St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:B.E. Civil Engineering

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulli of elasticity used in day to day engineering applications.
CO2 : Estimate the optical parameters of visible and laser sources slong with their applications in various fields.
CO3 : Calculate the thickness of wire and wavelength of light using air wedge and spectrometer.
CO4 : Determine the water quality parameters (DO, Chloride, Cu content, Alkalinity, and hardness) of the water sample
CO5 : Analyse quantitatively the metals (Fe, Na, Cu) in the given sample using potentiometer , flame photometer and understant how conductometric better than volumetric titrations and the skill to do the experiment.
Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the methods of water purification
CO2 : Define the terms in phase rule and adsorption
CO3 : Explain the types of energy resources
CO4 : Determine the composition and characterisation of fuels and alloys
CO5 : Classify the types of water,fuels and alloys
Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 :Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 :Write and execute simple Python programs
CO3 :Develop Python programs for complex problems
CO4 :Apply basic and compound data types, functions and files to implement Python programs
CO5 :Design and analyse algorithms, modules and packages
Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the fundamentals and standards of Engineering graphics
CO2 : Apply freehand sketching of basic geometrical constructions and multiple views of objects.
CO3 : Analyze orthographic projections of lines and plane surfaces.
CO4 : Analyze projections and solids and development of surfaces.
CO5 : Analyze isometric and perspective sections of simple solids.
Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write, test and debug simple Python Programs
CO2 : Implement Python Programs with conditionals and looping statements
CO3 : Develope Python Programs using functions

CO4 : Use Python lists,tuples ,dictionaries for representing compound data
CO5 : Read and write data from/to files and write programs using python packages
Course:Communicative English-[HS8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Learn vocabulary, skim and scan passages and share information related to one/oneself/family and friends.
CO2 : Improve their telephonic conversation skills, general reading and free writing skills and language skills through preposition and conjunction.
CO3 : Acquire language skills through degrees of comparison, pronouns and direct indirect questions, comprehend short and long passages, describe products and express opinions.
CO4 : Improve their language skills through reading, draft e-mails and personal letters and use correct tenses in the language usage.
CO5 : Write short essays and dialogues and participate in group activities.
Course:Engineering Mathematics - I-[MA8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : defines the fundamentals of differential calculas
CO2 : defines the various concepts of functions of several variables with maxima and minima concepts
CO3 : analysis of integral calculus with bi-parts and bernoulli's formulae
CO4 : application of multiple integrals using single, double, triple, arwea under the given curve and the volume enclosed by the given curve
CO5 : application of the basic and the advanced application of differential equation with constant and variable coefficients
Course:Engineering Physics-[PH8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will be able to describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge.
CO2 : Students will be able to mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials.
CO3 : Students will be able to illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues.
CO4 : Students will be able to summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals.
CO5 : Students will be able to determine the Moduli of elasticity of different materials, Eigen value and Eigen function of particles, Working of thermal devices and Functioning of Scanning Tunneling Microscope to enhance the development of society.

Semester:2

Course:Basic Electrical and Electronics Engineering-[BE8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : llustrate the operation of AC & DC Circuits
CO2 : Explain the operation of Electrical Machines
CO3 : Ability to identify Semiconductor Devices
CO4 : Apply the Digital Electronics for domestic Application
CO5 : Explain the operation of communication System

Course:Engineering Practices Lab-[GE8261]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand wiring procedures practically
CO2 : Understand all the fundamental concepts involving electrical Engineering
CO3 : Handle basic electrical and electronics equipments
CO4 : Understand all the fundamental concepts involving Electronics Engineering
CO5 : Assemble basic electronic Components
Course:Environmental Sciences and Engineering-[GE8291]
Upon completion of the course, the students will.../ will be able to...
CO1 : Acquire knowledge about importance of environment education and ecosystem
CO2 : Understand that environmental pollution and its prevention
CO3 : Develope knowledge for the conservation of natural resources
CO4 : Analyze social and environmental problems
CO5 : Become aware of the need to control population for sustainable development
Course:Engineering Mechanics-[GE8292]
Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate force and moments of particles in space
CO2 : Analyze the rigid body in equilibrium.
CO3 : Estimate the properties of surfaces and solids.
CO4 : Analyze the dynamics of particles with respect to displacements
CO5 : Illustrate friction and its effect on elements of simple rigid bodies
Course:Technical English-[HS8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Read technical texts and write area- specific texts effortlessly.
CO2 : Listen and comprehend lectures and talks in their area of specialization successfully.
CO3 : Speak appropriately and effectively in varied formal and informal contexts.
CO4 : Write reports and winning job applications.
CO5 : Participate in Group discussions
Course:Engineering Mathematics II-[MA8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform.
CO2 : Explain the properties of matrices and vector differential operators.
CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions.
CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations.
CO5 : Evaluate analytic function, vector and complex integration using various methods.
Course:Physics for Civil Engineering-[PH8201]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basics of thermal behavior of materials, sound absorbing materials and new engineering materials to improve their engineering knowledge.
CO2 : Mention the Advanced prevention and safety measures of hazards and various design and measurements of light effects.
CO3 : Illustrate the importance of lighting design, designing of newer materials and analysis of hazards to assess societal and safety issues.
CO4 : Summarize the factors affecting acoustics of buildings and thermal performance of

	buildings.
CO5 :	Determine the heat gain and loss of different materials, measurement of day light and sound absorption coefficient of materials, identify the different properties of ceramics and different estimation techniques of hazards to enhance the development of society.
Course:Computer Aided Building Drawing-[CE8211]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software.
CO2 :	Students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
CO3 :	Acquire the knowledge in Computer aided drafting using Auto CAD software
CO4 :	Apply the concept of plan, elevation and sectional views of buildings in accordance with development and control rules satisfying orientation and functional requirements as per National Building Code
CO5 :	Understand the AutoCAD commands for drawing 2D building drawings required for different civil engineering applications.

Semester:3

Course:Strength of Materials I-[CE8301]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Describe the theory of stress, strain, forces, moment, torsion, deflection, principal stresses and principal plane.
CO2 :	Determine Shear force and bending moment in beams and understand concept of theory of simple bending.
CO3 :	Compute elastic constants, deflection, bending and torsional behavior of shaft and springs.
CO4 :	Analyze the beams, trusses, shaft and springs using alternate methods.
CO5 :	Draw shear force and bending moment diagram for beams and Mohr's circle for principal plane
Course:Fluid Mechanics-[CE8302]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Describe the concept of fluid properties in static, kinematic and dynamic equilibrium, pipe flow, boundary layer formation and model studies.
CO2 :	Illustrate fluid laws and theorems pertaining to loss of fluid head.
CO3 :	Identify and compare the characteristics of fluids in static kinematic and dynamic equilibrium, types of flow, boundary layer and model analysis.
CO4 :	Calculate the flow characteristics and pressure of fluid passing through closed pipes and open channels.
CO5 :	Evaluate the hydrostatic pressure of fluids, model studies and static, kinematic and dynamic equilibrium of fluids.
Course:Surveying-[CE8351]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Describe the principles and surveying techniques related to conventional and modern surveying.
CO2 :	Compare the methods of surveying and error sources in time systems.
CO3 :	Compute the bearings, levels, distances, and corrected values from the observed errors.

CO4 : Interpret the electronic surveying methods over conventional techniques.
CO5 : Plot the entire place using GPS by carrying out field work in surveying.

Course:Surveying Laboratory-[CE8361]

Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate the survey and collect field data
CO2 : Develop and Prepare field notes from survey data
CO3 : Interpret survey data and compute areas and volumes
CO4 : Relate the different methods and their procedure for levelling.
CO5 : Determine angle and distancebetween two points

Course:Construction Materials-[CE8391]

Upon completion of the course, the students will.../ will be able to...
CO1 : Check the quality of stones, bricksand concrete blocks including the manufacturing process
CO2 : Check the quality of cement, lime, aggregate and mortar
CO3 : Manufacturing concrete
CO4 : Define the properties of timber, plywood, veneer, steel, thermocol,and aluminium
CO5 : Select Required Modern Materials

Course:Engineering Geology-[CE8392]

Upon completion of the course, the students will.../ will be able to...
CO1 : Determine the importance of geology and geological features with engineering technology.
CO2 : Classify faults, folds and joints in rocks.
CO3 : Describe the types of rocks, their distribution and uses.
CO4 : Enumerate the geological methods to study the structure of rocks in earth crust.
CO5 : Differentiate dams, tunnels, bridges and reservoir for making of their engineering importance.

Course:Interpersonal Skills / Listening and Speaking-[HS8381]

Upon completion of the course, the students will.../ will be able to...
CO1 : Listen and respond appropriately
CO2 : Participate in group discussions
CO3 : Make effective presentations
CO4 : Speak clearly with proper stress and intonation
CO5 : Participate confidently and appropriately in conversations both formal and informal

Course:Transforms and Partial Differential Equations-[MA8353]

Upon completion of the course, the students will.../ will be able to...
CO1 : Solve first, second order homogeneous and non-homogeneous partial differential equations using standard methods and Fourier series method
CO2 : Find the Fourier series of a given function satisfying Dirchlet's condition
CO3 : Determine Fourier transform and z transforms of some standard functions
CO4 : Apply Fourier transform to evaluate certain definite Integrals and z transform to solve difference equations
CO5 : Formation of partial differential equations and difference equations

Course:Construction Materials Laboratory-[CE8311]

Upon completion of the course, the students will.../ will be able to...
CO1 : The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally.
CO2 : Gain knowledge on construction materials, properties, testing methods

CO3 :	Student knows the techniques to characterize various construction materials through relevant tests.
CO4 :	Students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
CO5 :	Understand the behaviour of fresh and hardened concrete members.

Semester:4

Course:Construction Techniques and Practices-[CE8401]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	know the different construction techniques and structural systems
CO2 :	Understand various techniques and practices on masonry construction, flooring, and roofing.
CO3 :	Plan the requirements for substructure construction.
CO4 :	Know the methods and techniques involved in the construction of various types of super structures
CO5 :	Plan the requirements for superstructure construction
Course:Strength of Materials II-[CE8402]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Interpret the basic concepts of strain energy and deflection of determinate beams, rigidly jointed and pin jointed plane frames
CO2 :	Analyze fixed beams, propped cantilever beams and continuous beams and to draw shear force as well as bending moment diagram
CO3 :	Determine the load carrying capacity and stresses induced in columns and to analyze thin cylinders and thick cylinders
CO4 :	Apply the different theories of failures on many practical cases
CO5 :	Choose proper method in designing of beams subjected to unsymmetrical bending curved bars in industries
Course:Applied Hydraulic Engineering-[CE8403]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Define the properties of uniform flow, gradually varied flow and rapidly varied flow.
CO2 :	compare the working principles and characteristics of hydraulic machines.
CO3 :	Solve the problems related to flow properties and hydraulic machines.
CO4 :	choose the best channel sections based on the uniform flow and hydraulic machines based on efficiency.
CO5 :	Estimate the flow profiles and energy dissipation.
Course:Concrete Technology-[CE8404]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Describe the materials, admixtures and properties and principles of mix design of concrete.
CO2 :	Make use of suitable materials, admixtures and mix proportion required for the preparation of concrete.
CO3 :	Analyze the properties of concrete and their effects due to the addition of admixtures.
CO4 :	Prioritize the types of cement, special concretes and properties of fresh and hardened concrete.
CO5 :	Develop concrete mix design for the required strength.

Course:Strength of Materials Laboratory-[CE8481]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Understand the basic concepts of stress, strain, deformation, and material behaviour under different types of loading (axial, torsion, bending).
CO2 :	Demonstrate the testing of different materials under the action of tensile load, compressive load, double shear and torsion
CO3 :	Calculate the young's modulus of steel and wooden materials by conducting deflection testing.
CO4 :	Determine the stiffness of open coil and closed coil springs by applying compressive and tensile load respectively.
CO5 :	Make use of equipment to assess special strength characteristics such as toughness and hardness experimentally.

Course:Soil Mechanics-[CE8491]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Students are able to Characterize and classify Soils and also Determine Index properties of soil
CO2 :	Students are able to analyze the effect of water and the concept of stress and permeability in soil
CO3 :	Students are able to Compute and Analyze the Consolidation Settlement
CO4 :	Students are able to Identify shear strength Parameters for field condition
CO5 :	Students are able to Understand the concept of stability analysis of slope protection as per soil condition

Course:Hydraulic Engineering Laboratory-[CE8461]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	To understand the concept of flow measuring devices.
CO2 :	Estimate the frictional losses in pipes and fittings.
CO3 :	Estimate the performance of pumps for specific applications.
CO4 :	Evaluate the performance of turbines based on flow and head.
CO5 :	Compute the meta centric height of floating body.

Course:Numerical Methods-[MA8491]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Familiarize with numerical solution of equations
CO2 :	Compute eigen values, eigen vectors and inverse of matrices using numerical methods
CO3 :	Understand the techniques of interpolation and approximation
CO4 :	Know different methods in numerical differentiation and integration
CO5 :	Apply various numerical techniques to solve ODE and PDE

Semester:5

Course:Design of Reinforced Cement Concrete Elements-[CE8501]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Describe the guiding principles of the serviceability limit state and the ultimate limit stat concepts.
CO2 :	Summarize the fundamental mechanics of reinforced concrete and the empirical assumption made for analysis.
CO3 :	Determine the fundamental machines to the design of RC beams, slabs and column by limit

state methods.
CO4 : Differentiate and check the strength and failure mode of structural element.
CO5 : Generate the basic structural elements like beams, columns slabs, footing and staircase according to IS code.

Course:Water and Waste Water Analysis Laboratory-[CE8512]

Upon completion of the course, the students will.../ will be able to...
CO1 : Determine the physical, chemical and biological characteristics of water and waste water.
CO2 : Compute the dosage requirement for coagulation process.
CO3 : Interpret the pollution concentration in water and waste water.
CO4 : Analyse the physico-chemical and biological parameters of water with regard to the water quality requirements.
CO5 : Examine the growth of micro-organisms in waste water.

