necessary for engineering practice
- Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems

Discrete Mathematical Structures (18CS36)

Course outcomes:

- Use propositional and predicate logic in knowledge representation and truth verification.
- Demonstrate the application of discrete structures in different fields of computer science.
- Solve problems using recurrence relations and generating functions.
- Application of different mathematical proofs techniques in proving theorems in the courses.
- Compare graphs, trees and their applications.

Analog and Digital Electronics Laboratory (18CSL37)

Course outcomes:

This laboratory course enable students to get practical experience in design, assembly and evaluation/testing of

- Analog components and circuits including Operational Amplifier, Timer, etc.
- Combinational logic circuits.
- Flip - Flops and their operations
- Counters and registers using flip-flops.
- Synchronous and Asynchronous sequential circuits.
- A/D and D/A converters

Data Structures Laboratory (18CSL38)

Course outcomes:

This laboratory course enable students to get practical experience in design, develop, implement, analyze and evaluation/testing of

- Asymptotic performance of algorithms.
- Linear data structures and their applications such as stacks, queues and lists
- Non-Linear data structures and their applications such as trees and graphs
- Sorting and searching algorithms

Vyavaharika Kannada (Kannada for communication) (18KVK39)

Course outcomes:

- The course will enable the students to understand Kannada and communicate in Kannada language.

Aadalitha Kannada (Kannada for Administration) (18KAK39)

Course outcomes:

- The course will enable the students to understand Kannada and communicate in Kannada language

Constitution of India, Professional Ethics and Cyber Law (18CPC39)

Course outcomes:

Course Learning Objectives:

- know the fundamental political codes, structure, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens
- Understand engineering ethics and their responsibilities; identify their individual roles and ethical responsibilities towards society.
- Know about the cybercrimes and cyber laws for cyber safety measures.

4TH SEMESTER

COMPLEX ANALYSIS, PROBABLITY AND STATISTICAL METHODS (18MAT41)

Course Outcomes:

At the end of the course the student will be able to:

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

DESIGN AND ANALYSIS OF ALGORITHMS (18CS42)

Course Outcomes:

The student will be able to :

- Describe computational solution to well known problems like searching, sorting etc.
- Estimate the computational complexity of different algorithms.
- Devise an algorithm using appropriate design strategies for problem solving.

OPERATING SYSTEMS (18CS43)

Course Outcomes:

The student will be able to :

- Demonstrate need for OS and different types of OS
- Apply suitable techniques for management of different resources
- Use processor, memory, storage and file system commands
- Realize the different concepts of OS in platform of usage through case studies

MICROCONTROLLER AND EMBEDDED SYSTEMS (18CS44)

Course Outcomes:

The student will be able to :

- Describe the architectural features and instructions of ARM microcontroller
- Apply the knowledge gained for Programming ARM for different applications.
- Interface external devices and I/O with ARM microcontroller.
- Interpret the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
- Develop the hardware /software co-design and firmware design approaches.
- Demonstrate the need of real time operating system for embedded system applications

OBJECT ORIENTED CONCEPTS (18CS45)

Course Outcomes:

The student will be able to :

- Explain the object-oriented concepts and JAVA.
- Develop computer programs to solve real world problems in Java.
- Develop simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles using swings.

DATA COMMUNICATION (18CS46)

Course Outcomes:

The student will be able to :

- Explain the various components of data communication.
- Explain the fundamentals of digital communication and switching.
- Compare and contrast data link layer protocols.
- Summarize IEEE 802.xx standards

DESIGN AND ANALYSIS OF ALGORITHMS LABORATORY (18CSL47)

Laboratory Outcomes:

The student should be able to:

- Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
- Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply

MICROCONTROLLER AND EMBEDDED SYSTEMS LABORATORY (18CSL48)

Laboratory Outcomes:

The student should be able to:

- Develop and test program using ARM7TDMI/LPC2148
- Conduct the following experiments on an ARM7TDMI/LPC2148 evaluation board using evaluation version of Embedded 'C' & Keil Uvision-4 tool/compiler

5TH SEMESTER

MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY (18CS51)

Course outcomes:

The students should be able to:

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their
  importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

COMPUTER NETWORKS AND SECURITY (18CS52)

Course Outcomes:

The student will be able to :

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

DATABASE MANAGEMENT SYSTEM (18CS53)

Course Outcomes:

The student will be able to :

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

AUTOMATA THEORY AND COMPUTABILITY (18CS54)

Course Outcomes:

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

APPLICATION DEVELOPMENT USING PYTHON (18CS55)

Course Outcomes:

After studying this course, students will be able to :

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

UNIX PROGRAMMING (18CS56)

Course Outcomes:

The student will be able to :

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

COMPUTER NETWORK LABORATORY (18CSL57)

Laboratory Outcomes:

The student should be able to:

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

DBMS LABORATORY WITH MINI PROJECT (18CSL58)

Laboratory Outcomes:

The student should be able to:

- Create, Update and query on the database.
- Demonstrate the working of different concepts of DBMS
- Implement, analyze and evaluate the project developed for an application

ENVIRONMENTAL STUDIES (18CIV59)

Course Outcomes:

At the end of the course, students will be able to:

- 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 issue

6TH SEMESTER

FILE STRUCTURES (18IS61)

Course Outcomes:

The student will be able to :

- Choose appropriate file structure for storage representation.
- Identify a suitable sorting technique to arrange the data
- .Select suitable indexing and hashing techniques for better performance to a given problem

SOFTWARE TESTING (18IS62)

Course Outcomes:

The student will be able to :

- Derive test cases for any given problem
- Compare the different testing techniques
- Classify the problem into suitable testing model
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact.

WEB TECHNOLOGY AND ITS APPLICATIONS (18CS63)

Course Outcomes:

The student will be able to :

- Adapt HTML and CSS syntax and semantics to build web pages.
- Construct and visually format tables and forms using HTML and CSS
- Develop Client-Side Scripts using JavaScript and Server-Side Scripts using PHP to generate and display the contents dynamically.
- Appraise the principles of object oriented development using PHP

- Inspect JavaScript frameworks like jQuery and Backbone which facilitates developer to focus on core features.

CLOUD COMPUTING AND ITS APPLICATIONS (18CS643)

Course Outcomes:

The student will be able to :

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

DATA MINING AND DATA WAREHOUSING(18CS641)

Course Outcomes:

The student will be able to :

- Identify data mining problems and implement the data warehouse
- Write association rules for a given data pattern
- Choose between classification and clustering solution

OBJECT ORIENTED MODELING AND DESIGN (18CS642)

Course Outcomes:

The student will be able to :

- Describe the concepts of object-oriented and basic class modelling.
- Draw class diagrams, sequence diagrams and interaction diagrams to solve problems
- Choose and apply a befitting design pattern for the given problem

ADVANCED JAVA AND J2EE(18CS644)

Course Outcomes:

The student will be able to :

- Interpret the need for advanced Java concepts like enumerations and collections in developing• modular and efficient programs
- Build client-server applications and TCP/IP socket programs
- Illustrate database access and details for managing information using the JDBC API
- Describe how servlets fit into Java-based web application architecture
- Develop reusable software components using Java Beans

INFORMATION MANAGEMENT SYSTEM(18IS645)

Course Outcomes:

The student will be able to :

- Describe the role of information technology and information systems in business
- Record the current issues of information technology and relate those issues to the firm Interpret how to use information technology to solve business problems

MOBILE APPLICATION DEVELOPMENT(18CS651)

Course outcomes:

The students should be able to:

- Create, test and debug Android application by setting up Android development environment
- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications
- Demonstrate methods in storing, sharing and retrieving data in Android applications
- Analyze performance of android applications and understand the role of permissions and security
- Describe the steps involved in publishing Android application to share with the world

INTRODUCTION TO DATA SRUCTURES AND ALGORITHM (18CS652)

Course Outcomes:

The student will be able to :

- Identify different data structures in C programming language
- Appraise the use of data structures in problem solving
- Implement data structures using C programming language

PROGRAMMING IN JAVA (OPEN ELECTIVE) (18CS653)

Course outcomes:

The students should be able to:

- Explain the object-oriented concepts and JAVA

.• Develop computer programs to solve real world problems in Java.