Course:Foundation Engineering-[CE8591]

Upon completion of the course, the students will.../ will be able to...
CO1 : Interpret the processes in site investigation and selection of foundation
CO2 : Summarize the importance of bearing capacity of soil regarding the shallow foundation
CO3 : Design the footings in soil according to the diverse types of loads acting
CO4 : Analyze the lateral stability of pile foundation
CO5 : Evaluate the design parameters of retaining walls in construction

Course:Water Supply Engineering-[EN8491]

Upon completion of the course, the students will.../ will be able to...
CO1 : Define the drinking water supply systems, including water transport, treatment and distribution.
CO2 : Describe the structure and components of drinking water supply systems, including water transport, treatment and distribution.
CO3 : Demonstrate the unit operations and processes in water supply and treatment.
CO4 : Design the functional units of water supply, treatment and distribution.
CO5 : Interpret the elements of water quality, supply, treatment and their relation to public health, and water supply project alternatives.

Course:Geographic Information System (EL-I)-[GI8014]

Upon completion of the course, the students will.../ will be able to...
CO1 : Define the fundamentals of GIS, history of GIS, database structures, data input methods and basic aspects of data quality.
CO2 : Compare the raster and vector data models, open source and proprietary software, topology and non-topology.
CO3 : Demonstrate E-R models and raster, vector data models in GIS.
CO4 : Check the datum projection, interoperability, data quality and raster- vector conversion in data input and output.
CO5 : Generate ER diagram, spatial data models, GPS data integration and data output models.

Course:Environment and Agriculture (Open EL-I)-[OAI551]

Upon completion of the course, the students will.../ will be able to...
CO1 : Interpret the environment concerns on agriculture with water shortage and globalization.
CO2 : Analyze the Erosion, deposition in irrigation systems on agricultural drainage and downstream impacts

CO3 :	Monitor Global warming that changes environment in Ecosystem
CO4 :	Coordinate ecological diversity, wild life and agriculture and their impacts on the environment on Pollination crisis
CO5 :	Check the global environmental governance on mega farms and vertical farms with virtual water trade and its impacts on local environment

Course:Soil Mechanics Laboratory-[CE8511]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Prepare soil samples for testing, performing the test, collecting and analyzing data according to ASTM.
CO2 :	Apply the laboratory results to problem identification, quantification, and basic soil mechanics related design problem.
CO3 :	Demonstrate the ability to write clear technical lab reports.
CO4 :	Perform common soil tests to identify physical and mechanical properties of soils.
CO5 :	Evalute the soil mechanics tests and determines which test is needed in designing civil engineering projects.

Semester:6

Course:Ground Improvement Techniques (EL-II)-[CE8001]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Interpret the use of ground improvement techniques in engineering, seepage analysis, mechanical modification techniques of cohesion-less and cohesive soils, role of geotextiles and grouting equipment and stabilization of soil.
CO2 :	Identify and compare the geotechnical problems in variety of soils and methods of dewatering and stabilization for varying site conditions.
CO3 :	Examine the problematic soil and suggest suitable remedial measures based on the requirement of project
CO4 :	Evaluate the deficiencies if any in the deposits of a project area and capable of providing alternate methods to improve its character.
CO5 :	Design drainage, dewatering systems and reinforced earth retaining structures for complex civil engineering problems

Course:Air Pollution and Control Engineering-[CE8005]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Identify the major sources and sinks of air pollutants.
CO2 :	Understand the key chemical transformations of air pollutants.
CO3 :	Relate air pollution and noise pollution regulation and its scientific basis.
CO4 :	Analyze the different stacks and their plume patterns
CO5 :	Describe the engineering solutions to various air pollution problems.

Course:Structural Analysis II-[CE8602]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Describe the theory of influence line, arches, suspension cables and plastic analysis.
CO2 :	Distinguish the methods of analysis of arches, suspension bridges with stiffening girders, determinate and indeterminate beams frames and trusses.
CO3 :	Compute critical stresses concentrated and moving loads, absolute maximum bending moment, Settlement and temperature effects of cable and shape factor.
CO4 :	Analyze the beams, frames, trusses, arches and suspension bridges using alternate

methods.
CO5 : Draw influence lines for statically determinate structures and indeterminate structure.
Course:Irrigation Engineering-[CE8603]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the need, development, merits, and demerits of irrigation, Regime theory and crop season.
CO2 : Estimate various Efficiencies,Evapo transpiration and Consumptive use
CO3 : Demonstrate the Modernisation techniques and Management techniques
CO4 : Design various Irrigation Structures.
CO5 : Plan various Irrigation methods, Scheduling and Distribution methods.
Course:Highway Engineering-[CE8604]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the planning, design, construction, evaluation and maintenance aspects of highways.
CO2 : Describe the planning, design, construction, evaluation and maintenance of highways.
CO3 : Demonstrate the structure, construction methods, evaluation of pavements and testing of highway materials.
CO4 : Appraise the conventional and modern materials and methods of construction of pavements.
CO5 : Design the geometrics and the layers of flexible and rigid pavements.
Course:Wastewater Engineering-[EN8592]
Upon completion of the course, the students will.../ will be able to...
CO1 : Estimate sewage generation, sewerage systems and wastewater collection.
CO2 : Explain the basic concept of unit processes and operation.
CO3 : Design the conventional unit processes and operations for the treatment of water and wastewater.
CO4 : Select the conventional waste management and Secondary treatment processes.
CO5 : Discuss the method of sludge disposal and health safety and sustainability, disposal standards, effluent standards.
Course:Professional Communication-[HS8581]
Upon completion of the course, the students will.../ will be able to...
CO1 : Make effective Presentations.
CO2 : Participate confidently in Group Discussion.
CO3 : Attend job interviewsand be successful in them.
CO4 : Develop adequate Soft skills required for the work place.
CO5 : Develop a long term career- plan -Making career changes.
Course:Design of Steel Structural Elements-[CE8601]
Upon completion of the course, the students will.../ will be able to...
CO1 : Summarize basics of steel structural systems and its elements, its classifications and its advantages over reinforced concrete elements
CO2 : Classify the types of steel sections based on the various geometrical properties.
CO3 : Select a suitable type of connection and the corresponding design parameters for a particular joint for the different combinations of loads.
CO4 : Outline the step by step procedure to design tension, compression and flexural members under various circumstances.
CO5 : Justify the adoption of steel sections for a particular structural elements following various

checking conditions
Course:Highway Engineering Laboratory-[CE8611]
Upon completion of the course, the students will.../ will be able to... CO1 : Know the properties of aggregates and bitumen by performing tests. CO2 : Outline the properties of bituminous mixes by performing tests on it. CO3 : Evaluate the pavement condition by Benkelman Beam method CO4 : Demonstrate the application of field testing equipment CO5 : Test the road aggregates and bitumen for their suitability as road material
Course:Irrigation and Environmental Engineering Drawing-[CE8612]
Upon completion of the course, the students will.../ will be able to... CO1 :Demonstrate the basic perception of envirronmental and irrigation engineering structures. CO2 :Evalute the principles in the designing of structure. CO3 :Illustrate the engineering concepts in the substructure construction techniques. CO4 :Apply the safety principles to avoid risk in the construction sequences. CO5 :Examine the knowledge about the various roles of engineers in theconstruction

Semester:7

Course:Pavement Engineering(EL-III)-[CE8006]
Upon completion of the course, the students will.../ will be able to... CO1 : Demonstrate types of pavement, causes of distress and methods of stabilization of pavement. CO2 : Make use of suitable methods to assess the quality and serviceability of roads. CO3 : Examine the factors influencing the design of flexible and rigid pavement. CO4 : Evaluate the performance, stresses and deflections in pavements. CO5 : Design flexible and rigid pavements based on IRC guidelines.
Course:Estimation, Costing and Valuation Engineering-[CE8701]
Upon completion of the course, the students will.../ will be able to... CO1 : Infer the importance of estimation of quantities of items of work involved in buildings and details in plans, document, and valuation, and discriminate specification CO2 : Identify the current rates for items of work and book value for property CO3 : Compare the present values of buildings and the depreciation rate of buildings CO4 : Assess the contract document and prepare estimation, specification for the proposed work CO5 : Formulate specification, tender document and design basis report based on the requirement
Course:Railways, Air Ports,Docks and Harbour Engineering-[CE8702]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the concepts of planning, design, construction, and maintenance of railways, airports and harbours. CO2 : Describe the planning, design, construction, and maintenance aspects of railways, airports and harbours. CO3 : Demonstrate the structural components, layouts and design aspects of railways, airports and harbours. CO4 : Appraise the conventional and modern methods of construction and maintenance of railway tracks. CO5 : Design the geometrics of railways, airports and harbours.

Course:Testing of Materials (Open EL-II)-[OML751]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Understanding of professional and ethical responsibility in the areas of material testing.
CO2 :	Understand the mathematics and engineering in calculating the mechanical properties of structural materials.
CO3 :	Apply the techniques, skills and modern engineering tools necessary for engineering.
CO4 :	Analyse the function on multi-disciplinary teams in the area of materials testing.
CO5 :	Create to communicate effectively the mechanical properties of materials.
Course:Creative and Innovative Project (Activity Based -Subject Related)-[CE8711]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same. To train the students in preparing project reports and to face reviews and viva voce examination
Course:Industrial Training (4 weeks During VI Semester ? Summer)-[CE8712]	
Upon completion of the course, the students will.../ will be able to...	
CO1 : To understand the concept of development and implementation of new techniques.	

Semester:8

Course:Maintenance, Repair and Rehabilitation of Structures (EL-V)-[CE8020]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Summarize the importance of maintenance, effects in structures due to climate and temperature variations, techniques for repair and their protection methods.
CO2 :	Demonstrate the causes for deterioration and the repairing techniques to improve the service life of the structures elements.
CO3 :	Identify the damaged structure and maintain the engineering structures safely and effectively.
CO4 :	Categorize suitable type of concrete to strengthen the structures and the modern techniques and equipment being adopted for the demolition of large and hazardous structure in safe manner.
CO5 :	Assess the quality and durability of concrete and adopt suitable repair techniques and protection methods.
Course:Prefabricated Structures (EL-V)-[CE8022]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	State the standardization, structural components, joints and tolerance system of prefabrication.
CO2 :	Illustrate the production, construction of structural members, detailing and codal provisions.
CO3 :	Summarize the effects of abnormal loads and codal provisions..
CO4 :	Differentiate the erection processes, large panel construction and joint flexibility in prefabrication.
CO5 :	Interpret the Design principles of the structural members, expansion joints, connections and abnormal loads.
Course:Professional Ethics in Engineering (EL-IV)-[GE8076]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Demonstrate the basic perception of professional, industrial standards, codes of ethics

and role of profrssional ethics in engineering. CO2 : Develop the ethical principles for making of moral judgements. CO3 : Illustrate the engineering ethics and human values in the personal and professional life. CO4 : Apply the safety principles to avoid risk by being aware of their responsibilities and rights. CO5 : Examine the knowledge about the various roles of engineers in the professional life.
Course:Structural Design and Drawing-[CE8703]
Upon completion of the course, the students will.../ will be able to... CO1 : Gain a solid background on the working principles of various engineering structures such as Retaining Walls, flat slabs, reinforced concrete and steel bridges, reinforced concrete and steel water tanks, the various steel trusses and gantry girders and their elements. CO2 : Calculate the different kinds of external loads acting on the structures. CO3 : Analyse the structures in order to obtain the internal forces induced due to various load combinations. CO4 : Identify the critical elements/region having maximum amount of internal forces. CO5 : Do Design and detailing of structures by manual drawing, as per the specifications of Indian standard code books available for various structures.
Course:Project Work-[CE8811]
Upon completion of the course, the students will.../ will be able to... CO1 : Take up any challenging practical problems and find solution by formulating proper methodology.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Construction Engineering and Management

Semester:1

Course:Modern Construction Materials-[CN5101]
Upon completion of the course, the students will.../ will be able to...
CO1 : students will have the knowledge of different types of concrete such as high strength, high performances polymer concrete etc
CO2 : students will have the knowledge of modern construction metals to be used in the field.
CO3 : They know about the plastics FRP composites and their property
CO4 : They know about the properties of flooring and façade materials.
CO5 : They gain the knowledge of applications of different smart materials and modern materials in construction field.
Course:Statistical Methods for Engineers-[MA5165]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe characteristics of estimators , method of maximum likelihood estimation and method of moments
CO2 : Use statistical tests in testing hypotheses on data.
CO3 : Concept of linear regression, correlation, and its applications
CO4 : List the guidelines for designing experiments and recognize the key historical figures in Design of Experiments.
CO5 : Perform exploratory analysis of multivariate data, such as multivariate normal density, calculating descriptive statistics, testing for multivariate normality.
Course:Construction Planning, Scheduling and Control-[CN5103]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the basic concepts of planning, scheduling, accounting, quality control, safety and organization of data in construction
CO2 : Describe the planning concepts, scheduling procedures, cost and quality control, safety concerns, and data organization in construction
CO3 : Demonstrate project planning, scheduling and organization of data in databases
CO4 : Interpret scheduling techniques, quality control and safety in construction
CO5 : Generate construction plans, schedules, codings and budgets of construction projects
Course:Advanced Concrete Technology (EL-I)-[CN5001]
Upon completion of the course, the students will.../ will be able to...
CO1 : Discuss the concrete ingredient and its influencing at gaining strength
CO2 : Experimenting the various test conducted for concrete and concrete making materials
CO3 : Design the concrete mix design as per IS codes.
CO4 : Explain the application and the use of special concrete and the special methods of concreting and their properties
CO5 : Describe the manufacturing of concrete.
Course:Quantitative Techniques in management-[CN5003]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define operations research, production management, financial management and cost concepts
CO2 : Understand other concepts regarding estimation, planning, scheduling and accounting

CO4 : know the various quantitative methods applied to the elements of management
Course:Construction Equipment-[CN5102]
Upon completion of the course, the students will.../ will be able to... CO1 : Demonstrate the principles of Construction Equipment's and Management. CO2 : Classify the Equipment for Earthwork and Other Construction Equipment. CO3 : Estimate the cost of equipment and the amount of depreciation. CO4 : Illustrate the components of Asphalt and Concrete Plants. CO5 : Compare the Materials Handling Equipment.