• Develop simple GUI interfaces for a computer program to interact with users

INTRODUCTION TO OPERATING SYSTEM (OPEN ELECTIVE) (18CS654)

Course outcomes:

The students should be able to:

- Explain the fundamentals of operating system

- Comprehend process management, memory management and storage management.
- Familiar with various types of operating systems

SOFTWARE TESTING LABORATORY(18ISL66)

Laboratory Outcomes:

The student should be able to:

- List out the requirements for the given problem
- Design and implement the solution for given problem in any programming

- language(C,C++,JAVA) Derive test cases for any given problem
- Apply the appropriate technique for the design of flow graph.
- Create appropriate document for the software artefact

FILE STRUCTURES LABORATORY WITH MINI PROJECT(18ISL67)

Laboratory Outcomes:

The student should be able to:

- Implement operations related to files
- Apply the concepts of file system to produce the given application.
- Evaluate performance of various file systems on given parameters

MOBILE APPLICATION DEVELOPMENT(18CSMP68)

Laboratory Outcomes:

After studying these laboratory programs, students will be able to ;

- Create, test and debug Android application by setting up Android development environment.
- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications.
- Demonstrate methods in storing, sharing and retrieving data in Android applications

Infer the role of permissions and security for Android applications.•

7TH SEMESTER

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (18CS71)

Course outcomes:

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

BIG DATA AND ANALYTICS (18CS72)

Course outcomes:

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

SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (18CS731)

Course outcomes:

- Design and implement codes with higher performance and lower complexity
- Be aware of code qualities needed to keep code flexible
- Experience core design principles and be able to assess the quality of a design with respect to these principles.
- Capable of applying these principles in the design of object oriented systems.

- Demonstrate an understanding of a range of design patterns. Be capable of comprehending a design presented using this vocabulary.
- Be able to select and apply suitable patterns in specific contexts

HIGH PERFORMANCE COMPUTING (18CS732)

Course outcomes:

- Illustrate the key factors affecting performance of CSE applications
- Illusrate mapping of applications to high-performance computing systems
- Apply hardware/software co-design for achieving performance on real-world applications

ADVANCED COMPUTER ARCHITECTURES (18CS733)

Course outcomes:

- Explain the concepts of parallel computing and hardware technologies
- Compare and contrast the parallel architectures
- Illustrate parallel programming concepts

USER INTERFACE DESIGN (18CS734)

Course outcomes:

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

DIGITAL IMAGE PROCESSING (18CS741)

Course outcomes:

- Explain fundamentals of image processing
- Compare transformation algorithms
- Contrast enhancement, segmentation and compression techniques

NETWORK MANAGEMENT (18CS742)

Course outcomes:

- Analyze the issues and challenges pertaining to management of emerging network technologies such as wired/wireless networks and high-speed internets.
- Apply network management standards to manage practical networks
- Formulate possible approaches for managing OSI network model.
- Use on SNMP for managing the network
- Use RMON for monitoring the behavior of the network
- Identify the various components of network and formulate the scheme for the managing them

NATURAL LANGUAGE PROCESSING (18CS743)

Course outcomes:

- Analyze the natural language text.
- Define the importance of natural language.
- Understand the concepts Text mining.
- Illustrate information retrieval techniques.

CRYPTOGRAPHY (18CS744)

Course outcomes:

- Define cryptography and its principles
- Explain Cryptography algorithms
- Illustrate Public and Private key cryptography
- Explain Key management, distribution and ceritification
- Explain authentication protocols
- Tell about IPSec

ROBOTIC PROCESS AUTOMATION DESIGN & DEVELOPMENT (18CS745)

Course outcomes:

- To understand Basic Programming concepts and the underlying logic/structure
- To Describe RPA , where it can be applied and how its implemented
- To Describe the different types of variables, Control Flow and data manipulation techniques
- To Understand Image, Text and Data Tables Automation
- To Describe automation to Email and various types of Exceptions and strategies to handle

INTRODUCTION TO BIG DATA ANALYTICS (18CS751)

Course outcomes:

- Explain the importance of data and data analysis
- Interpret the probabilistic models for data
- Define hypothesis, uncertainty principle
- Evaluate regression analysis

PYTHON APPLICATION PROGRAMMING(18CS752)

Course outcomes:

Course Outcomes:After studying this course, students will be able to

- Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
- Demonstrate proficiency in handling Strings and File Systems.
- Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Implement exemplary applications related to Network Programming, Web Services and Databases in Python

INTRODUCTION TO ARTIFICIAL INTELLIGENCE (18CS753)

Course outcomes:

- Identify the AI based problems
- Apply techniques to solve the AI problems
- Define learning and explain various learning techniques
- Discuss on expert systems

INTRODUCTION TO DOT NET FRAMEWORK FOR APPLICATION DEVELOPMENT (18CS754)

Course outcomes:

- Build applications on Visual Studio .NET platform by understanding the syntax and semantics of C#
- Demonstrate Object Oriented Programming concepts in C# programming language
- Design custom interfaces for applications and leverage the available built-in interfaces in building complex applications.
- Illustrate the use of generics and collections in C#
- Compose queries to query in-memory data and define own operator behaviour

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LABORATORY (18CSL76)

Laboratory Outcomes:

- Implement and demonstrate AI and ML algorithms.
- Evaluate different algorithms

8TH SEMESTER

INTERNET OF THINGS(18CS81)

Course Outcomes:

The student will be able to :

- Interpret the impact and challenges posed by IoT networks leading to new architectural models.
- Compare and contrast the deployment of smart objects and the technologies to connect them to network.
- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

MOBILE COMPUTING(18CS821)

Course Outcomes:

The student will be able to :

- Explain state of art techniques in wireless communication.
- Discover CDMA, GSM. Mobile IP, WImax
- Demonstrate program for CLDC, MIDP let model and security concerns

NOSQL DATABASE(18CS823)

Course Outcomes:

The student will be able to :

- Define, compare and use the four types of NoSQL Databases (Document-oriented, KeyValue Pairs, Column-oriented and Graph).
- Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases.
- Explain the detailed architecture, define objects, load data, query data and performance tunevDocument-oriented NoSQL databases.

MULTICORE ARCHITECTURE AND PROGRAMMING(18CS824)

Course Outcomes:

The student will be able to :

- Identify the limitations of ILP and the need for multicore architectures
- Define fundamental concepts of parallel programming and its design issues
- Solve the issues related to multiprocessing and suggest solutions
- Make out the salient features of different multicore architectures and how they exploit parallelism
- Demonstrate the role of OpenMP and programming concept

STORAGE AREA NETWORKS(18CS822)

Course Outcomes:

The student will be able to :

- Identify key challenges in managing information and analyze different storage networking technologies and virtualization
- Explain components and the implementation of NAS
- Describe CAS architecture and types of archives and forms of virtualization
- Illustrate the storage infrastructure and management activities

VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY, MYSURU – 570028

DEPARTMENT OF MECHANICAL ENGINEERING
III Semester

Scheme of Study:	17		
Course Name :	Material Science	**Semester:**	3rd
Course Code:	17ME32	**Year of Study:**	2nd
Course Outcomes:			
C202.1	Describe the mechanical properties of metals, their alloys and various modes of failure.		
C202.2	Understand the microstructures of ferrous and non-ferrous materials to mechanical properties.		
C202.3	Explain the processes of heat treatment of various alloys.		
C202.4	Understand the properties and potentialities of various materials available and material selection procedures.		
C202.5	Know about composite materials and their processing as well as applications.		

Scheme of Study:	17		
Course Name :	Basic Thermodynamics	**Semester:**	3rd
Course Code:	17ME33	**Year of Study:**	2nd
Course Outcomes:			
C203.1	Explain thermodynamic systems, properties, Zeroth law of thermodynamics, temperature scales and energy interactions.		
C203.2	Determine heat, work, internal energy, enthalpy for flow & non flow process using First and Second Law of Thermodynamics.		
C203.3	Interpret behavior of pure substances and its applications to practical problems.		
C203.4	Determine change in internal energy, change in enthalpy and change in entropy using TD relations for ideal gases.		
C203.5	Calculate Thermodynamics properties of real gases at all ranges of pressure, temperatures using modified equation of state including Vander Waals equation, Redlich Wong equation and Beattie-		

Scheme of Study:	17		
Course Name :	Mechanics of Materials	**Semester:**	3rd
Course Code:	17ME34	**Year of Study:**	2nd
Course Outcomes:			
C204.1	Understand simple, compound, thermal stresses and strains their relations, Poisson's ratio, Hooke's law, mechanical properties including elastic constants and their relations.		
C204.2	Determine stresses, strains and deformations in bars with varying circular and rectangular cross-sections subjected to normal and temperature loads		
C204.3	Determine plane stress, principal stress, maximum shear stress and their orientations using analytical method and Mohr's circle		
C204.4	Determine the dimensions of structural members including beams, bars and rods using Energy methods and also stress distribution in thick and thin cylinders		
C204.5	Draw SFD and BMD for different beams including cantilever beams, simply supported beams and overhanging beams subjected to UDL, UVL, Point loads and couples		
C204.6	Determine dimensions, bending stress, shear stress and its distribution in beams of circular, rectangular, symmetrical I and T sections subjected to point loads and UDL		
C204.7	Determine the dimensions of shafts based on torsional strength, rigidity and flexibility and also elastic stability of columns using Rankin's and Euler's theory		

Scheme of Study:	17		
Course Name :	Metal Casting and Welding	**Semester:**	3rd
Course Code:	17ME35A	**Year of Study:**	2nd
Course Outcomes:			
C205.1	Describe the casting process and prepare different types of cast products		
C205.2	Explain the melting processes and metal molding methods required for casting.		
C205.3	Describe the cleaning methods and practices followed in casting and solidification process of non-ferrous alloys.		
C205.4	Classify and explain different types of Welding processes used in industries.		
C205.5	Explain the inspection techniques and metallurgical aspects related to permanent joining techniques.		

Scheme of Study:	17		
Course Name :	Computer Aided Machine Drawing	**Semester:**	3rd
Course Code:	17ME36A	**Year of Study:**	2nd
Course Outcomes:			
C206.1	Make drawings using orthographic projections and sectional views with Indian Standards.		
C206.2	Make drawings of thread forms, fasteners.		
C206.3	Make drawings of keys, riveted joints and couplings.		
C206.4	Make drawings of assemblies from part drawings of Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D.		
C206.5	Model assemblies from part drawings of Plummer block, Ram bottom safety valve, I.C. Engine connecting rod, Screw Jack, Tailstock of lathe, Machine Vice and Lathe square tool post in 2D and 3D.		

Scheme of Study:	17		
Course Name :	Materials Testing Lab	**Semester:**	3rd
Course Code:	17MEL37A	**Year of Study:**	2nd
Course Outcomes:			
C207.1	Acquire experimentation skills in the field of material testing.		
C207.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.		
C207.3	Apply the knowledge to analyze a material failure and determine the failure inducing agents.		
C207.4	Apply the knowledge of testing methods in related areas.		
C207.5	Know how to improve structure/behavior of materials for various industrial applications		

Scheme of Study:	17		
Course Name :	Machine Shop	**Semester:**	3rd
Course Code:	17MEL38A	**Year of Study:**	2nd
Course Outcomes:			
C208.1	Perform turning, facing, knurling, thread cutting, tapering, eccentric turning and allied operations.		
C208.2	Perform keyways / slots, grooves etc using shaper.		
C208.3	Perform gear tooth cutting, Surface Milling/Slot Milling operations using milling machine.		
C208.4	Understand the formation of cutting tool parameters of single point cutting tool using bench grinder / tool and cutter grinder.		
C208.5	Demonstrate interpersonal skills with necessary precautions and safety norms followed in Machine Shop.		

VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY, MYSURU – 570028

DEPARTMENT OF MECHANICAL ENGINEERING

IV Semester

Scheme of Study:	17		
Course Name :	Kinematics of Machinery	**Semester:**	4th
Course Code:	17ME42	**Year of Study:**	2nd
Course Outcomes:			
C211.1	Identify mechanisms with basic understanding of motion.		
C211.2	Comprehend motion analysis of planar mechanisms, gears, gear trains and cams.		
C211.3	Carry out motion analysis of planar mechanisms, gears, gear trains and cams.		

Scheme of Study:	17		
Course Name :	Applied Thermodynamics	**Semester:**	4th
Course Code:	17ME43	**Year of Study:**	2nd
Course Outcomes:			
C212.1	Apply thermodynamic concepts to analyze the performance of gas power cycles including propulsion systems.		
C212.2	Evaluate the performance of steam turbine components.		
C212.3	Understand combustion of fuels and combustion processes in I C engines including alternate fuels and pollution effect on environment.		
C212.4	Apply thermodynamic concepts to analyze turbo machines.		
C212.5	Determine performance parameters of refrigeration and air-conditioning systems.		
C212.6	Understand the principles and applications of refrigeration systems.		
C216.7	Analyze air-conditioning processes using the principles of psychometric and Evaluate cooling and heating loads in an air- conditioning system.		

Scheme of Study:	17		
Course Name :	Fluid mechanics	**Semester:**	4th
Course Code:	17ME44	**Year of Study:**	2nd
Course Outcomes:			
C213.1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.		
C213.2	Understand and apply the principles of pressure, buoyancy and floatation.		
C213.3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.		
C213.4	Understand and apply the principles of fluid kinematics and dynamics.		
C213.5	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.		
C213.6	Understand the basic concept of compressible flow and CFD.		

Scheme of Study:	17		
Course Name :	Machine Tools and Operations	**Semester:**	4th
Course Code:	17ME45A	**Year of Study:**	2nd
Course Outcomes:			
C214.1	Explain the construction & specification of various machine tools.		
C214.2	Describe various machining processes pertaining to relative motions between tool & work piece.		
C214.3	Discuss different cutting tool materials, tool nomenclature & surface finish		
C214.4	Apply mechanics of machining process to evaluate machining time.		
C214.5	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.		

Scheme of Study:	17		
Course Name :	Mechanical Measurements and Metrology	**Semester:**	4th
Course Code:	17ME46A	**Year of Study:**	2nd
Course Outcomes:			
C215.1	Understand the objectives of metrology, methods of measurement, selection of measuring instruments, standards of measurement and calibration of end bars.		
C215.2	Describe slip gauges, wringing of slip gauges and building of slip gauges, angle measurement using sine bar, sine center, angle gauges, optical instruments and straightness measurement using Autocollimator.		
C215.3	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design.		
C215.4	Understand the principle of Johnson Mikrokator, sigma comparator, dial indicator, LVDT, back pressure gauges, Solex comparators and Zeiss Ultra Optimeter.		
C215.5	Describe measurement of major diameter, minor diameter, pitch, angle and effective diameter of screw threads by 2 – wire, 3 – wire methods, screw thread gauges and tool maker's microscope.		
C215.6	Explain measurement of tooth thickness using constant chord method, addendum comparator methods and base tangent method, composite error using gear roll tester and measurement of pitch, concentricity, run out and involute profile.		
C215.7	Understand laser interferometers and Coordinate measuring machines. Understand laser interferometers and Coordinate measuring machines.		
C215.8	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.		
C215.9	Describe functioning of force, torque, pressure, strain and temperature measuring devices.		