Semester:2

Course:Computer Applications in Construction Engineering and Planning-[CN5203]
Upon completion of the course, the students will.../ will be able to... CO1 : To describe the basic concept of computer applications in construction management and planning CO2 : To articulate the computer applications in construction management and planning. CO3 : To analyze the applications of software in construction management and planning. CO4 : To predict the application of software in construction management CO5 : To validate the application of software in construction management
Course:Advanced Construction Techniques-[CN5201]
Upon completion of the course, the students will.../ will be able to... CO1 : Demonstrate the basic perception of modern consruction in engineering. CO2 : Evalute the principles of the super structure constructions. CO3 : Illustrate the engineering concepts in the substructure construction techniques. CO4 : Apply the safety principles to avoid risk in the demolition nd construction sequences. CO5 : Examine the knowledge about the various roles of engineers in theconstruction.
Course:Economics and Finance Management in Construction-[CN5204]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the basics of construction economics and finance including comparing and evaluating alternative proposals, management of funds, and management accounting. CO2 : Describe the concepts of construction economics and finance including comparing and evaluating alternative proposals, management of funds, and management accounting. CO3 : Demonstrate cash flow diagrams, and cash flow and funds flow statements. CO4 : Interpret the interest rates and, the methods of comparing alternative proposals and depreciation CO5 : Generate cash flow and funds flow statements.
Course:Construction Project Management-[CN5006]
Upon completion of the course, the students will.../ will be able to... CO1 : understand the owners perspectives , evolution of management and organizations CO2 : understand the planning objectives in management CO3 : understand the construction process in the field. CO4 : understand the various labour ,material utilization CO5 : understand various cost estimation.
Course:Construction Personal Management-[CN5007]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the various processes in manpower planning, organizational and human resource

management.
CO2 : Describe the various welfare and development policies and methods in construction.
CO3 : Demonstrate the importance of management at management at organizational leveland its impacts.
CO4 : Appraise the concept onTQM and need for automation in construction.
CO5 : Define the various insurances , housing and pension schemes in construction industry.
Course:Contract Laws and Regulations-[CN5202]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the Basic concept &Terminology of law of contract
CO2 : Describe the procedure for contract ,Tender , Arbitration
CO3 : Distinguish among the various process involved in contract Formation
CO4 : Identify the relevant legal aspects ,legal requirements and provision
CO5 : Explain the law of labour regulations
Course:Advanced Construction Engineering and Computing Techniques Laboratory-[CN5211]
Upon completion of the course, the students will.../ will be able to...
CO1 : The students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally
CO2 : Gain knowledge on construction materials, properties, testing methods
CO3 : Student knows the techniques to characterize various construction materials through relevant tests.
CO4 : Students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.
CO5 : Understand the quantity takeoff and simulation models for projects.

Semester:3

Course:Resource Management and Control in Construction (EL-VI)-[CN5010]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify the resources and it's usage in construction Industry
CO2 : Describe the needs of labours management
CO3 : Demonstrate the selection of material and equipment
CO4 : Determine the flow of time in construction projects
CO5 : Formulate the allocation levelling of resources
Course:Project Safety Management (EL-V)-[CN5011]
Upon completion of the course, the students will.../ will be able to...
CO1 : explain the theoretical basis for the different methods and tools in use to identify, analyse and evaluate accident risks and remedial actions.
CO2 : choose and assess appropriate methods and tools for a systematic and efficient accident prevention work in industrial organisations and projects.
CO3 : apply accident models for analysis of accidents ,methods for accident investigation at different levels, methods for safety audits.
CO4 : analyse incident databases, choose and recommend efficient preventive measures.
CO5 : solve practical task in operational safety management and recognize principles behind Norwegian and European safety legislation.
Course:Quality Control and Assurance in Construction-[CN5301]

Upon completion of the course, the students will.../ will be able to... CO1 : Describe about the quality management in construction. CO2 : Enumerate quality systems in construction. CO3 : Determine quality planning in construction CO4 : Implement quality assurrance in construction. CO5 : Illustrate quality improvement techniques in construction
Course:Practical Training II (2 Weeks)-[CN5311]
Upon completion of the course, the students will.../ will be able to... CO1 : To understand the concept of development and implementation of new techniques.
Course:Seminar-[CN5312]
Upon completion of the course, the students will.../ will be able to... CO1 : Show competence in identifying relevant information, defining and explaining topics under discussion. CO2 : Speak clearly and audibly in a manner appropriate to the subject, ask appropriate questions, respond to a range of questions, and take part in meaningful discussion to reach a shared understanding. CO3 : Demonstrate the ability to pay close attention to what others say and respond constructively. CO4 : Present information in a well-structured, and logical sequence, respond respectfully to opposing ideas, and develop the ability to synthesize, evaluate and reflect on information. CO5 : Demonstrate through asking appropriate questions, the understanding of discussions and spark further discussion.
Course:Project Work (Phase I)-[CN5313]
Upon completion of the course, the students will.../ will be able to... CO1 : The students will able to acquire sufficient kknowledge in the related area and identify the systematic approach to carryout their phase ii project in a well manner.

Semester:4

Course:Practical Training -III-[CN5411]
Upon completion of the course, the students will.../ will be able to... CO1 : To understand the concept of development and implementation of new techniques.
Course:Project Work (Phase-II)-[CN5412]
Upon completion of the course, the students will.../ will be able to... CO1 : On completion of this course, the students will be in a position to manage construction industry efficiently and also pusue the research activities in a systematic way.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Structural Engineering

Semester:1

Course:Advanced Mathematical Methods-[MA5151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Apply Laplace and Fourier transforms to initial value, initial –boundary value and boundary value problems in Partial Differential Equations.
CO2 : Maximize and minimize the functional that occur in various branches of Engineering Disciplines.
CO3 : Construct conformal mappings between various domains and use of conformal mapping in studying problems in physics and engineering particularly to fluid flow and heat flow problems.
CO4 : Understand tensor algebra and its applications in applied sciences and engineering and develops ability to solve mathematical problems involving tensors
CO5 : use tensor analysis as a tool in the field of applied sciences and related fields.
Course:Maintenance and Rehabilitation of Structures (EL-I)-[ST5001]
Upon completion of the course, the students will.../ will be able to...
CO1 : Monitor distress and find causes
CO2 : Recognize cracks and repair
CO3 : Identify moisture sourse and preventive measure
CO4 : Identify causes and deterioration and remedial measures
CO5 : Demonstrate the strengthening of existing structures
Course:Advanced Concrete Structures-[ST5101]
Upon completion of the course, the students will.../ will be able to...
CO1 : Knowledge in the design of reinforced concrete members and structures
CO2 : Perform analysis and design of reinforced concrete members and connections.
CO3 : Design and detailing of special structures
CO4 : Interpret plastic behavior of structures
CO5 : Identify the relevant ductile detailing to withstand earthquake loads
Course:Prefabricated Structures (EL-II)-[ST5002]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the design principles associated with the prefabricated structures and the various components used for the construction.
CO2 : Describe the methods, materials and equipments used for the components and joints in a prefabricated structure
CO3 : Interpret the various technologies used from the manufacturing process to the installation process.
CO4 : Explain the various types available in each prefabricated component and the mechanisms of transfer of loads and deflection.
CO5 : Design floors, stairs,roof,walls and industrial buildings and various joints for the connections.
Course:Dynamics of Structures-[ST5102]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the basics of dynamics, equation of motion for SDOF and MDOF and modal

	super position method and modal analysis.
CO2 :	Calculate the dynamic responses due to diverse types of dynamic loads.
CO3 :	Interpret the dynamic performances of MDOF regarding to masses and stiffnesses and the contribution of each mode in total response.
CO4 :	Students will be familiar with the selection of method suitable for analyzing continuous and other complex structures.
CO5 :	Students will be aware of the various numerical methods available for analyzing nonlinear system and systems with randomly distributed load.

Course:Theory of Elasticity and Plasticity-[ST5103]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze the fundamentals of stress and strain and formulate the compatibility equations.
CO2 : Illustrate plane stress and plane strain conditions and solve real life problems.
CO3 : Analyse torsional behavior of thin walled closed and open sections.
CO4 : Describe the methods of analysis and solution by finite difference method.
CO5 : Compare various theories of failure and apply the principles of plasticity to solve complex problems

Semester:2

Course:Prestressed Concrete-[ST5009]
Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate the fundamentals of prestressing, flexural members, continuous beams, tension and compression members and composite structures.
CO2 : Relate the concept of Composite members with practical application
CO3 : Analyse the structural elements of prestressed and composite members.
CO4 : Evaluate the losses and deflection, shear and torsion, and stresses in water tanks and other prestressed members.
CO5 : Design continuous beams by understanding the concept of concordant cable profile and other structural elements.

Course:Wind and Cyclone Effects on Structures-[ST5010]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the behavior of wind and cyclone effects on various types of structures.
CO2 : Make use of various code provisions for the design of structures for wind load.
CO3 : Analyse the effects of wind and cyclone on low rise and tall buildings.
CO4 : Assess the static and dynamic effects on flexible and rigid structures through wind tunnel studies.
CO5 : Design high rise structures subjected wind load, even structures exposed to cyclone.

Course:Advanced Steel Structures-[ST5201]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to design the structural members subjected to combined forces
CO2 : Perform analysis and design of bolted connections of industrial structures.
CO3 : Design and detailing of industrial buildings.
CO4 : Interpret plastic behavior of structures
CO5 : Identify the relevant detailing and design light gauge steel structures as per codal provisions.

Course:Stability of Structures-[ST5202]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understanding the buckling effect of structural elements
CO2 : Understanding the mathematical problems in structural elements
CO3 : Applying differential equation and different methods in structural elements
CO4 : Analysis of buckling effect of beam, column, and plate
CO5 : Create to communicate inelastic behavior of different methods
Course:Earthquake Analysis and Design of Structures-[ST5301]
Upon completion of the course, the students will.../ will be able to...
CO1 : Knowledge on various earthquake resistance techniques in different structures
CO2 : Summarize and compare the various methods of dynamic loading
CO3 : Compute the vibration behavior in structural and non-structural member
CO4 : Differentiate the seismic motion in various structure.
CO5 : Evaluate seismic hazards from past Earthquake.
Course:Experimental Techniques-[ST5203]
Upon completion of the course, the students will.../ will be able to...
CO1 : Knowledge about measurement and its principle
CO2 : Identify the distress using various equipments
CO3 : Acquire skills for carrying out tests and ensure safety of the structures
CO4 : Operate various vibration measuring instruments a d analyze the structures .
CO5 : Evluate the models using direct and indirect modelling
Course:Finite Element Analysis of Structures-[ST5204]
Upon completion of the course, the students will.../ will be able to...
CO1 : To study the basics of finite element analysis, its approximation, tackling errors induced and the step by step procedure involved in analysing various structures.
CO2 : To understand the pioneer methods to finite element analysis and their comparison.
CO3 : To apply the finite element analysis procedure on various structures in order to calculate the internal forces
CO4 : To interprete the results by varying the various parameterS
CO5 : To evaluate the static as well as dynamics performances of various structures using any finite element analysis software
Course:Advanced Structural Engineering Laboratory-[ST5211]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will able to cast and test Reinforced concrete beams for strength and deformation behavior.
CO2 : Gain knowledge about the effects of admixtures in workability.
CO3 : Analyze the behavior of rolled steel beams under different loading condition.
CO4 : Apply non-destructing testing of concrete in existing structures
CO5 : Evaluate the strength behavior of the column and beam model.

Semester:3

Course:Design of Steel Concrete Composite Structures-[ST5014]
Upon completion of the course, the students will.../ will be able to...
CO1 : Generalize the knowledge in design concrete composite elements and structures.
CO2 : Understanding the behavior of concrete composite elements and structures

CO3 : Applying knowledge in design of composite beams, columns, trusses and box girder bridges
CO4 : Analysis the position to design composite beams, columns, trusses and box - girder bridges including the related connections.
CO5 : Create exposure on case studies related to steel - concrete constructions of buildings.
Course:Design of Bridges-[ST5015]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the bridge components and Design methods of solid deck slab
CO2 : Analyse slab and beams and find maximum bending moment
CO3 : Design slab and beams for maximum bending moment
CO4 : Calculate the forces on the steel bridge and Design its components
CO5 : List the types of fundation, Bearing of bridge and design its components.
Course:Earthquake Analysis and Design of Structures-[ST5301]
Upon completion of the course, the students will.../ will be able to...
CO1 : Knowledge on various earthquake resistance techniques in different structures
CO2 : Summarize and compare the various methods of dynamic loading
CO3 : Compute the vibration behavior in structural and non-structural member
CO4 : Differentiate the seismic motion in various structure.
CO5 : Evaluate seismic hazards from past Earthquake.
Course:Practical Training II (2 weeks)-[ST5311]
Upon completion of the course, the students will.../ will be able to...
CO1 : To understand the concept of development and implementation of existing as well as new techniques.
Course:Seminar-[ST5312]
Upon completion of the course, the students will.../ will be able to...
CO1 : Show competence in identifying relevant information, defining and explaining topics under discussion.
CO2 : Speak clearly and audibly in a manner appropriate to the subject, ask appropriate questions, respond to a range of questions, and take part in meaningful discussion to reach a shared understanding
CO3 : Demonstrate the ability to pay close attention to what others say and respond constructively
CO4 : Present information in a well-structured, and logical sequence, respond respectfully to opposing ideas, and develop the ability to synthesize, evaluate and reflect on information.
CO5 : Demonstrate through asking appropriate questions, the understanding of discussions and spark further discussion.
Course:Project Work (Phase I)-[ST5313]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of literature.
CO2 : Develop the methodology to solve the identified problem.
CO3 : Preparing project reports and to face reviews and viva-voce examination

Semester:4

Course:Practical Training -III-[ST5411]
Upon completion of the course, the students will.../ will be able to...
CO1 : To understand the concept of development and implementation of existing as well as new techniques
Course:Project Work (Phase-II)-[ST5412]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identified problem based on the formulated methodology
CO2 : Develop skills to analyze and discuss the test results, and make conclusions

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.
Course Outcomes
Program:B.E. Computer Science and Engg. (Sec-A)
2020 -- 2021

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulii of elasticity used in day to day engineering applications
CO2 : Estimate the optical parameters of visible and laser sources along with their applications in various fields
CO3 : Calculate the band gap of semiconducting materials.
CO4 : Determine the water quality parameters (DO, Chloride, Cu content, Alkalinity and hardness) of the given water sample.
CO5 : Analyse quantitatively the metals (Fe, Na and Cu) in the given sample using potentiometer, flame photometer and Understand how conductometric titrations are better than volumetric titrations and the skill to do the experiment.
Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the methods of water purification
CO2 : Define the terms in phase rule and adsorption
CO3 : Explain the types of Energy resources**.**
CO4 : Determine the composition and characteristics of fuels and alloys
CO5 : Classify the types of water, fuels and alloys
Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 :Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 :Write and execute simple Python programs.
CO3 :Develop Python programs for complex problems.
CO4 :Apply basic and compound data types, functions and files to implement Python programs
CO5 :Design and analyse algorithms, modules and packages.
Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the fundamentals and standards of Engineering graphics
CO2 : Apply freehand sketching of basic geometrical constructions and multiple views of objects.
CO3 : Analyze orthographic projections of lines and plane surfaces.
CO4 : Analyze projections and solids and development of surfaces.
CO5 : Analyze isometric and perspective sections of simple solids.
Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write, test and debug simple Python Programs
CO2 : Implement Python Programs with conditionals and looping statements
CO3 : Develope Python Programs using functions
CO4 : Use Python lists,tuples ,dictionaries for representing compound data