Scheme of Study:	17		
Course Name :	Mechanical Measurements and Metrology Lab	**Semester:**	4th
Course Code:	17MEL47B	**Year of Study:**	2nd
Course Outcomes:			
C216.1	To calibrate pressure gauge, thermocouple, LVDT, load cell, micrometer.		
C216.2	To measure angle using Sine Center/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.		
C216.3	To demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.		
C216.4	To measure cutting tool forces using Lathe/Drill tool dynamometer.		
C216.5	To measure Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth vernier/Gear tooth micrometer.		
C216.6	To measure surface roughness using Tally Surf/ Mechanical Comparator.		

Scheme of Study:	17		
Course Name :	Foundry and Forging Lab	**Semester:**	4th
Course Code:	17MEL48B	**Year of Study:**	2nd
Course Outcomes:			
C217.1	Demonstrate various skills of sand preparation, molding.		
C217.2	Demonstrate various skills of forging operations		
C217.3	Work as a team keeping up ethical principles.		

VIDYA VIKAS INSTITUTE OF ENGINEERING AND TECHNOLOGY, MYSURU – 570028
DEPARTMENT OF MECHANICAL ENGINEERING
V Semester

Scheme of Study:	17		
Course Name :	Management and Engineering Economics	**Semester:**	5th
Course Code:	17ME51	**Year of Study:**	3rd
Course Outcomes:			
C301.1	Understand needs, functions, roles, scope and evolution of Management.		
C301.2	Understand importance, purpose of Planning and hierarchy of planning and also analyze its types.		
C301.3	Discuss Decision making, Organizing, Staffing, Directing and Controlling.		
C301.4	Select the best economic model from various available alternatives and prepare the project reports effectively.		
C301.5	Understand various interest rate methods and implement the suitable one and estimate various depreciation values of commodities.		

Scheme of Study:	17		
Course Name :	Dynamics of Machinery	**Semester:**	5th
Course Code:	17ME52	**Year of Study:**	3rd
Course Outcomes:			
C302.1	Apply basic principles of kinematics to perform static and dynamic force analysis of mechanisms subjected to different loading conditions for equilibrium.		
C302.2	Analyze the effect of unbalance in rotating and reciprocating machines to determine, both analytically and graphically, the magnitude and position of balancing masses.		
C302.3	Analyze the function of centrifugal governors and compute its performance parameters.		
C302.4	Compute gyroscopic couple and analyze its effect on stabilization of sea vehicles, aircrafts and automobiles.		
C302.5	Apply Newton's equation of motion and energy methods to model basic vibrating mechanical systems subjected to free, damped, and forced vibrations		

Scheme of Study:	17		
Course Name :	Turbo Machines	**Semester:**	5th
Course Code:	17ME53	**Year of Study:**	3rd
Course Outcomes:			
C303.1	Able to give precise definition of turbo machinery.		
C303.2	Identify various types of turbo machinery.		
C303.3	Apply the Euler's equation for turbo machinery to analyze energy transfer in turbo machines.		
C303.4	Understand the principle of operation of pumps, fans, compressors and turbines.		
C303.5	Perform the preliminary design of turbo machines (pumps, rotary compressors and turbines)		
C303.6	Analyze the performance of turbo machinery.		

Scheme of Study:	17		
Course Name :	Design of Machine Elements - I	**Semester:**	5th
Course Code:	17ME54	**Year of Study:**	3rd
Course Outcomes:			
C304.1	Understand standard design practices and process with regard to material properties and its selection, factor of safety and its considerations, and design standards and codes.		
C304.2	Analyze machine and structural members subjected to static load conditions and predict their failure using established theories of failure		
C304.3	Analyze and Design machine components subjected Impact and fatigue loads		
C304.4	Analyze and Design power transmission elements such as shafts and couplings subjected to various load conditions.		
C304.5	Analyze and Design permanent and temporary mechanical and structural joints employed in engineering practice		

Scheme of Study:	17		
Course Name :	Non Traditional Machining	**Semester:**	5th
Course Code:	17ME554	**Year of Study:**	3rd
Course Outcomes:			
C305.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.		
C305.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM, AJM and WJM.		
C305.3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations.		
C305.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.		
C305.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.		

Scheme of Study:	17		
Course Name :	Project Management	**Semester:**	5th
Course Code:	17ME564	**Year of Study:**	3rd
Course Outcomes:			
C306.1	Describe the selection, prioritization and initiation of projects.		
C306.2	Explain project planning and scheduling within organization.		
C306.3	Discuss project resource and risk management planning using project quality tools.		
C306.4	Evaluate progress, performance and interpret the results of the project.		
C306.5	Draw the network diagram to calculate the duration of the project and reduce it using crashing.		

Scheme of Study:	17		
Course Name :	Fluid Mechanics & Machinery Lab	**Semester:**	5th
Course Code:	17MEL57	**Year of Study:**	3rd
Course Outcomes:			
C307.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.		
C307.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics		
C307.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.		
C307.4	Determine the energy flow pattern through the hydraulic turbines and pumps		
C307.5	Exhibit his competency towards preventive maintenance of hydraulic machines.		

Scheme of Study:	17		
Course Name :	Energy Lab	**Semester:**	5th
Course Code:	17MEL58	**Year of Study:**	3rd
Course Outcomes:			
C308.1	Perform experiments to determine the properties of fuels and oils.		
C308.2	Conduct experiments on engines and draw characteristics.		
C308.3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry.		
C308.4	Identify exhaust emission, factors affecting them and report the remedies.		
C308.5	Determine the energy flow pattern through the I C Engine		
C308.6	Exhibit his competency towards preventive maintenance of IC engines.		

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DEPARTMENT OF MECHANICAL ENGINEERING
VI SEMESTER

Scheme of Study:	17		
Course Name :	Finite Element Analysis	**Semester:**	6th
Course Code:	17ME61	**Year of Study:**	3rd
Course Outcomes:			
C309.1	Understand the concepts behind formulation methods in FEM.		
C309.2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.		
C309.3	Develop element characteristic equation and generation of global equation.		
C309.4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, and fluid flow, axi symmetric and dynamic problems and solve them displacements, stress and strains induced.		

Scheme of Study:	17		
Course Name :	Computer integrated Manufacturing	**Semester:**	6th
Course Code:	17ME62	**Year of Study:**	3rd
Course Outcomes:			
C310.1	Able to define Automation, CIM, CAD, CAM and explain the differences between these concepts.		
C310.2	Solve simple problems of transformations of entities on computer screen.		
C310.3	Explain the basics of automated manufacturing industries through mathematical models and analyze different types of automated flow lines.		
C310.4	Analyze the automated flow lines to reduce down time and enhance productivity.		
C310.5	Explain the use of different computer applications in manufacturing, and able to prepare part programs for simple jobs on CNC machine tools and robot programming.		
C310.6	Visualize and appreciate the modern trends in Manufacturing like additive manufacturing, Industry 4.0 and applications of Internet of Things leading to Smart Manufacturing.		

Scheme of Study:	17		
Course Name :	Heat Transfer	**Semester:**	6th
Course Code:	17ME63	**Year of Study:**	3rd
Course Outcomes:			
C311.1	Understand the basic modes of heat transfer and Compute temperature distribution in steady-state and unsteady-state heat conduction and interpret heat transfer through extended surfaces.		
C311.2	Explain the principles of radiation heat transfer and understand the numerical formula for heat conduction problems.		
C311.3	Interpret and compute forced and free convective heat transfer.		
C311.4	Design heat exchangers using LMTD and NTU methods.		
C311.5	Understand the principles of boiling and condensation including radiation heat transfer related engineering problems.		

Scheme of Study:	17		
Course Name :	Design of Machine Elements -II	**Semester:**	6th
Course Code:	17ME64	**Year of Study:**	3rd
Course Outcomes:			
C312.1	Apply the principles of stress analysis to design curved beams, cylinders and cylinder heads.		
C312.2	Identify and describe several types of springs. Analyze and Compute the dimensions of various geometric features of springs to conform to design requirements.		
C312.3	Identify and describe several types of Power transmission elements such as belt, chain, rope, gear drives. Analyze and Compute the dimensions of various geometric features to satisfy power transmission requirements.		
C312.4	Design, Analyze types of mechanical clutches and brakes for power transmission.		
C312.5	Design, analyze and select Journal bearings and rolling element bearings for specified loading conditions and life requirements.		

Scheme of Study:	17		
Course Name :	Metal Forming	**Semester:**	6th
Course Code:	17ME653	**Year of Study:**	3rd
Course Outcomes:			
C313.1	Able to understand the concept of different metal forming process.		
C313.2	Able to approach metal forming processes both analytically and numerically		
C313.3	Able to design metal forming processes.		
C313.4	Able to develop approaches and solutions to analyze metal forming processes and the associated problems and flaws.		

Scheme of Study:	17		
Course Name :	Industrial Safety	**Semester:**	6th
Course Code:	17ME662	**Year of Study:**	3rd
Course Outcomes:			
C314.1	Able to Identify the hazards around the work environment and industries. Use the safe measures while performing work in and around the work area of the available laboratories.		
C314.2	Able to recognize the sign boards and its application and become familiar to use the portable extinguishers used for different class of fires.		
C314.3	Able to follow proper instructions while handling the tools/machines used in workshops or machine shops and strictly adhere to safety procedure while working in machine tools.		
C314.4	Able to understand instructions of using electrical equipment and follow electrical safety procedures while handling it.		
C314.5	Able to identify probable chemical hazards, understand specific instructions on how to protect yourself and others against chemical injury/ accidents, handling and storing of chemicals.		

Scheme of Study:	17		
Course Name :	Heat Transfer Lab	**Semester:**	6th
Course Code:	17MEL66	**Year of Study:**	3rd
Course Outcomes:			
C313.1	Perform experiments to determine the thermal conductivity of a metal rod		
C313.2	Conduct experiments to determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.		
C313.3	Estimate the effective thermal resistance in composite slabs and efficiency in pin-fin		
C313.4	Determine surface emissivity of a test plate		
C313.5	Estimate performance of a refrigerator and effectiveness of fin		
C313.6	Calculate temperature distribution of study and transient heat conduction through plane wall, cylinder and fin using numerical approach.		

Scheme of Study:	17		
Course Name :	Modeling and Analysis Lab	**Semester:**	6th
Course Code:	17MEL67	**Year of Study:**	3rd
Course Outcomes:			
C314.1	Demonstrate the basic features of an analysis package.		
C314.2	Use the modern tools to formulate the problem, and able to create geometry, descritize, apply boundary condition to solve problems of bars, truss, beams, plate to find stress with different- loading conditions.		
C314.3	Demonstrate the deflection of beams subjected to point, uniformly distributed and varying loads further to use the available results to draw shear force and bending moment diagrams.		
C314.4	Analyze the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.		
C314.5	Carry out dynamic analysis and finding natural frequencies for various boundary conditions and also analyze with forcing function.		

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DEPARTMENT OF MECHANICAL ENGINEERING

VII SEMESTER

Scheme of Study:	17		
Course Name :	Energy Engineering	**Semester:**	7th
Course Code:	17ME71	**Year of Study:**	4th
Course Outcomes:			
C401.1	Summarize the basic concepts of thermal energy systems,		
C401.2	Identify renewable energy sources and their utilization.		
C401.3	Understand the basic concepts of solar radiation and analyze the working of solar PV and thermal systems.		
C401.4	Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas.		
C401.5	Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator.		
	Identify methods of energy storage for specific applications		

Scheme of Study:	17		
Course Name :	Fluid Power Systems	**Semester:**	7th
Course Code:	17ME72	**Year of Study:**	4th
Course Outcomes:			
C402.1	Identify and analyze the functional requirements of a fluid power transmission system for a given application.		
C402.2	Visualize how a hydraulic/pneumatic circuit will work to accomplish the function.		
C402.3	Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application.		
C402.4	Select and size the different components of the circuit.		
C402.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application.		

Scheme of Study:	17		
Course Name :	Control Engineering	**Semester:**	7th
Course Code:	17ME73	**Year of Study:**	4th
Course Outcomes:			
C403.1	Recognize control system and its types, control actions		
C403.2	Determine the system governing equations for physical models (Electrical, Thermal, Mechanical, Electro Mechanical)		
C403.3	Calculate the gain of the system using block diagram and signal flow graph		
C403.4	Illustrate the response of 1^{st} and 2^{nd} order systems		
C403.5	Determine the stability of transfer functions in complex domain and frequency domain		
C403.6	Employ state equations to study the controllability and observability		

Scheme of Study:	17		
Course Name :	Tribology	**Semester:**	7th
Course Code:	17ME742	**Year of Study:**	4th
Course Outcomes:			
C404.1	Understand the fundamentals of Tribology and associated parameters.		
C404.2	Apply concepts of Tribology for the performance analysis and design of components experiencing relative motion.		
C404.3	Analyze the requirements and design hydrodynamic journal and plane slider bearings for a given application.		
C404.4	Select proper bearing materials and lubricants for a given tribological application.		
C404.5	Apply the principles of surface engineering for different applications of Tribology.		

Scheme of Study:	17		
Course Name :	Mechatronics	**Semester:**	7th
Course Code:	17ME753	**Year of Study:**	4th
Course Outcomes:			
C405.1	Illustrate various components of Mechatronics systems.		
C405.2	Assess various control systems used in automation.		
C405.3	Develop mechanical, hydraulic, pneumatic and electrical control systems.		

Scheme of Study:	17		
Course Name :	Design Lab	**Semester:**	7th
Course Code:	17MEL76	**Year of Study:**	4th
Course Outcomes:			
C406.1	To understand the working principles of machine elements such as Governors, Gyroscopes etc.,		
C406.2	To identify forces and couples in rotating mechanical system components.		
C406.3	To identify vibrations in machine elements and design appropriate damping methods and to determine the critical speed of a rotating shaft.		
C406.4	To measure strain in various machine elements using strain gauges		

Scheme of Study:	17		
Course Name :	CIM Lab	**Semester:**	7th
Course Code:	17MEL77	**Year of Study:**	4th
Course Outcomes:			
C407.1	Generate CNC Lathe part program for Turning, Facing, Chamfering, Grooving, Step turning, Taper turning, Circular interpolation etc.		
C407.2	Generate CNC Mill Part programming for Point to point motions, Line motions, Circular interpolation, Contour motion, Pocket milling- circular, rectangular, Mirror commands etc.		
C407.3	Use Canned Cycles for Drilling, Peck drilling, Boring, Tapping, Turning, Facing, Taper turning Thread cutting etc.		
C407.4	Simulate Tool Path for different Machining operations of small components using CNC Lathe & CNC Milling Machine.		
C407.5	Use high end CAM packages for machining complex parts; use state of art cutting tools and related cutting parameters; optimize cycle time; set up and cut part on.		
C407.6	Understand & write programs for Robot control; understand the operating principles of hydraulics, pneumatics and electro pneumatic systems.		