CO5 : Read and write data from/to files and write programs using python packages
Course:Communicative English-[HS8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Learn vocabulary, skim and scan passages and share information related to one/oneself/ family and friends
CO2 : Improve their telephonic conversation skills, general reading and free writing skills and language skills through preposition and conjunction.
CO3 : Acquire language skills through degrees of comparison, pronouns and direct indirect questions, comprehend short and long passages, describe products and express opinions.
CO4 : Improve their language skills through reading, draft e-mails and personal letters ans use correct tenses in the language usage.
CO5 : Write short essays and dialogues and participate in group activities.
Course:Engineering Mathematics - I-[MA8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the representation of a function, limit and continuity of a function.
CO2 : Describe the techniques of differentiation, partial differentiation, integration and D.E.
CO3 : Solve maxima and minima of one variable and two variables
CO4 : Compute proper integral, improper integral and multiple integrals
CO5 : Apply various techniques in solving differential equations.
Course:Engineering Physics-[PH8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge
CO2 : mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials
CO3 : illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues
CO4 : summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals
CO5 : determine the Moduli of elasticity of different materials, Eigen value and Eigen function of particles, Working of thermal devices

Semester:2

Course:Basic Electrical,Electronics and Measurement Engineering-[BE8255]
Upon completion of the course, the students will.../ will be able to...
CO1 : Solve the electric circuits by applying basic laws and theorems.
CO2 : Explain the construction, principle and performance of electrical machines.
CO3 : Describe the different renewable sources, batteries and protective devices.
CO4 : Discuss the basic electronics circuits using diode, transistor and op-amps.
CO5 : Outline the operation of various measuring instruments and transducers.
Course:Programming in C-[CS8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop simple applications in C using basic constructs
CO2 : Design and implement applications using arrays and strings
CO3 : Develop and implement applications in C using functions and pointers

CO4 : Develop applications in C using structures CO5 : Design applications using sequential and random access file processing
Course:C Programming Laboratory-[CS8261]
Upon completion of the course, the students will.../ will be able to... CO1 : Develop C programs for simple applications by making use of basic constructs CO2 : Develop C programs using arrays and strings CO3 : Develop C programs involving functions, recursion, pointers, and structures CO4 : Design applications using sequential and random access file processing CO5 : Create a mini project for an application
Course:Engineering Practices Laboratory-[GE8261]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand wiring procedures practically CO2 : Understand all the fundamental concepts involving electrical Engineering CO3 : Handle basic electrical and electronics equipments CO4 : Understand all the fundamental concepts involving Electronics Engineering CO5 : Assemble basic electronic Components
Course:Environmental Science and Engineering-[GE8291]
Upon completion of the course, the students will.../ will be able to... CO1 : Outline the importance of Environmental education and ecosystem CO2 : Explain the environmental problems and its prevention CO3 : Discuss the conservation of natural resources CO4 : Categorize social and social and environmental problems CO5 : Summarize the need to control population for sustainble development
Course:Technical English-[HS8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Read technical texts and write area specific texts effortlessly CO2 : Listen and comprehend lectures and talks in their area of specialization successfully. CO3 : speak appropriately and effectively in varied formal and informal contexts. CO4 : Write reports and winning job applications. CO5 : participate in Group Discussions.
Course:Engineering Mathematics II-[MA8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform. CO2 : Explain the properties of matrices and vector differential operators. CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions. CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations. CO5 : Evaluate analytic function, vector and complex integration using various methods.

Course:Physics for Information Sciences-[PH8252]
Upon completion of the course, the students will.../ will be able to... CO1 : Mention the concepts of classical and quantum electron theories, and energy band structures CO2 : Summarize the basics of Semiconductor Physics and their applications in various devices

CO3 : Describe the magnetic properties of materials and their applications in data storage CO4 : Illustrate the functioning of optical materials for optoelectronics CO5 : Describe various quantum structures and their applications in carbon electronics.
Course:Engineering Mathematics II-[MA8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform. CO2 : Explain the properties of matrices and vector differential operators. CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions. CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations. CO5 : Evaluate analytic function, vector and complex integration using various methods.

Semester:3

Course:Digital Principles and System Design-[CS8351]
Upon completion of the course, the students will.../ will be able to... CO1 : Simplify Boolean functions using KMap. CO2 : Design and Analyze Combinational Circuits. CO3 : Design and Analyze Sequential Circuits. CO4 : Implement designs using Programmable Logic Devices. CO5 : Write HDL code for combinational and Sequential Circuits.
Course:Data Structures Laboratory-[CS8381]
Upon completion of the course, the students will.../ will be able to... CO1 : Write functions to implement linear and non-linear data structure operations CO2 : Suggest appropriate linear / non-linear data structure operations for solving a given problem CO3 : Appropriately use the linear / non-linear data structure operations for a given problem CO4 : Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval CO5 : Identify and use a suitable data structure and algorithm to solve a real world problem
Course:Object Oriented Programming Laboratory-[CS8383]
Upon completion of the course, the students will.../ will be able to... CO1 : Develop and implement Java programs for simple applications that make use of classes, packages and interfaces CO2 : Develop and implement Java programs with array list and exception handling CO3 : Develop and implement Java programs with multithreading. CO4 : Design applications using file processing and generic programming. CO5 : Design applications using swings and event handling.
Course:Data Structures-[CS8391]
Upon completion of the course, the students will.../ will be able to... CO1 : Implement the list ADT and apply for complex engineering issues. CO2 : Implement the stack and queue ADT for having a high level of understanding. CO3 : Have a good knowledge of heap, search tree data structures and implement tree ADT CO4 : Analyse and implement graph data structures. CO5 : Apply searching, sorting and hashing techniques.

Course:Object Oriented Programming-[CS8392]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basic concepts of OOP and fundamentals in Java.
CO2 : Write simple programs in Java and analyze the OOP concepts.
CO3 : Build Java applications using exceptions and I/O streams.
CO4 : Develop Java applications with threads and generics classes.
CO5 : Design interactive Java programs using swings.
Course:Communication Engineering-[EC8395]
Upon completion of the course, the students will.../ will be able to...
CO1 : Summarize the analog communication techniques and its effects on communication receiver.
CO2 : Evaluate the performance of PCM, DPCM, DM in digital Communication systems.
CO3 : Compute the probability error in digital modulated signals.
CO4 : Analyze different source coding and channel coding schemes for the given communication system
CO5 : Identify the multiple access method for data transmission depending on channel model.
Course:Interpersonal Skills / Listening and Speaking-[HS8381]
Upon completion of the course, the students will.../ will be able to...
CO1 : Listen and respond appropriately
CO2 : Participate in group discussions
CO3 : Make effective presentations
CO4 : Speak clearly with proper stress and intonation
CO5 : Participate confidently and appropriately in conversations both formal and informal
Course:Discrete Mathematics-[MA8351]
Upon completion of the course, the students will.../ will be able to...
CO1 : Have knowledge of the concepts needed to test the logic of a program
CO2 : Be aware of the counting principles
CO3 : Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science
CO4 : Be exposed to concepts and properties of algebraic structures such as groups, rings and fields
CO5 : Have an understanding in identifying structures on many levels and being exposed to concepts and properties of algebraic structures such as groups, rings and fields
Course:Digital Systems Laboratory-[CS8382]
Upon completion of the course, the students will.../ will be able to...
CO1 : To understand the various basic logic gates
CO2 : Implement simplified combinational circuits using basic logic gates
CO3 : Implement combinational circuits using MSI devices
CO4 : Implement sequential circuits like registers and counters
CO5 : Simulate combinational and sequential circuits using HDL

Semester:4

Course:Operating Systems Laboratory-[CS8461]
Upon completion of the course, the students will.../ will be able to...
CO1 : Compare the performance of CPU scheduling algorithms and understand the usage of UNIX command and shell programming
CO2 : Implement deadlock avoidance and detection algorithms
CO3 : Implement semaphores and IPC
CO4 : Analyze the performance of the various page replacement algorithms
CO5 : Implement file organization and file allocation strategies
Course:Database Management Systems Laboratory-[CS8481]
Upon completion of the course, the students will.../ will be able to...
CO1 : Make use of typical data definitions and manipulation commands
CO2 : Analyse the database using queries to retrieve records
CO3 : Applying PL/SQL for processing database
CO4 : Analyse front end tools to design forms ,reports and menus
CO5 : Develop solutions using databae concepts for real time requirements
Course:Computer Architecture-[CS8491]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basic structure and operations of digital computer
CO2 : Design of arithmetic and logical unit.
CO3 : Design and Analysis of pipelined control units
CO4 : Evaluate the concepts of parallel processing architecture
CO5 : Classify the organization of different memory systems and I/O communication.
Course:Database Management Systems-[CS8492]
Upon completion of the course, the students will.../ will be able to...
CO1 : Classify the modern and futuristic database applications based on size and complexity
CO2 : Map ER model to Relational model to perform database design effectively
CO3 : Write queries using normalization criteria and optimize queries
CO4 : Compare and contrast various indexing strategies in different database systems
CO5 : Appraise how advanced databases differ from traditional databases
Course:Operating Systems-[CS8493]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the structure and functions of OS
CO2 : Apply scheduling algorithms, deadlock prevention and avoidance algorithm
CO3 : Compare and Analyze memory management schemes
CO4 : Outline the IO systems and file systems
CO5 : Perform administrative tasks on Linux servers and create a virtual machines
Course:Software Engineering-[CS8494]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify the Key activities in managing a Software Project.
CO2 : Summarize the concepts of requirements analysis and Analysis Modeling
CO3 : Apply systematic procedure for software design and deployment
CO4 : Compare and contrast the various testing and maintenance.
CO5 : Manage project Schedule, Estimate project cost and Effort Required
Course:Advanced Reading and Writing-[HS8461]

Upon completion of the course, the students will.../ will be able to... CO1 : Read and comprehend texts. CO2 : Read and evaluate texts critically. CO3 : Write different types of essays. CO4 : Write winning job applications. CO5 : Display critical thinking in various professional contexts.
Course:Probability and Queueing Theory-[MA8402]
Upon completion of the course, the students will.../ will be able to... CO1 : know the concept of probability, random variables, random processes and queueing models. CO2 : Classify the mgf, distributions, transformation of random variable and random processes. CO3 : understand the ideas of single and multiple server queueing models and P-K formula. CO4 : Apply discrete and continuous random variable, markov and Poisson processes. CO5 : Apply queueing models with finite and infinite capacity, series and open Jackson Networks.

Semester:5

Course:Theory of Computation-[CS8501]
Upon completion of the course, the students will.../ will be able to... CO1 : Demonstrate the basic concepts of Mathematical proof, Automata theory, Context free grammar, Push down automata, Turing machine and Undecidable Problem. CO2 : Design Finite Automata, Push down automata and Turing machines. CO3 : Distinguish the computing languages and classify their respective Types. CO4 : Propose computation solutions using Turing machines. CO5 : Prove the decidability and intractability of computational problems.
Course:Networks Laboratory-[CS8581]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the basic network commands and to implement various applications using TCP and UDP sockets. CO2 : Simulate datalink layer protocols. CO3 : Use simulation tools to analyze the performance of various network protocols. CO4 : Analyse various routing algorithms CO5 : Implement error correction codes.
Course:Object Oriented Analysis and Design Laboratory-[CS8582]
Upon completion of the course, the students will.../ will be able to... CO1 : Perform OO analysis and design for a given problem specification. CO2 : Identify and map basic software requirements in UML mapping. CO3 : Design by applying appropriate design patterns. CO4 : Improve the software quality using design patterns and to explain the rationale behind applying specific design pattern CO5 : Test the compliance of the software with the SRS
Course:Computer Networks-[CS8591]
Upon completion of the course, the students will.../ will be able to... CO1 : describe the basic layers and its function in computer networks CO2 : evaluate the performance of a network.

CO3 : analyze routing algorithms. CO4 : outline the functions of transport layer protocols CO5 : interpret the working of various application layer protocols.
Course:Object Oriented Analysis and Design-[CS8592]
Upon completion of the course, the students will.../ will be able to... CO1 : Design and implement projects using OO concepts CO2 : Use the UML analysis and design diagrams. CO3 : Apply appropriate design patterns CO4 : Create code from design CO5 : Compare and contrast various testingtechniques
Course:Microprocessors and Microcontrollers-[EC8691]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand programs based on 8086 microprocessor CO2 : Describe the Memory Interfacing circuits CO3 : Interface Input/output circuits CO4 : Realize architecture and programming language of 8051 microcontroller. CO5 : Design 8051 microcontroller based systems
Course:Air Pollution and Control Engineering-[OCE551]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the nature and characteristics of air pollution,noise pollution and basic concepts of air quality management CO2 : explain and solve air and noise pollution problems CO3 : design stack and particulate air pollution control devices CO4 : detect air pollution control equipments CO5 : design indoor air pollution control devices
Course:Microprocessors and Microcontrollers Laboratory-[EC8681]
Upon completion of the course, the students will.../ will be able to... CO1 : Write ALP Programmes for fixed and Floating Point and Arithmetic operations CO2 : Interface different I/Os with processor CO3 : Generate waveforms using Microprocessors CO4 : Execute Programs in 8051 CO5 : Explain the difference between simulator and Emulator
Course:Algebra and Number Theory-[MA8551]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the efficient use of advanced algebraic techniques and Number theory. CO2 : Prove simple theorems about the statements proven by the text in advanced algebraic techniques and Number theory CO3 : Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts CO4 : Apply the basic notions of groups, rings, fields which will then be used to solve related problems CO5 : Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.

Semester:6

Course:Data Warehousing and Data Mining-[CS8075]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the techniques and methods of data warehousing and mining.
CO2 : Analyze the reporting and querying tools for data visualization
CO3 : Apply data mining tools to discover the knowledge in data warehouse.
CO4 : Apply appropriate classification and clustering techniques for data analysis
CO5 : Apply data mining tools to discover the knowledge in data warehouse.
Course:Mobile Computing-[CS8601]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basics of mobile telecommunication systems.
CO2 : Illustrate the generations of telecommunication systems in wireless networks.
CO3 : Determine the functionality of MAC, network layer and identify a routing protocol for a given Ad hoc network.
CO4 : Explain the functionality of Transport and Application layers.
CO5 : Develop a mobile application using android/blackberry/iOS/Windows SDK.
Course:Compiler Design-[CS8602]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the different phases of compiler.
CO2 : Design a lexical analyzer for a sample language.
CO3 : Apply different parsing algorithms to develop the parsers for a given grammar.
CO4 : Understand syntax-directed translation and run-time environment.
CO5 : Learn to implement code optimization techniques and a simple code generator.
Course:Distributed Systems-[CS8603]
Upon completion of the course, the students will.../ will be able to...
CO1 : Elucidate the foundations and issues of distributed systems
CO2 : Understand the various synchronization issues and global state for distributed systems
CO3 : Comprehend the Mutual Exclusion and Deadlock detection algorithms in distributed systems
CO4 : Show the use of agreement protocols and fault tolerance mechanisms in distributed systems.
CO5 : Relate the features of peer-to-peer and distributed shared memory systems and Interpret the real-time distributed system applications
Course:Internet Programming-[CS8651]
Upon completion of the course, the students will.../ will be able to...
CO1 : Construct a basic website using HTML and Cascading Style Sheets.
CO2 : Design dynamic web page with validation using JavaScript objects.
CO3 : Develop server-side programs using Servlets and JSP.
CO4 : Implement simple web page in PHP, and to present data in XML format.
CO5 : Develop rich client presentation using AJAX and Web Service Applications.
Course:Internet Programming Laboratory-[CS8661]
Upon completion of the course, the students will.../ will be able to...
CO1 : Construct Web pages using HTML/XML and style sheets.
CO2 : Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.

CO3 : Develop dynamic web pages using server side scripting.
CO4 : Develop web applications using PHP programming.
CO5 : Construct web applications using AJAX and web services.

Course:Mobile Application Development Laboratory-[CS8662]

Upon completion of the course, the students will.../ will be able to...
CO1 : Develop mobile applications using GUI and Layouts.
CO2 : Develop mobile applications using Event Listener.
CO3 : Develop mobile applications using Databases.
CO4 : Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.
CO5 : Analyze and discover own mobile app for simple needs.

Course:Artificial Intelligence-[CS8691]

Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate the basic concepts and use appropriate search algorithms for Artificial Intelligent problems
CO2 : Represent a problem using first order and predicate logic
CO3 : Provide the apt agent strategy to solve a given problem
CO4 : Design software agents to solve a problem
CO5 : Design applications for Natural Language Processing that use Artificial Intelligence.

Course:Intellectual Property Rights-[GE8075]

Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basic concepts of IPR and history of IPR policy
CO2 : Understand and apply registration process of IPRs
CO3 : Learn various policies and principles of IPR
CO4 : Analyze IP laws in cyber security domains
CO5 : Apply the knowledge and evaluate the IP infringement and enforcement measure

Course:Professional Communication-[HS8581]

Upon completion of the course, the students will.../ will be able to...
CO1 : Make effective presentations
CO2 : Participate confidently in group discussion
CO3 : Attend job interviews and be successful in them
CO4 : Develop adequate Soft Skills required for the workplace
CO5 : Develop a long term career plan- making career changes

Course:Mini Project-[CS8611]

Upon completion of the course, the students will.../ will be able to...
CO1 : Identify and Finalize problem statement by surveying variety of domains.
CO2 : Perform requirement analysis and identify design methodologies
CO3 : Apply advanced programming techniques to develop solutions to the problem
CO4 : Test the quality of the proposed method by evaluation metrics
CO5 : Present technical report by applying different visualization tools.

Semester:7

Course:Human Computer Interaction-[CS8079]
Upon completion of the course, the students will.../ will be able to...
CO1 :Design effective dialog for HCI
CO2 : Design effective HCI for individuals and persons with disabilities
CO3 :Assess the importance of user feedback
CO4 :Explain the HCI implications for designing multimedia/ ecommerce/ elearning Web sites
CO5 :Develop meaningful user interface
Course:Cloud Computing Laboratory-[CS8711]
Upon completion of the course, the students will.../ will be able to...
CO1 : Configure various virtualization tools such as Virtual Box, VMware workstation.
CO2 : Design and deploy a web application in a PaaS environment.
CO3 : Learn how to simulate a cloud environment to implement new schedulers.
CO4 : Demonstrate generic cloud environment that can be used as a private cloud
CO5 : Manipulate large data sets in a parallel environment.
Course:Cloud Computing-[CS8791]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explore the main concepts, key enabling technologies, strengths and limitations of cloud computing.
CO2 : Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.
CO3 : Understand the core issues of cloud computing such as resource management and security.
CO4 : Design and use current cloud technologies.
CO5 : Analyse and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.
Course:Cryptography and Network Security-[CS8792]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2 : Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3 : Apply the different cryptographic operations of public key cryptography
CO4 : Apply the various Authentication schemes to simulate different applications.
CO5 : Understand various Security practices and System security standards
Course:Total Quality Management-[GE8077]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to understand quality management philosophies, frameworks and able to evaluate the strategies for customer satisfaction also.
CO2 : Able to analyze the various principles of TQM viz. leadership, employee involvement, supplier partnership with an in-depth understanding of people and relationships, approaches and measures.
CO3 : Able to apply the tools and techniques like traditional tools, new management tools, Six-sigma, Benckmarking, Failure mode and Effect Analysis etc in both production and service industries including IT.
CO4 : Able to apply the tools and techniques like Quality Control Circles, Quality Cost, Quality Function Deployment, Taguchi Quality Lost Function, Total Productive Maintenance,

	Performance Measure etc in both manufacturing and service processes.
CO5 :	Being familiar with the knowledge of environment & quality management standards and able to implement, prepare documents for evidence and evaluate using auditing.

Course:Security Laboratory-[IT8761]

Upon completion of the course, the students will.../ will be able to...

CO1 : Build cryptosystems by applying symmetric key encryption algorithms
CO2 : Build cryptosystems by applying public key encryption algorithms.
CO3 : Construct code for authentication algorithms.
CO4 : Develop a signature scheme using Digital signature standard.
CO5 : Demonstrate the network System using open source tool

Course:Systems Engineering-[OME753]

Upon completion of the course, the students will.../ will be able to...

CO1 : Describe processes, methods, life cycle and practices of systems engineering.
CO2 : Apply fundamental methods and tools of systems engineering for developing simple, complex and real world projects.
CO3 : Analyze systems using systems engineering approaches to increase performance and to make decision for optimization.
CO4 : Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability, and sustainability
CO5 : Develop system or product using the techniques, skills, and modern engineering tools.

Course:Principles of Management-[MG8591]

Upon completion of the course, the students will.../ will be able to...

CO1 : Have clear understanding of managerial functions and have some basic knowledge on international aspect of management; able to describe the basic of management and its types, skills, management roles, types of business organization and current trends in business.
CO2 : Understand the planning process in the organization; able to explain the nature and purpose of planning, types, objectives of planning and decision process.
CO3 : Understand the concept of organization; able to compare the different organization structures, authorities and responsibilities, human resource management and training and development.
CO4 : Demonstrate directing, leadership and communicate effectively; estimate the individual and group behavior, motivation, job satisfaction types and theories of leadership, communication and IT.
CO5 : Analyze / isolate issues and formulate best control methods; apply the knowledge using the various system and process of controlling, budgetary and non-budgetary control techniques, use of computer and IT in management control, reporting.

Semester:8

Course:Project Work-[CS6811]

Upon completion of the course, the students will.../ will be able to...

CO1 : Identify and Finalize problem statement by surveying variety of domains
CO2 : Perform requirement analysis and identify design methodologies
CO3 : Apply advanced programming techniques to develop solutions to the problem
CO4 : Test the quality of the proposed method by evaluation metrics

CO5 : Present technical report by applying different visualization tools.
Course:Green Computing-[CS8078]
Upon completion of the course, the students will.../ will be able to...
CO1 : Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
CO2 : To understand green (power-efficient) technologies for components of one single computer, such as CPU, memory and disk
CO3 : Enhance the skill in energy saving practices in their use of hardware.
CO4 : Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
CO5 : Understand the ways to minimize equipment disposal requirements.
Course:Professional Ethics in Engineering-[GE8076]
Upon completion of the course, the students will.../ will be able to...
CO1 : Apply the engineering ethics and human values in his personal and professional life
CO2 : Able to apply ethical principles for making moral judgments
CO3 : Understand the basic perception of profession, industrial standards, codes of ethics and role of professional ethics in engineering field
CO4 : Apply safety principles to avoid risk by being aware of their responsibilities and rights
CO5 : Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Computer Science and Engineering

Semester:1

Course:Advanced Computer Architecture-[CP5152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify the limitations of ILP and point out how data level parallelism is exploited in architectures.
CO2 : Design hierarchal memory system and discuss the various techniques used for optimizing the cache performance
CO3 : Discuss the issues related to multiprocessing and suggest solutions
CO4 : Point out the salient features of different multicore architectures and how they exploit parallelism
CO5 : Know about the VECTOR,SIMD and GPU architectures
Course:Advanced Software Engineering-[CP5154]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the advantages of various Software Development Lifecycle Models
CO2 : Gain knowledge on project management approaches and perform formal analysis on specifications
CO3 : Use UML diagrams for analysis and design
CO4 : Architect and design using architectural styles and design patterns
CO5 : Understand software testing approaches and Devops practices
Course:Operating System Internals-[CP5153]
Course Outcomes
Upon completion of the course, the students will.../ will be able to...
CO1 : To comprehend the internal algorithms and high level structures of operating system.
CO2 : To discuss the processes, threads, filesystems and the associated system calls.
CO3 : Outline memory management strategies and revise any algorithm present in a system or design a new algorithm to replace an existing one.
CO4 : To appropriately use and modify the data structures for different software system.
CO5 : To summarise the knowledge in the implementation of inter-process communication and executable files.

Semester:2

Course:Cloud Computing Technologies-[CP5092]
Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate the concepts of storage virtualization, network virtualization and its management
CO2 : Apply the concept of virtualization in the cloud computing
CO3 : Identify the architecture, infrastructure and delivery models of cloud computing
CO4 : Develop services using Cloud computing
CO5 : Apply the security models in the grid and cloud environment

Course:Data Analytics Laboratory-[CP5261]
Upon completion of the course, the students will.../ will be able to...
CO1 : Implement Map Reduce programs for processing big data
CO2 : Realize storage of big data using H base, Mongo DB
CO3 : Analyse big data using linear models
CO4 : Analyse big data using machine learning techniques such as SVM
CO5 : analyse big data using machine learning techniques such as decision tree classification and clustering
Course:Term Paper Writing and Seminar-[CP5281]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop scientific and technical reading
CO2 : Develop writing skills
CO3 : Understand and construct research articles.
CO4 : Obtain information from a variety of sources and then place it in logically developed ideas.
CO5 : Prepare document and presented the paper.
Course:Internet of Things-[CP5292]
Upon completion of the course, the students will.../ will be able to...
CO1 : Outline the basics of IoT
CO2 : Comprehend the IoT architecture.
CO3 : Analyze various protocols for IoT
CO4 : Design a portable IoT using Rasperry Pi
CO5 : Deploy an IoT application and connect to the cloud.
CO6 : Analyze applications of IoT in real time scenario
Course:Big Data Analytics-[CP5293]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze the Big Data Fundamentals, including the evolution of Big Data, the characteristics of Big Data and the challenges introduced.
CO2 : Analyze the HADOOP and Map Reduce technologies associated with big data analytics.
CO3 : Apply tools and techniques to analyze Big Data.
CO4 : Design efficient algorithms for mining the data from large volumes
CO5 : Explore on Big Data applications Using Pig and Hive.

Semester:3

Course:Software Quality Assurance and Testing-[CP5005]
Upon completion of the course, the students will.../ will be able to...
CO1 : Perform functional and nonfunctional tests in the life cycle of the software product.
CO2 : Understand system testing and test execution process
CO3 : Identify defect prevention techniques and software quality assurance metrics.
CO4 : Apply techniques of quality assurance for typical applications
CO5 : Apply the techniques for quality assurance
Course:Information Storage Management-[CP5076]
Upon completion of the course, the students will.../ will be able to...
CO1 : Select various storage technologies to suit for required application.
CO2 : Apply security measures to safeguard storage & farm.

CO3 : Creating an own Storage and network storage architecture. CO4 : Integrate emerging technologies into professional practice. CO5 : Designing security and virtualization check list for datacenter

Semester:4

Course:Project Work Phase II-[CP5411]
Upon completion of the course, the students will.../ will be able to... CO1 : Identify and describe the problem and scope of project CO2 : Demonstrate a depth of knowledge of Computer Science and Engineering. CO3 : Collect, analyze and present data into meaningful information using relevant tools CO4 : Select, plan and execute a proper methodology in problem solving, work independently and ethically CO5 : Present the results in written and in oral format to a panel of experts effectively.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:B.E. Electronics and Communication Engg. (Sec-A)

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulii of elasticity used in day to day engineering applications
CO2 : Estimate the optical parameters of visible and laser sources along with their applications in various fields
CO3 : Calculate the band gap of semiconducting materials.
CO4 : Determine the water quality parameters(DO, Chloride, Cu content, Alkalinity and hardness) of the given water sample
CO5 : Analyse quantitatively the metals (Fe, Na, Cu) in the given sample using potentiometer, flame photometer and Understand how conductometric titrations are better than volumetric titrations and the skill to do the experiment.
Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the methods of water purification
CO2 : Define the terms in phase rule and adsorption
CO3 : Explain the types of Energy resources
CO4 : Determine the composition and characteristics of fuels and alloys
CO5 : Classify the types of water,fuels and alloys
Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 :Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 :Write and execute simple Python programs.
CO3 :Develop Python programs for complex problems.
CO4 :Apply basic and compound data types, functions and files to implement Python programs
CO5 :Design and analyse algorithms, modules and packages.
Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the existing national standards related to engineering drawings
CO2 : Understand the given Engineering drawing and interpret a given three dimensional drawing
CO3 : Apply the fundamentals and standards in engineering drawing through drafting exercises of geometrical solids
CO4 : Identify methods of surface development for different solids and understand some of the hidden geometry of the cut object
CO5 : Analyse the three dimensional view of objects as perceived by the human eye
Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write, test and debug simple Python Programs
CO2 : Implement Python Programs with conditionals and looping statements

CO3 : Develope Python Programs using functions
CO4 : Use Python lists,tuples ,dictionaries for representing compound data
CO5 : Read and write data from/to files and write programs using python packages

Course:Communicative English-[HS8151]

Upon completion of the course, the students will.../ will be able to...