Scheme of Study:	17		
Course Name :	Project Phase – I	**Semester:**	7th
Course Code:	17MEP78	**Year of Study:**	4th
Course Outcomes:			
C408.1	Demonstrate a sound technical knowledge of their selected project topic.		
C408.2	Undertake problem identification, formulation and solution.		
C408.3	Design engineering solutions to complex problems utilizing a systems approach.		
C408.4	Communicate with engineers and the community at large in written an oral forms.		
C408.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.		

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DEPARTMENT OF MECHANICAL ENGINEERING

VIII SEMESTER

Scheme of Study:	17		
Course Name :	Operations Research	**Semester:**	8th
Course Code:	17MEL81	**Year of Study:**	4th
Course Outcomes:			
C409.1	Understand the meaning, definitions, scope, need, phases and techniques of operations research.		
C409.2	Formulate as L.P.P and derive optimal solutions to linear programming problems by graphical method, Simplex method, Big-M method and Dual Simplex method.		
C409.3	Formulate as Transportation and Assignment problems and derive optimum solutions for transportation, Assignment and travelling salesman problems.		
C409.4	Solve problems on game theory for pure and mixed strategy under competitive environment.		
C409.5	Solve waiting line problems for M/M/1 and M/M/K queuing models.		
C409.6	Construct network diagrams and determine critical path, floats for deterministic and PERT networks including crashing of Networks.		
C409.7	Determine minimum processing times for sequencing of n jobs-2 machines, n jobs-3machines,n jobs-m machines and 2 jobs-n machines using Johnson's algorithm.		

Scheme of Study:	17		
Course Name :	Additive Manufacturing	**Semester:**	8th
Course Code:	17ME82	**Year of Study:**	4th
Course Outcomes:			
C410.1	Understand the different process of Additive Manufacturing. using Polymer, Powder and Nano materials manufacturing.		
C410.2	Analyze the different characterization techniques.		
C410.3	Describe the various NC, CNC machine programming and Automation techniques.		

Scheme of Study:	17		
Course Name :	Product life cycle management	**Semester:**	8th
Course Code:	17ME835	**Year of Study:**	4th
Course Outcomes:			
C411.1	Explain the various strategies of PLM and Product Data Management.		
C411.2	Describe decomposition of product design and model simulation.		
C411.3	Apply the concept of New Product Development and its structuring.		
C411.4	Analyze the technological forecasting and the tools in the innovation.		
C411.5	Apply the virtual product development and model analysis		

Scheme of Study:	17		
Course Name :	Internship / Professional Practice	**Semester:**	8th
Course Code:	17ME84	**Year of Study:**	4th
Course Outcomes:			
C412.1	Acquire knowledge of administration, marketing, finance and economics of the industry in which the internship is done.		
C412.2	Develop a greater understanding about career options while more clearly defining personal career goals.		
C412.3	Gain practical experience of the activities and functions of professionals within industry.		
C412.4	Identify areas for future knowledge and skill development.		
C412.5	Expand intellectual capacity, credibility, judgment, intuition.		

Scheme of Study:	17		
Course Name :	Project Phase – II	**Semester:**	8th
Course Code:	17MEP85	**Year of Study:**	4th
Course Outcomes:			
C413.1	Present the project and be able to defend it.		
C413.2	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.		
C413.3	Habituated to critical thinking and use problem solving skills, Work in a team to achieve common goal.		
C413.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.		
C413.5	Learn on their own, reflect on their learning and take appropriate actions to improve it.		

Scheme of Study:	17		
Course Name :	Seminar	**Semester:**	8th
Course Code:	17MES86	**Year of Study:**	4th
Course Outcomes:			
C414.1	Attain, use and develop knowledge in the field of engineering and other disciplines through independent learning and collaborative study.		
C414.2	Identify, understand and discuss current, real-time issues.		
C414.3	Improve oral and written communication skills.		
C414.4	Explore an appreciation of the self in relation to its larger diverse social and academic contexts.		
C414.5	Apply principles of ethics and respect in interaction with others.		

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DEPARTMENT OF MECHANICAL ENGINEERING
III Semester

Scheme of Study:	18		
Course Name :	Mechanics of Materials	**Semester:**	3rd
Course Code:	18ME32	**Year of Study:**	2nd
Course Outcomes:			
C202.1	Understand simple, compound, thermal stresses and strains their relations and strain energy.		
C202.2	Analyze structural members for stresses, strains and deformations.		
C202.3	Analyze the structural members subjected to bending and shear loads.		
C202.4	Analyze shafts subjected to twisting loads.		
C202.5	Analyze the short columns for stability.		

Scheme of Study:	18		
Course Name :	Basic Thermodynamics	**Semester:**	3rd
Course Code:	18ME33	**Year of Study:**	2nd
Course Outcomes:			
C203.1	Explain fundamentals of thermodynamics and evaluate energy interactions across the boundary of thermodynamic systems.		
C203.2	Evaluate the feasibility of cyclic and non-cyclic processes using 2nd law of thermodynamics.		
C203.3	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 transfers and change in properties.		
C203.4	Interpret the behavior of pure substances and its application in practical problems.		
C203.5	Recognize differences between ideal and real gases and evaluate thermodynamic properties of ideal and real gas mixtures using various relations.		

Scheme of Study:	18		
Course Name :	Material Science	**Semester:**	3rd
Course Code:	18ME34	**Year of Study:**	2nd
Course Outcomes:			
C204.1	Understand the crystallographic and mechanical properties of metals and their alloys.		
C204.2	Analyze the various modes of failure and understand the microstructures of ferrous and nonferrous materials.		
C204.3	Describe the processes of heat treatment of various alloys.		
C204.4	Acquire the Knowledge of composite materials and their production process as well as applications.		
C204.5	Understand the properties and potentialities of various materials available and material selection procedures.		

Scheme of Study:	18		
Course Name :	Metal cutting and forming	**Semester:**	3rd
Course Code:	18ME35A	**Year of Study:**	2nd
Course Outcomes:			
C205.1	Explain the construction & specification of various machine tools.		
C205.2	Discuss different cutting tool materials, tool nomenclature & surface finish.		
C205.3	Apply mechanics of machining process to evaluate machining time.		
C205.4	Analyze tool wear mechanisms and equations to enhance tool life and minimize machining cost.		
C205.5	Understand the concepts of different metal forming processes.		
C205.6	Apply the concepts of design of sheet metal dies to design different dies for simple sheet metal components.		

Scheme of Study:	18		
Course Name :	Computer Aided Machine Drawing	**Semester:**	3rd
Course Code:	18ME36A	**Year of Study:**	2nd
Course Outcomes:			
C206.1	Identify the national and international standards pertaining to machine drawing.		
C206.2	Understand the importance of the linking functional and visualization aspects in the preparation ofthe part drawings		
C206.3	Apply limits and tolerances to assemblies and choose appropriate fits for given assemblies.		
C206.4	Interpret the Machining and surface finish symbols on the component drawings.		
C206.5	Preparation of the part or assembly drawings as per the conventions.		