CO1 : Learn vocabulary,skim and scan passages and share information related to one /oneself /family and friends.
CO2 : Improve their telephonic conversation skills,general reading and free writing skills and language skills through preposition and conjunction
CO3 : Acquire language skills through degrees of comparision , pronouns and direct /indirect questions comprehend short and long passages ,describe products and express opinions
CO4 : Improve their language skills through reading ,draft e-mails and personal letters and use correct tenses in the language usage
CO5 : Write short essays and dialogues and participate in group activities

Course:Engineering Mathematics - I-[MA8151]

Upon completion of the course, the students will.../ will be able to...

CO1 : Explain the representation of a function, limit and continuity of a function.
CO2 : Describe the techniques of differentiation, partial differentiation, integration and D.E.
CO3 : Solve maxima and minima of one variable and two variables
CO4 : Compute proper integral, improper integral and multiple integrals.
CO5 : Apply various techniques in solving differential equations.

Course:Engineering Physics-[PH8151]

Upon completion of the course, the students will.../ will be able to...

CO1 : Describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge.
CO2 : mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials
CO3 : illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues.
CO4 : summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals.
CO5 : determine the Moduli of elasticity of different materials, Eigen value and Eigen function of particles, Working of thermal devices and Functioning of Scanning Tunneling Microscope to enhance the development of society.

Semester:2

Course:Basic Electrical and Instrumentation Engineering-[BE8254]

Upon completion of the course, the students will.../ will be able to...

CO1 : Outline three phase electrical circuits and its power measurement
CO2 : Analyze the circuit model of Transformers
CO3 : Interpret the construction and working principle of DC machines
CO4 : Interpret the construction and working principle of AC machines
CO5 : Compare and contrast different types of measuring instruments

Course:Circuit Analysis-[EC8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze DC and AC electrical circuits, apply the circuit theorems
CO2 : Analyze about resonance and coupled circuits
CO3 : Analyze the transient and steady state response of the circuits subjected to step and sinusoidal excitations
CO4 : Compare the two port network parameter
Course:Electronic Devices-[EC8252]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the construction and operation of diode, transistor, FET, thyristors and display devices.
CO2 : Understand the characteristics of diode, transistor and FET to operate these devices.
CO3 : Understand the characteristics of metal-semiconductor diode and FET, heavily doped diodes, power and display devices.
CO4 : Solve problems on the functioning of diode, transistor, FET and other basic electronic devices.
CO5 : Analyze the transistor and other basic electronic devices with its operation and equivalent models.
Course:Engineering Practices Laboratory-[GE8261]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand wiring procedures practically
CO2 : Understand all the fundamental concepts involving electrical Engineering
CO3 : Handle basic electrical and electronics equipments
CO4 : Understand all the fundamental concepts involving Electronics Engineering
CO5 : Assemble basic electronic Components
Course:Technical English-[HS8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Read technical texts and write area specific texts effortlessly
CO2 : Listen and comprehend lectures and talks in their area of specilization successfully
CO3 : Speak appropriately and effectively in varied formal and informal contexts
CO4 : Write reports and winning job applications
CO5 : participate in group discussions
Course:Physics for Electronics Engineering-[PH8253]
Upon completion of the course, the students will.../ will be able to...
CO1 : Mention the electron transport properties of conductors, basic principles of semiconductors, magnetic and dielectric properties of materials
CO2 : Describe the optical properties of materials and principles of nano devices
CO3 : Summarize the classical and quantum concepts of conducting materials, Physics of semiconducting devices and magnetic principles used in electronics devices
CO4 : Illustrate the functioning of various optoelectronic and nano devices
CO5 : Demonstrate the applications of semiconductor, magnetic, dielectric, optical and quantum devices in engineering field
Course:Engineering Mathematics II-[MA8251]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the basic concepts of matrices, vectors, analytic function andLaplace transform
CO2 : Explain the properties of matrices and vector differential operators

CO3 :	Understand the basics of Laplace transform for elementary functions and line integral of analytic functions
CO4 :	Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations
CO5 :	Evaluate analytic function, vector and complex integration using various methods

Course:Circuit and Devices Laboratory-[EC8261]

Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the characteristics of clipper, clamper and FWR
CO2 : Analyze the characteristics of basic electronic devices
CO3 : Justify Thevinin, Norton theorem, KVL & KCL, and Super Position Theorems
CO4 : Design RL and RC circuits

Semester:3

Course:Electronic Circuits- I-[EC8351]

Upon completion of the course, the students will.../ will be able to...
CO1 : Understands the method of biasing transistors
CO2 : Analyze BJT amplifiers
CO3 : Analyze single stage and multistage amplifier circuits
CO4 : Analyze frequency response of amplifiers
CO5 : Design of regulated power supplies

Course:Signals and Systems-[EC8352]

Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate the properties of signals and systems.
CO2 : Apply Fourier series, Fourier Transform and Laplace transform for continuous time signals and systems.
CO3 : Analyze continuous time LTI system using Fourier and Laplace transforms.
CO4 : Characterize the effects of discrete time signals using DTFT and Z-transform.
CO5 : Design recursive and non-recursive discrete and continuous time systems.

Course:Fundamentals of Data Structures in C Laboratory-[EC8381]

Upon completion of the course, the students will.../ will be able to...
CO1 : Develop C programs for simple applications making use of basic constructs
CO2 : Apply basic data structure for a given problem using C
CO3 : Implement linear and non linear data structues using C
CO4 : Implement functions and recursive functions in C
CO5 : Choose appropriate searching,sorting,and hashing algorithm for an application and implement it in a modularized way

Course:Control Systems Engineering-[EC8391]

Upon completion of the course, the students will.../ will be able to...
CO1 : Identify the various control system components and their representations.
CO2 : Analyse the various time domain parameters.
CO3 : Analysis the various frequency response plots and its system.
CO4 : Apply the concepts of various system stability criterions.
CO5 : Design various transfer functions of digital control system using state variable models.

Course:Digital Electronics-[EC8392]

Upon completion of the course, the students will.../ will be able to...

CO1 : practice digital electronics in the present contemporary world.

CO2 : Design various combinational digital circuits using logic gates.

CO3 : the analysis and design procedures for Synchronous and Asynchronous Sequential Circuits.

CO4 : practice the semiconductor memories and related technology.

CO5 : practice electronic circuits involved in the design of logic gates.

Course:Fundamentals of Data Structures In C-[EC8393]

Upon completion of the course, the students will.../ will be able to...

CO1 : Learn the basic features of C

CO2 : Differentiate various programming structures like structure ,union and array

CO3 : Explore the applications of linear data structures

CO4 : Explore the applications of non-linear and graph data structures

CO5 : Understand the basic sorting and searching algorithm.

Course:Interpersonal Skills/Listening &Speaking-[HS8381]

Upon completion of the course, the students will.../ will be able to...

CO1 : Listen and Respond Appropriately.

CO2 : Participate in Group Discussion

CO3 : Make Effective Presentation

CO4 : Speak clearly with proper stress and intonation.

CO5 : Participate confidently and appropriately in conversations both formal and informal.

Course:Linear Algebra and Partial Differential Equations-[MA8352]

Upon completion of the course, the students will.../ will be able to...

CO1 : define linear combinations, null spaces and ranges, inner product, linear and non-linear equations, Fourier series

CO2 : understand the fundamental concepts of vector spaces, linear transformation and inner product

CO3 : Classify the PDEs and explain the Fourier series

CO4 : apply computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, norms, orthogonalization and diagonalizability

CO5 : solve various types of partial differential equations and apply Fourier series in wave equations and heat equations

Course:Analog and Digital Circuits Laboratory-[EC8361]

Upon completion of the course, the students will.../ will be able to...

CO1 : Analyze the frequency response of BJT/FET Amplifiers

CO2 : Simulate and analyze amplifier circuit using SPICE

CO3 : Measure CMRR in differential amplifier

CO4 : Design regulated power supplies

CO5 : Design BJT/JFET amplifiers

CO6 : Design and test digital logic circuits

Semester:4

Course:Electromagnetic Fields-[EC8451]
Upon completion of the course, the students will.../ will be able to...
CO1 : Solve simple problems requiring estimation of electric and magnetic field quantities based on these concepts and laws
CO2 : Analyze field potentials due to static changes and static magnetic fields.
CO3 : Interpret the materials affect electric and magnetic fields.
CO4 : Inspect the relation between the fields under time varying situations.
CO5 : Discuss the principles of propagation of uniform plane waves.
Course:Electronic Circuits II-[EC8452]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand feedback concepts and stability.
CO2 : Design Oscillator circuits
CO3 : Design the tuned amplifiers
CO4 : Analyze the wave shaping and Multivibrator circuits
CO5 : Design power amplifiers and DC converters
Course:Linear Integrated Circuits-[EC8453]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basic building blocks of linear integrated circuits
CO2 : Discuss linear and non-linear applications of operational amplifiers
CO3 : Describe the theory and applications of analog multipliers and PLL
CO4 : Describe theory of ADC and DAC
CO5 : Explain the concepts of waveform generation and introduce some special function ICs
Course:Linear Integrated Circuits Laboratory-[EC8462]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design amplifiers, oscillators, D-A converters using operational amplifiers
CO2 : Design filters using op-amp and performs an experiment on frequency response
CO3 : Analyze the working of PLL and describe its application as a frequency multiplier
CO4 : Design DC power supply using ICs
CO5 : Analyze the performance of filters, multivibrators, A/D converter and analog multiplier using SPICE
Course:Communication Theory-[EC8491]
Upon completion of the course, the students will.../ will be able to...
CO1 : To introduce the concepts of various amplitude modulations and demodulation and their spectral characteristics.
CO2 : To introduce the concepts of various angle modulations and demodulation and their spectral characteristics.
CO3 : To understand the properties of random process.
CO4 : To know the effect of noise on communication systems
CO5 : To gain knowledge in sampling and quantization.
Course:Environmental Science and Engineering-[GE8291]
Upon completion of the course, the students will.../ will be able to...
CO1 : Outline the importance of environmental education and ecosystem
CO2 : Explain the environmental pollution and its prevention
CO3 : Discuss the conservation of natural resources

CO4 : Categorize the social and environmental problems
CO5 : Summarize the need to control population for sustainable development
Course:Probability and Random Processes-[MA8451]
Upon completion of the course, the students will.../ will be able to...
CO1 : Know the necessary basic concepts in probability and random processes
CO2 : Understand the concept of probability used in Baye's theorem, one and two dimensional random variables and introduce some standard distributions applicable to engineering which can describe real life phenomenon
CO3 : Understand the concepts of random processes, spectral densities and linear systems which are widely used in IT fields
CO4 : Apply the concept of probability, correlation and spectral densities in communication engineering
CO5 : Apply random processes and linear systems with random inputs in communication engineering
Course:Circuits Design and Simulation Laboratory-[EC8461]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze various types of feedback amplifiers
CO2 : Design Oscillators,Tuned Amplifiers
CO3 : Design wave-shaping circuits.
CO4 : Design multi vibrators
CO5 : Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and multivibrators using PSPICE
Course:Communication Theory-[EC8491]
Upon completion of the course, the students will.../ will be able to...
CO1 : To introduce the concepts of various amplitude modulations and demodulation and their spectral characteristics.
CO2 : To introduce the concepts of various angle modulations and demodulationand their spectral characteristics.
CO3 : To understand the properties of random process.
CO4 : To know the effect of noise on communication systems
CO5 : To gain knowledge in sampling and quantization.

Semester:5

Course:Digital Communication-[EC8501]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the principles of information source &discrete memoryless channels.
CO2 : Explain the various waveform coding schemes
CO3 : Design and implement base band transmission & reception schemes.
CO4 : Analyze the spectral characteristics of band pass signaling schemes and their noise performance.
CO5 : Design error control coding schemes
Course:Communication Networks-[EC8551]
Upon completion of the course, the students will.../ will be able to...
CO1 : Choose the components needed to build a network

CO2 : Infer the network functionality into layers CO3 : Outline the functionality of each layer of the network CO4 : Identify solution for each functionality at each lyer. CO5 : Examine the node to node communication in the network.
Course:Computer Architecture and Organization-[EC8552]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe data representation, instruction formats and the operation of a digital computer CO2 : Explain the concept of various memories, interfacing and organization of multiple processors CO3 : Illustrate the fixed point and floating-point arithmetic for ALU operation. CO4 : Discuss about implementation schemes of control unit and pipeline performance CO5 : Discuss parallel processing technique and unconventional architectures
Course:Discrete-Time Signal Processing-[EC8553]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the cocepts of DFT and apply it for linear filtering CO2 : Explain the characteristics of IIR filter and design. CO3 : Explain the characteristics of FIR filter and design. CO4 : Summarize finite word length effects and solve the related problems. CO5 : Implement digital systems using digital signal processor
Course:Digital Signal Processing Laboratory-[EC8562]
Upon completion of the course, the students will.../ will be able to... CO1 : Carryout basic signal processing operations CO2 : Demonstrate their abilities towards MATLAB based implementation of various DSP systems CO3 : Analyze the architecture of a DSP Processor CO4 : Design and Implement the FIR and IIR Filters in DSP Processor for performing filtering operation over real-time signals CO5 : Design a DSP system for various applications of DSP
Course:Communication Networks Laboratory-[EC8563]
Upon completion of the course, the students will.../ will be able to... CO1 : Communicate betwen two desktop computers CO2 : Implement the different protocols CO3 : Program using Sockets CO4 : Implement and Compare the various Routing Algorithms CO5 : Use the Simulation tool
Course:Total Quality Management-[GE8077]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the Dimensions, Contributions and Barriers regarding Quality CO2 : Analyze the Principles of TQM CO3 : Analyze utilization for Quality improvement CO4 : Apply various types of Techniques used to measure Quality CO5 : Evaluate Various Quality Systems in manufacturing and service sectors
Course:Basic of Biomedical Instrumentation-[OMD551]
Upon completion of the course, the students will.../ will be able to...

CO1 : Understand bio potential generation and its propagation
CO2 : Determine bio signal characteristics and electrode placement for physiological recording
CO3 : Understand the concepts of bio amplifier for physiological recording
CO4 : Understand measurement techniques for non-electrical physiological parameters
CO5 : Understand different biochemical measurement techniques.
Course:Communication System Laboratory-[EC8561]
Upon completion of the course, the students will.../ will be able to...
CO1 : Simulate and validate the various functional modules of a communication system
CO2 : Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes
CO3 : Apply various channel coding schemes
CO4 : Demonstrate their capabilities towards the improvement of the noise performance of communication system
CO5 : Simulate end-to-end communication Link

Semester:6

Course:VLSI Design-[EC8095]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the concepts to realize digital building blocks using MOS transistor
CO2 : Design combinational MOS circuits and power strategies
CO3 : Design and construct Sequential Circuits and Timing systems
CO4 : Design arithmetic building blocks and memory subsystems
CO5 : Implement FPGA design flow and testing.
Course:Transmission Lines and RF Systems-[EC8651]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the propagation of signals through transmission lines.
CO2 : Analyze the signal propagation at Radio frequencies.
CO3 : Analyze impedance matching by stubs using Smith chart.
CO4 : Analyze the RF propagation and their characteristics in Waveguide.
CO5 : Design a RF transceiver system for wireless communication.
Course:Microprocessors and Microcontroller-[EC8691]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the architecture and programs based on 8086 microprocessor
CO2 : Describe the Memory Interfacing circuits of 8086 microprocessor
CO3 : Interface Input/output circuits with 8086 microprocessor
CO4 : Realize architecture and programming language of 8051 microcontroller.
CO5 : Design 8051 microcontroller based systems
Course:Professional Communication-[HS8581]
Upon completion of the course, the students will.../ will be able to...
CO1 : Make effective presentation.
CO2 : Participate confidently in Group Discussion.
CO3 : Attend job interviews and be successful in them.
CO4 : Develop adequate Soft Skills required for the work place.
CO5 : Develop a long term career-plan- making careeer changes.

Course:Principles of Management-[MG8591]
Upon completion of the course, the students will.../ will be able to...
CO1 : The students can be able to apply management concepts and theories in their field of work.
CO2 : Able to formulate strategic planning and management decisions in the given situation.
CO3 : Design an organization structure and apply the functions of human resource management in the given organization.
CO4 : Apply the communication techniques and motivational theories in directing and leading the employees in the achievement of organizational goal.
CO5 : Evaluate the control techniques and apply management control techniques.
Course:Wireless Networks-[EC8004]
Upon completion of the course, the students will.../ will be able to...
CO1 : understand the latest 3G/4G networks and it sarchitecture
CO2 : Analyze the mobile network layer protocol and routing
CO3 : Illustrate the 3G network architectures
CO4 : Discuss the internetworking of WLAN and WWAN standards
CO5 : Illustrate the 4G network architectures and technologies
Course:Technical Seminar-[EC8611]
Upon completion of the course, the students will.../ will be able to...
CO1 : Outline the advanced engineering developments
CO2 : Analyze and present technological developments
CO3 : Make use of teaching aids such as over head projectors,power point presentation and demonstrative models.
CO4 : Construct and present technical reports
CO5 : face the placement interviews
Course:Wireless Communication-[EC8652]
Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate the features of wireless channel propagation and different parameters of mobile multipath channels
CO2 : Apply the principles of mobile communication in design of a cellular system.
CO3 : Design and implement various signaling schemes for wireless communication in fading channels.
CO4 : Analyze the performance of different multipath mitigation techniques.
CO5 : Design and analyze transmit/receive diversity and MIMO systems.
Course:VLSI Design Laboratory-[EC8661]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write HDL code for basic as well as advanced digital integrated circuit
CO2 : Import the logic modules into FPGA Boards
CO3 : Synthesize Place and Route the digital IPs
CO4 : Design and Simulate Digital & Analog IC Blocks using EDA tools
CO5 : Extract the layouts of Digital & Analog IC Blocks using EDA tools
Course:Microprocessors and Microcontroller Laboratory-[EC8681]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explaiin ALP program for fixed and Floating Point and Arithmetic operations
CO2 : Demonstrate the Interfacing of different Inputs /Outputs with 8086 processor
CO3 : Generate waveforms using 8086 Microprocessors

CO4 : Perform Programs for arithmetic and logical operation in 8051 CO5 : Analysis the difference between simulator and Emulator

Semester:7

Course:Antennas and Microwave Engineering-[EC8701]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the basic principles in antenna and microwave system design CO2 : Demonstrate antenna array with excitation amplitude CO3 : Describe passive microwave components and active sources CO4 : Design various types of antennas, microwave mixer, oscillator and amplifiers
Course:Ad hoc and Wireless Sensor Networks-[EC8702]
Upon completion of the course, the students will.../ will be able to... CO1 :Explain the Fundamental Concepts, routing protocol and applications of ad hoc networks. CO2 :Describe the challenges, goals and architecture of wireless Sensor networks. CO3 :Illustrate the networking concepts and protocols used in wireless Sensor networks. CO4 :Discuss the security requirements, challenges issues and possible solutions for attacks. CO5 :Explain the challenges in programming and the platform and tools.
Course:Embedded Laboratory-[EC8711]
Upon completion of the course, the students will.../ will be able to... CO1 : Write programs in ARM for a specific Application CO2 : Interface memory and Write programs related to memory operations CO3 : Interface A/D and D/A convertors with ARM system CO4 : Analyze the performance of interrupt CO5 : Write programmes for interfacing keyboard, display, motor and sensor.
Course:Optical Communication-[EC8751]
Upon completion of the course, the students will.../ will be able to... CO1 : Realize basic elements in optical fibers, different modes and configurations. CO2 : Analyze the transmission characteristics associated with dispersion and polarization techniques. CO3 : Design optical sources and detectors with their use in optical communication system. CO4 : Construct fiber optic receiver systems, measurements and coupling techniques. CO5 : Design optical communication systems and its networks.
Course:Advanced Communication Laboratory-[EC8761]
Upon completion of the course, the students will.../ will be able to... CO1 : Analyze the performance of simple optical link by measurement of losses and analyzing the mode characteristics of fiber. CO2 : Analyze the Eye Pattern, Pulse broadening of optical fiber and the impact on BER. CO3 : Estimate the Wireless Channel Characteristics and analyze the performance of Wireless Communication System. CO4 : Understand the intricacies in Microwave System design
Course:Embedded and Real Time Systems-[EC8791]
Upon completion of the course, the students will.../ will be able to... CO1 : To explain the architecture, RTOS computing platform and design techniques CO2 : Utilize the concepts of embedded computing platform design.

CO3 : Explain the basic concepts of real time Operating system design. CO4 : Apply the system design techniques to develop software for embedded systems. CO5 : Model real-time applications using embedded-system concepts
Course:Disaster Management-[GE8071]
Upon completion of the course, the students will.../ will be able to... CO1 : Differentiate the types of disasters, causes and their impact on environment and society CO2 : Assess vulnerability and various methods of risk reduction measures as well as mitigation. CO3 : Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.
Course:Hospital Management-[OBM752]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the principles of Hospital administration CO2 : Identify the importance of Human resource management CO3 : List various marketing research techniques CO4 : Identify Information management systems and its uses CO5 : Understand safety procedures followed in hospitals
Course:Optical Communication-[EC8751]
Upon completion of the course, the students will.../ will be able to... CO1 : Realize basic elements in optical fibers, different modes and configurations. CO2 : Analyze the transmission characteristics associated with dispersion and polarization techniques. CO3 : Design optical sources and detectors with their use in optical communication system. CO4 : Construct fiber optic receiver systems, measurements and coupling techniques. CO5 : Design optical communication systems and its networks.

Semester:8

Course:Satellite Communication-[EC8094]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand and analyze the satellite orbits CO2 : Understand the components and functions of space segment CO3 : Understand and analyze the satellite link design CO4 : Explain the satellite access and coding methods CO5 : Understand the applications of satellites
Course:Project Work-[EC8811]
Upon completion of the course, the students will.../ will be able to... CO1 : Identify challenging practical problems and provide solutions to cope up with present scenario of Electronics and Communication Engineering field. CO2 : Analyzing the various methodologies and technologies for solving the problem. CO3 : Apply technical knowledge and project management skills for solving the problem. CO4 : Design and develop hardware and / or software for their project specific problem. CO5 : Prepare the project report and give proper explanation during presentation and demonstration.

Course:Professional Ethics in Engineering-[GE8076]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain about the morals, Ethics, social and human values
CO2 : Apply Ethics for solving moral issues
CO3 : Apply Ethics in Engineering experimentation
CO4 : Infer the rights and responsibilities of an Engineer in the society
CO5 : Apply Ethics in the society by understanding the global issues

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2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Communication Systems

Semester:1

Course:Advanced Digital Signal Processing-[AP5152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basics of discrete random signal processing.
CO2 : Explain various types of linear estimation and prediction.
CO3 : Understand the basics of digital filter and recursion algorithm.
CO4 : Analyze the various type of adaptive filter.
CO5 : Understand the basics of multirate signal processing
Course:Real Time Embedded Systems-[CU5092]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the architecture and programming of ARM processor
CO2 : Revise computing platform and design analysis.
CO3 : Explain the basic concepts of real time Operating system design.
CO4 : Describe the concept of Accelerators and embedded networks
CO5 : Discuss case studies related to embedded systems
Course:Communication Systems Laboratory-[CU5161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Measure and analyze various transmission line parameters.
CO2 : Design Microstrip patch antennas
CO3 : Implement the adaptive filtering algorithms
CO4 : To generate and detect digital communication signals of various modulation techniques using MATLAB
CO5 : Evaluate cellular mobile communication technology and propagation model
Course:Advanced Radiation Systems-[CU5191]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand antenna radiation concepts
CO2 : Understand modern antenna concepts
CO3 : Analyze the concept of phased array
CO4 : Design aperture antenna
CO5 : Design dipole and patch antenna
Course:Optical Networks-[CU5192]
Upon completion of the course, the students will.../ will be able to...
CO1 : Recall the basics of optical networks , transmission and non linear effects in networks.
CO2 : Explain Transmission System Engineering and Optical Internets
CO3 : Explain SONET/SDH and the Architecture of Optical Transport Networks
CO4 : Analyze Network topologies, MPLS and Optical Networks.
CO5 : Analyze the protection schemes, VPN and Multiprotocol Lambda Switching
Course:Applied Mathematics for Communication Engineers-[MA5154]
Upon completion of the course, the students will.../ will be able to...
CO1 : Know the various methods to solve system of linear equations
CO2 : Conceptualize the principle of optimality, formulation, computational procedure ans solution of linear programming

CO3 : Understand the numerical methods of ordinary differential equations
CO4 : Computation of probability, random variables and their associated distributions, correlations and regression
CO5 : Exposing the basic characteristic features of a queuing system and acquire skills in analyzing queuing models
Course:Advanced Digital Communication Techniques-[CU5151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Designing different detection schemes for reducing BER at the receiver.
CO2 : Design different equalization techniques in AWGN channel.
CO3 : Possess knowledge on different block codes in communication system design.
CO4 : Analyze the communication system using convolution codes.
CO5 : Analyze the basics of Multicarrier and Multiuser Communications.

Semester:2

Course:Digital Communication Receivers-[CU5071]
Upon completion of the course, the students will.../ will be able to...
CO1 :Designing different detection schemes for reducing BER at the receiver.
CO2 :Design different types of receiver for AWGN channel.
CO3 :Possess knowledge on different types of fading channels in communication system design.
CO4 :Analyze the communication system using synchronization techniques.
CO5 :Analyze various adaptive equalization techniques.
Course:Software Defined Radio-[CU5094]
Upon completion of the course, the students will.../ will be able to...
CO1 : Undertand the existing Software architectures
CO2 : Analyze RF components
CO3 : Analyze multi rate signal processing
CO4 : Design data converters
CO5 : Design the hardware processors
Course:MIC and RF System Design-[CU5201]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the fundamentals of transceiver architecture
CO2 : Summarise the RF filter, oscillator, and Mixer
CO3 : Explain the fabrication of MIC components
CO4 : Analyze feedback system and power amplifier
CO5 : Design high frequency amplifiers
Course:Electromagnetic Interference and Compatibility-[CU5292]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design electronic systems that function without errors or problems related to electromagnetic compatibility
CO2 : Solve basic electromagnetic compatibility problems
CO3 : Demonstrate the various EMI mitigation techniques.
CO4 : Identify standards for EMI/EMC.
CO5 : Compare EMI test methods with different new methods.
Course:Advanced Wireless Networks-[NC5252]
Upon completion of the course, the students will.../ will be able to...

CO1 : Illustrate the latest 4G networks and LTE CO2 : Relate the wireless IP architecture and LTE network architecture CO3 : Illustrate the adaptive link layer and network layer graphs and protocol CO4 : Understand about the mobility management and cellular network CO5 : Understand QoS challenges and QoS Attributes and Management of Wireless Networks.
Course:Term Paper Writing and Seminar-[CP5281]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the subject and narrow it to a topic. CO2 : State an objective and collect the relevant bibliography. CO3 : Understand author's contributions. CO4 : Understand each paper and prepare an outline. CO5 : Write a final paper and give a final presentation
Course:RF System Design Laboratory-[CU5211]
Upon completion of the course, the students will.../ will be able to... CO1 : Apply knowledge to identify a suitable architecture and systematically design an RF system. CO2 : Comprehensively record and report the measured data, and would be capable of analyzing, interpreting the experimentally measured data and produce the meaningful conclusions. CO3 : Design and develop microstrip filters
Course:Advanced Wireless Communication Systems-[CU5291]
Upon completion of the course, the students will.../ will be able to... CO1 : Characterize information theoretic MIMO channels CO2 : Design a space time receiver for error free transmission CO3 : Design transceiver structure of Massive MIMO for fading channels CO4 : Compare architectures of millimeter wave communication CO5 : Design and implement systems with Software Defined Radio, Cognitive Radio and analyze their performance.