Scheme of Study:	18		
Course Name :	Materials Testing Lab	**Semester:**	3rd
Course Code:	18MEL37A	**Year of Study:**	2nd
Course Outcomes:			
C207.1	Acquire experimentation skills in the field of material testing.		
C207.2	Develop theoretical understanding of the mechanical properties of materials by performing experiments.		
C207.3	Apply the knowledge to analyze a material failure and determine the failure inducing agents.		
C207.4	Apply the knowledge of testing methods in related areas.		
C207.5	Know how to improve structure/behavior of materials for various industrial applications		

Scheme of Study:	18		
Course Name :	Workshop and Machine Shop Practice	**Semester:**	3rd
Course Code:	18MEL38A	**Year of Study:**	2nd
Course Outcomes:			
C208.1	Prepare step, v-type, and dove tail, half round and related joints using fitting tools.		
C208.2	Perform turning, facing, knurling, thread cutting, tapering, eccentric turning and allied operations.		
C208.3	Perform keyways / slots, grooves etc using shaper and understand basic cutting tool parameters.		
C208.4	Perform gear tooth cutting, Surface Milling/Slot Milling operations using milling machine.		
C208.5	Demonstrate interpersonal skills with necessary precautions and safety norms followed in Machine Shop.		

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DEPARTMENT OF MECHANICAL ENGINEERING

IV Semester

Scheme of Study:	18		
Course Name :	Applied Thermodynamics	**Semester:**	4th
Course Code:	18ME42	**Year of Study:**	2nd
Course Outcomes:			
C211.1	Apply thermodynamic concepts to analyze the performance of gas power cycles.		
C211.2	Apply thermodynamic concepts to analyze the performance of vapor power cycles.		
C211.3	Understand combustion of fuels and performance of I C engines.		
C211.4	Understand the principles and applications of refrigeration systems.		
C211.5	Apply Thermodynamic concepts to determine performance parameters of refrigeration and air conditioning systems.		
C211.6	Understand the working principle of Air compressors and Steam nozzles, applications, relevance of air and identify methods for performance improvement.		

Scheme of Study:	18		
Course Name :	Fluid Mechanics	**Semester:**	4th
Course Code:	18ME43	**Year of Study:**	2nd
Course Outcomes:			
C212.1	Identify and calculate the key fluid properties used in the analysis of fluid behavior.		
C212.2	Understand and apply the principles of pressure, buoyancy and floatation.		
C212.3	Apply the knowledge of fluid statics, kinematics and dynamics while addressing problems of mechanical and chemical engineering.		
C212.4	Understand and apply the principles of fluid kinematics and dynamics.		

C212.5	Understand the concept of boundary layer in fluid flow and apply dimensional analysis to form dimensionless numbers in terms of input output variables.
C212.6	Understand the basic concept of compressible flow and CFD.

Scheme of Study:	18		
Course Name :	Kinematics of Machines	**Semester:**	4th
Course Code:	18ME44	**Year of Study:**	2nd
Course Outcomes:			
C213.1	Knowledge of mechanisms and their motion.		
C213.2	Understand the inversions of four bar mechanisms.		
C213.3	Analyze the velocity, acceleration of links and joints of mechanisms and Cams.		
C213.4	Understand the working of the spur gears.		
C213.5	Analyze the gear trains speed ratio and torque.		

Scheme of Study:	18		
Course Name :	Metal Casting and Welding	**Semester:**	4th
Course Code:	18ME45B	**Year of Study:**	2nd
Course Outcomes:			
C214.1	Describe the casting process and prepare different types of cast products		
C214.2	Explain the melting processes and metal molding methods required for casting.		
C214.3	Describe the cleaning methods and practices followed in casting and solidification process of non-ferrous alloys.		
C214.4	Classify and explain different types of Welding processes used in industries.		
C214.5	Explain the inspection techniques and metallurgical aspects related to permanent joining techniques.		

Scheme of Study:	18		
Course Name :	Mechanical Measurements and Metrology	**Semester:**	4th
Course Code:	18ME46B	**Year of Study:**	2nd
Course Outcomes:			
C215.1	Understand the objectives of metrology, methods of measurement, standards of measurement & various measurement parameters.		
C215.2	Explain tolerance, limits of size, fits, geometric and position tolerances, gauges and their design		
C215.3	Understand the working principle of different types of components. Describe measurement of major & minor diameter, pitch, angle and effective diameter of screw threads.		
C215.4	Explain measurement systems, transducers, intermediate modifying devices and terminating devices.		
C215.5	Describe functioning of force, torque, pressure, strain and temperature measuring devices.		

Scheme of Study:	18		
Course Name :	Mechanical Measurements and Metrology Lab	**Semester:**	4th
Course Code:	18MEL47B	**Year of Study:**	2nd
Course Outcomes:			
C216.1	Understand Calibration of pressure gauge, thermocouple, LVDT, load cell, micrometer.		
C216.2	Apply concepts of Measurement of angle using Sine Centre/ Sine Bar/ Bevel Protractor, alignment using Autocollimator/ Roller set.		
C216.3	Demonstrate measurements using Optical Projector/Tool maker microscope, Optical flats.		
C216.4	Analyze tool forces using Lathe/Drill tool dynamometer.		
C216.5	Analyze Screw thread parameters using 2-Wire or 3-Wire method, gear tooth profile using gear tooth Vernier / Gear tooth micrometer.		
C216.6	Understand the concepts of measurement of surface roughness.		

Scheme of Study:	18		
Course Name :	Foundry and Forging Lab	**Semester:**	4th
Course Code:	18MEL48B	**Year of Study:**	2nd
Course Outcomes:			
C217.1	Demonstrate various skills in preparation of molding sand for conducting tensile, shear and compression tests using Universal sand testing machine.		
C217.2	Demonstrate skills in determining permeability, clay content and Grain Fineness Number of base sands.		
C217.3	Demonstrate skills in preparation of forging models involving upsetting, drawing and bending operations.		
C217.4	Demonstrate various skills in basic welding operations.		

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DEPARTMENT OF MECHANICAL ENGINEERING
V Semester

Scheme of Study:	18		
Course Name :	Management and Economics	**Semester:**	5th
Course Code:	18ME51	**Year of Study:**	3rd
Course Outcomes:			
C301.1	Understand needs, functions, roles, scope and evolution of Management		
C301.2	Understand importance, purpose of Planning and hierarchy of planning and also analyze its types		
C301.3	Discuss Decision making, Organizing, Staffing, Directing and Controlling		
C301.4	Select the best economic model from various available alternatives and prepare the project reports effectively		
C301.5	Understand various interest rate methods and implement the suitable one and estimate various depreciation values of commodities		

Scheme of Study:	18		
Course Name :	Design of Machine Elements I	**Semester:**	5th
Course Code:	18ME52	**Year of Study:**	3rd
Course Outcomes:			
C302.1	Understand standard design practices and process with regard to material properties and its selection, factor of safety and its considerations, and design standards and codes.		
C302.2	Analyze machine and structural members subjected to static load conditions and predict their failure using established theories of failure		
C302.3	Analyze and Design machine components subjected Impact and fatigue loads		
C302.4	Analyze and Design power transmission elements such as shafts and couplings subjected to various load conditions.		
C302.5	Analyze and Design permanent and temporary mechanical and structural joints employed in engineering practice		

Scheme of Study:	18		
Course Name :	Dynamics of Machines	**Semester:**	5th
Course Code:	18ME53	**Year of Study:**	3rd
Course Outcomes:			
C303.1	Apply basic principles of kinematics to perform static and dynamic force analysis of mechanisms subjected to different loading conditions for equilibrium.		
C303.2	Analyze the effect of unbalance in rotating and reciprocating machines to determine, both analytically and graphically, the magnitude and position of balancing masses.		
C303.3	Analyze the function of centrifugal governors and compute its performance parameters.		
C303.4	Compute gyroscopic couple and analyze its effect on stabilization of sea vehicles, aircrafts and automobiles.		
C303.5	Apply Newton's equation of motion and energy methods to model basic vibrating mechanical systems subjected to free, damped, and forced vibrations		

Scheme of Study:	18		
Course Name :	Turbo Machines	**Semester:**	5th
Course Code:	18ME54	**Year of Study:**	3rd
Course Outcomes:			
C304.1	Model studies and thermodynamics analysis of turbo machines.		
C304.2	Analyze the energy transfer in Turbo machine with degree of reaction and utilization factor.		
C304.3	Classify, analyze and understand various type of steam turbine.		
C304.4	Classify, analyze and understand various type of hydraulic turbine.		
C304.5	Understand the concept of radial power absorbing machine and the problems involved during its operation.		

Scheme of Study:	18		
Course Name :	Fluid Power Engineering	**Semester:**	5th
Course Code:	18ME55	**Year of Study:**	3rd
Course Outcomes:			
C305.1	Identify and analyze the functional requirements of a fluid power transmission system for a given application.		
C305.2	Visualize how a hydraulic/pneumatic circuit will work to accomplish the function.		
C305.3	Design an appropriate hydraulic or pneumatic circuit or combination circuit like electro-hydraulics, electro-pneumatics for a given application.		
C305.4	Select and size the different components of the circuit.		
C305.5	Develop a comprehensive circuit diagram by integrating the components selected for the given application.		

Scheme of Study:	18		
Course Name :	Operations Management	**Semester:**	5th
Course Code:	18ME56	**Year of Study:**	3rd
Course Outcomes:			
C306.1	Explain the concept and scope of operations management in a business & relevance of decision making.		
C306.2	Apply forecasting techniques to analyze business related activities.		
C306.3	Describe the capacity and location planning processes required for manufacturing organization.		
C306.4	Acquire the Knowledge of aggregate planning and scheduling methods for production.		
C306.5	Discuss the needs of material requirement planning and supply chain management for an organization.		

Scheme of Study:	18		
Course Name :	Fluid Mechanics/Machines lab	**Semester:**	5th
Course Code:	18MEL57	**Year of Study:**	3rd
Course Outcomes:			
C307.1	Perform experiments to determine the coefficient of discharge of flow measuring devices.		
C307.2	Conduct experiments on hydraulic turbines and pumps to draw characteristics		
C307.3	Test basic performance parameters of hydraulic turbines and pumps and execute the knowledge in real life situations.		
C307.4	Determine the energy flow pattern through the hydraulic turbines and pumps		
C307.5	Exhibit his competency towards preventive maintenance of hydraulic machines.		

Scheme of Study:	18		
Course Name :	Energy Conversion Lab	**Semester:**	5th
Course Code:	18MEL58	**Year of Study:**	3rd
Course Outcomes:			
C308.1	Perform experiments to determine the properties of fuels and oils.		
C308.2	Conduct experiments on engines and draw characteristics.		
C308.3	Test basic performance parameters of I.C. Engine and implement the knowledge in industry.		
C308.4	Identify exhaust emission, factors affecting them and exhibit his competency towards preventive maintenance of IC engines.		

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VI SEMESTER

Scheme of Study:	18		
Course Name :	Finite Element Methods	**Semester:**	6th
Course Code:	18ME61	**Year of Study:**	3rd
Course Outcomes:			
C310.1	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso parametric elements.		
C310.2	Develop element characteristic equation and generation of global equation.		
C310.3	Formulate and solve Axi-symmetric and heat transfer problems.		
C310.4	Apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi-symmetric and dynamic problems		

Scheme of Study:	18		
Course Name :	Design of Machine Elements II	**Semester:**	6th
Course Code:	18ME62	**Year of Study:**	3rd
Course Outcomes:			
C310.1	Identify and describe several types of springs. Analyze and Compute the dimensions of various geometric features of springs to conform to design requirements.		
C310.2	Identify and describe several types of flexible Power transmission elements such as belt, chain, and rope drives. Analyze and Compute the dimensions of various geometric features to satisfy power transmission requirements.		
C310.3	Identify and describe Power transmission through Spur, Helical, Bevel and Worm gear drives. Analyze and Compute the dimensions of various geometric features of gears to satisfy power transmission requirements.		
C310.4	Perform the Design and Analyze types of mechanical clutches and brakes for motion control systems in power transmission.		
C310.5	Design, analyze and select Journal bearings and rolling element bearings for specified loading conditions and life requirements.		

Scheme of Study:	18		
Course Name :	Heat Transfer	**Semester:**	6th
Course Code:	18ME63	**Year of Study:**	3rd
Course Outcomes:			
C311.1	Understand the modes of heat transfer and apply the basic laws to formulate engineering systems.		
C311.2	Understand and apply the basic laws of heat transfer to extended surface, composite material, and unsteady state heat transfer problems.		
C311.3	Analyze heat conduction through numerical methods and apply the fundamental principle to solve radiation heat transfer problems.		
C311.4	Analyze heat transfer due to free and forced convective heat transfer.		
C311.5	Understand the design and performance analysis of heat exchangers and their practical applications, Condensation and Boiling phenomena.		

Scheme of Study:	18		
Course Name :	Non-Traditional Machining	**Semester:**	6th
Course Code:	18ME641	**Year of Study:**	3rd
Course Outcomes:			
C312.1	Understand the compare traditional and non-traditional machining process and recognize the need for Non-traditional machining process.		
C312.2	Understand the constructional features, performance parameters, process characteristics, applications, advantages and limitations of USM & AJM.		
C312.3	Identify the need of Chemical and electro-chemical machining process along with the constructional features, process parameters, process characteristics, applications, advantages and limitations.		
C312.4	Understand the constructional feature of the equipment, process parameters, process characteristics, applications, advantages and limitations EDM & PAM.		
C312.5	Understand the LBM equipment, LBM parameters, and characteristics. EBM equipment and mechanism of metal removal, applications, advantages and limitations LBM & EBM.		

Scheme of Study:	18		
Course Name :	Computer Aided Modelling and Analysis Lab	**Semester:**	6th
Course Code:	18MEL66	**Year of Study:**	3rd
Course Outcomes:			
C313.1	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.		
C313.2	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.		
C313.3	Analyze and solve 1D and 2D heat transfer conduction and convection problems with different boundary conditions.		
C313.4	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.		

Scheme of Study:	18		
Course Name :	Heat Transfer Lab	**Semester:**	6th
Course Code:	18MEL67	**Year of Study:**	3rd
Course Outcomes:			
C314.1	Determine the thermal conductivity of a metal rod and overall heat transfer coefficient of composite slabs.		
C314.2	Determine convective heat transfer coefficient for free and forced convection and correlate with theoretical values.		
C314.3	Evaluate temperature distribution characteristics of steady and transient heat conduction through solid cylinder experimentally.		
C314.4	Determine surface emissivity of a test plate and Stefan Boltzmann constant		
C314.5	Estimate performance of a refrigerator and effectiveness of a fin and Double pipe heat exchanger		

Scheme of Study:	18		
Course Name :	Mini-project	Semester:	6th
Course Code:	18MEMP68	Year of Study:	3rd
Course Outcomes:			
C313.1	Present the mini-project and be able to defend it.		
C313.2	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.		
C313.3	Habituated to critical thinking and use problem solving skills, Work in a team to achieve common goal.		
C313.4	Communicate effectively and to present ideas clearly and coherently in both the written and oral forms.		
C313.5	Work in a team to achieve common goal, reflect on their learning and take appropriate actions to improve it.		

Scheme of Study:	18		
Course Name :	Internship	Semester:	6th
Course Code:	***	Year of Study:	3rd
Course Outcomes:			
C314.1	Acquire knowledge of administration, marketing, finance and economics of the industry in which the internship is done.		
C314.2	Develop a greater understanding about career options while more clearly defining personal career goals.		
C314.3	Gain practical experience of the activities and functions of professionals within industry.		
C314.4	Identify areas for future knowledge and skill development.		
C314.5	Expand intellectual capacity, credibility, judgment, intuition.		

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