Semester:3

Course:Internet of Things-[CP5292]
Upon completion of the course, the students will.../ will be able to... CO1 : To understand the fundamentals of Internet of Things CO2 : To learn about the basics of IOT protocols CO3 : To build a small low cost embedded system using Raspberry Pi. CO4 : To apply the concept of Internet of Things in the real world scenario.
Course:Soft Computing Techniques-[MP5092]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the basics of artificial neural network, fuzzy logic and genetic algorithm CO2 : Explain the operation of feed forward and feedback neural networks, fuzzy logic systems and genetic algorithm CO3 : Apply the concept of neural network, fuzzy logic and genetic algorithm to solve practical problems CO4 : Model systems using neural network and fuzzy logic CO5 : Implement neural network, fuzzy systems and genetic algorith to solve problems

Course:Millimeter Wave Communications-[CU5301]
Upon completion of the course, the students will.../ will be able to... CO1 : To understand the fundamentals of Millimeter wave Communication. CO2 : Ability to understand Millimeter devices and circuits. CO3 : To understand the various components of Millimeter wave Communications system. CO4 : Knowledge of MIMO technology. CO5 : Ability to design antenna for Millimeter wave frequencies. CO6 : Knowledge of Millimeter wave technology.

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2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Medical Electronics

Semester:1

Course:Human Anatomy and Physiology-[BM5151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basics of Human Anatomy and Physiology
CO2 : Describe the muscular and skeletal system in human body
CO3 : Understand the basics of Energy producing system in human body
CO4 : Illustrate the various organs and systems involved in body functions.
CO5 : Make use of the physiological knowledge into biomedical engineering
Course:Bio Signal Processing-[BM5191]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basics of biomedical signals, time, frequency domain analysis, adaptive filters, classifiers and multivariate analysis
CO2 : Derive the time series parameters, frequency spectrum and adaptive filter parameters
CO3 : Apply the time domain and frequency domain analysis for different bio medical signals
CO5 : Implement time scale analysis and multivariate component analysis to store the biosignals
Course:Applied Mathematics for Medical Engineers-[MA5157]
Upon completion of the course, the students will.../ will be able to...
CO1 : understand and apply the concepts of vector space , subspace and linear transfortation
CO2 : apply the advanced application of the numerical solution of simultaneous linear equations by direct and indirect methods
CO3 : able to findout the intermediate values using interpolation techneches and also the predicted and corrected values using p-c methods
CO4 : fundamental concepts of linear programing problems, assignment problems and transportation problems
CO5 : the importance of queueing models with different queueing techniques
Course:Medical Ethics and Standards-[MX5091]
Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate professional guidelines for the health professions.
CO2 : Demonstrate Public duties and consent
CO3 : Illustrate hospital accreditation standards
CO4 : Interpret hospital safety standards
CO5 : Summarize the medical Equipment Safety Standards
Course:Medical Instrumentation-[MX5101]
Upon completion of the course, the students will.../ will be able to...
CO1 : Recall basic medical terms, physical values and describe the origin of bio-potentials and explain the role of bio-potential electrodes
CO2 : Demonstrate the working of bio-amplifiers, bio-potential signals and their recording.
CO3 : Illustrate methods to measure non-electrical parameters.
CO4 : Identify Measuring techniques used for blood flow and blood cell counting
CO5 : Identify biochemical sensors used for biochemical measurements
Course:Biomedical Equipments-[MX5102]
Upon completion of the course, the students will.../ will be able to...

CO1 : Describe the working of the pacemaker, pulmonary analyzers and aid equipments and their functions CO2 : Gain knowledge on different physiotherapy equipments and electrotherapy equipments CO3 : Obtain knowledge on instruments dealing with kidney and bones CO4 : Develop measurement systems for sensory parameter measurements CO5 : Develop biotelemetry system and analyze special therapeutic equipments available.
Course:Medical Instrumentation Laboratory-[MX5111]
Upon completion of the course, the students will.../ will be able to... CO1 : Classify the various recording methods used in medical field CO2 : Infer the graphical and imaging applications in biomedical system. CO3 : Students acquire knowledge about recording of bioelectric potentials CO4 : Students acquire knowledge about various physiological measurements used in medical field. CO5 : Measure ECG for different biomedical applications

Semester:2

Course:Applied Medical Image Processing-[BM5291]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand image processing concepts for medical images. CO2 : Analyze image enhancement and restoration methods. CO3 : Apply representation techniques for medical images. CO4 : Analyse and quantify biomedical data for Morphology and Segmentation techniques. CO5 : Analysis and visualization of medical images of numerous modalities such as PET, MRI, CT, or microscopy.
Course:Rehabilitation Engineering-[BM5391]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the basic concepts and principles of Rehabilitation Engineering CO2 : Understand various orthotic &prosthetic devices for upper and lower extremities CO3 : To design various types of Wheel Chairs CO4 : To understand various assistive technologies for vision & hearing. CO5 : Understand the recent developments in the field of Sensory Augmentation and Substitutions
Course:Medical Imaging and Radio Therapy-[MX5201]
Upon completion of the course, the students will.../ will be able to... CO1 : Will understand and apply x-rays and its application in medical imaging. CO2 : Will understand and apply various Medical Imaging techniques. CO3 : Will understand and apply various Radio diagnostic techniques. CO4 : Will understand and analyze special imaging techniques used for visualizing the cross sections of the body. CO5 : Will understand and Enumerate Radiation therapy techniques and its safety
Course:Health Care and Hospital Equipment Management-[MX5203]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand various health services and functions of hospitals. CO2 : Understand the management of hospital organization.

CO3 : Understand the various regulatory requirements and health care codes. CO4 : Understand the duties of trained technical personnel and functions of clinical engineer. CO5 : Understand the concepts of the technical work for equipment management. CO6 : Understand training required for equipment management and maintenance
Course:Data Acquisition and Processing Laboratory-[MX5211]
Upon completion of the course, the students will.../ will be able to... CO1 : Apply the techniques of medical image analysis and providing security to medical data CO2 : Analyse any physiological signal and model the physiological systems
Course:Biomedical Optics-[BM5094]
Upon completion of the course, the students will.../ will be able to... CO1 : understand the physical properties of light CO2 : Understand about the impact of lights in photonics, through the use and design of appropriate optical components CO3 : Examine the practical applications of optics in surgical purpose. CO4 : Explain the practical applications of optics in diagnostic purpose. CO5 : Explain the application of optics in therapeutic purpose.
Course:Biomechanics-[MX5202]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the mechanical properties of biological tissues and the properties of blood CO2 : Gain knowledge in the mechanism of circulatory system. CO3 : Understand the mechanical properties of bones. CO4 : Gain knowledge in the mechanism of joints. CO5 : Design of medical implants using software

Semester:3

Course:Quality Assurance and Safety in Hospital-[BM5074]
Upon completion of the course, the students will.../ will be able to... CO1 : understand the concepts of healthcare quality mnabnagement CO2 : understand the need for regulatory bodies in healthcare CO3 : understand the saferty measures to be followed in hospitals CO4 : understand the management of electrical and fire safety CO5 : assess quality care
Course:Advanced Neural Computing-[MX5072]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the principles of Neural Networks CO2 : Illustrate the behaviour of neural networks CO3 : Make use of neural network to solve real-world problems. CO4 : Utilize the basic operators of Genetic Algorithm in Neural network CO5 : Analyze the different neural computing techniques
Course:Human Assist Devices-[MX5301]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the importance of Heart lung machine and artificial Heart. CO2 : Understand the characteristics of cardiac assist devices and related issues CO3 : Describe the principle of dialyzer

CO4 : Summarize the prosthetic and orthotic devices for rehabilitation CO5 : Understand the function of ventilator and hearing aids
Course:Hospital / Biomedical Industry Training-[BM 5361]
Upon completion of the course, the students will.../ will be able to... CO1 : Recall the components used internally to construct biomedical equipment's CO2 : Develop and gain knowledge on the machines for diagnosing medical problems CO3 : Identify and practice the steps to Install, adjust, maintain, repair, or provide technical support for biomedical equipment CO4 : Evaluate the safety and effectiveness of biomedical equipment and other personnel on the proper use of biomedical equipment

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Applied Electronics

Semester:3

Course:Advanced Microprocessor and Microcontroller Architecture-[AP5301]
Upon completion of the course, the students will.../ will be able to...
CO1 : Summarize the features and important specifications of modern microprocessors
CO2 : Illustrate the salient features of CISC microprocessors.
CO3 : Recall the salient features RISC processors based on ARM architecture
CO4 : Describe the features and important specifications of modern microcontrollers
CO5 : Explain the salient features of ARM – M3 architecture

Course:Internet of Things-[CP5292]
Upon completion of the course, the students will.../ will be able to...
CO1 : To Understand the fundamentals of Internet of Things
CO2 : To learn about the basics of IOT protocols
CO3 : To learn about the basics of IOT protocols
CO4 : To apply the concept of Internet of Things in the real world scenario.

Course:MEMS and NEMS-[VL5091]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop new ideas and applications for MEMS devices.
CO2 : Understand the fabrication methods used to build/construct MEMS
CO3 : Discuss the design concepts of micro sensors
CO4 : Explain the concepts of micro actuators.
CO5 : Outline Nano systems and Quantum mechanics.

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2020 -- 2021

Course Outcomes

Program:B.E. Electrical and Electronics Engg.

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulli of elasticity used in day to day engineering applications.
CO2 : Estimate the optical parameters of visible and laser sources along with their applications in various fields.
CO3 : Calculate the thickness of wire and wavelength of light using air wedge and spectrometer.
CO4 : Determine the water quality parameters(DO, Chloride, Cu content, Alkalinity and hardness) of the given water sample.
CO5 : Analyse quantitatively the metals (Fe, Na, Cu) in the given sample using potentiometer, flame photometer and Understand how conductometric titrations are better than volumetric titrations and the skill to do the experiment
Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the methods of water purification
CO2 : Define the terms in phase rule and adsorption
CO3 : Explain the types of energy resources
CO4 : Determine the composition and characterisation of fuels and alloys
CO5 : Classify the types of water,fuels and alloys
Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 : Write and execute simple Python programs.
CO3 : Apply basic and compound data types, functions and files to implement Python programs
CO4 : Apply basic and compound data types, functions and files to implement Python programs
CO5 : Design and analyse algorithms, modules and packages.
Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the fundamentals and standards of Engineering graphics
CO2 : Apply freehand sketching of basic geometrical constructions and multiple views of objects.
CO3 : Analyze orthographic projections of lines and plane surfaces.
CO4 : Analyze projections and solids and development of surfaces.
CO5 : Analyze isometric and perspective sections of simple solids.
Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write, test and debug simple Python Programs
CO2 : Implement Python Programs with conditionals and looping statements
CO3 : Develope Python Programs using functions
CO4 : Use Python lists,tuples ,dictionaries for representing compound data

CO5 : Read and write data from/to files and write programs using python packages
Course:Communicative English-[HS8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Learn vocabulary, skim and scan passages and share information related to one/oneself/family and friends.
CO2 : Improve their telephonic conversation skills, general reading and free writing skills and language skills through preposition and conjunction.
CO3 : Acquire language skills through degrees of comparison, pronouns and direct indirect questions, comprehend short and long passages, describe products and express opinions.
CO4 : Improve their language skills through reading, draft e-mails and personal letters and use correct tenses in the language usage.
CO5 : Write short essays and dialogues and participate in group activities.
Course:Engineering Mathematics - I-[MA8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : defines the concept of differential calculus
CO2 : Study of functions of several variables with maxima and minima concepts
CO3 : analysis of integral calculas with bi-parts and bernoulli's formulae
CO4 : details of multiple integrals with single, double, triple, areea under the particular curve and the volume enclosed by the given figure
CO5 : application of the ordinary differential equation with constant and variable coefficients
Course:Engineering Physics-[PH8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will be able to describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge.
CO2 : Students will be able to mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials.
CO3 : Students will be able to illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues.
CO4 : Students will be able to summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals.
CO5 : Students will be able to determine the Moduli of elasticity of different materials, Eigen value and Eigen function of particles, Working of thermal devices and Functioning of Scanning Tunneling Microscope to enhance the development of society.

Semester:2

Course:Basic Civil and Mechanical Engineering-[BE8252]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will have an understanding of the basics of the various types of civil structures and the principle of various power plants and their impact in day to day life.
CO2 : Interpret the building materials and building components.
CO3 : Describe the surveying techniques and civil engineering structures.
CO4 : Students will have understanding about the functioning of various types of engines, power plants, boilers turbines & pumps
CO5 : Students will have an understanding about the terminologies of air conditioning and the

principles of Refrigeration and Air-conditioning

Course:Engineering Practices Lab-[GE8261]

Upon completion of the course, the students will.../ will be able to...

CO1 : Develop carpentary components and pipe connections
CO2 : Demonstrate basic machine operations
CO3 : Construct the models using sheet metal
CO4 : Create basic electrical circuits for home applications
CO5 : Infer foundry smithy and soldering works

Course:Environmental Science and Engineering-[GE8291]

Upon completion of the course, the students will.../ will be able to...

CO1 : Outline the importance of environmental education and ecosystem
CO2 : : Explain the environmental pollution and its prevention
CO3 : Discuss the conservation of natural resources
CO4 : Categorize the social and environmental problems
CO5 : : Summarize the need to control population for sustainable development

Course:Technical English-[HS8251]

Upon completion of the course, the students will.../ will be able to...

CO1 : Read technical texts and write area- specific texts effortlessly.
CO2 : Listen and comprehend lectures and talks in their area of specialization successfully.
CO3 : Speak appropriately and effectively in varied formal and informal contexts.
CO4 : Write reports and winning job applications.
CO5 : Participate in Group discussions

Course:Engineering Mathematics II-[MA8251]

Upon completion of the course, the students will.../ will be able to...

CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform
CO2 : Explain the properties of matrices and vector differential operators
CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions
CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations
CO5 : Evaluate analytic function, vector and complex integration using various methods.

Course:Physics for Electronics Engineering-[PH8253]

Upon completion of the course, the students will.../ will be able to...

CO1 : Mention the electron transport properties of conductors, basic principles of semiconductors, magnetic and dielectric properties of materials
CO2 : Describe the optical properties of materials and principles of nano devices
CO3 : Summarize the classical and quantum concepts of conducting materials, Physics of semiconducting devices and magnetic principles used in electronics devices
CO4 : Illustrate the functioning of various optoelectronic and nano devices
CO5 : Demonstrate the applications of semiconductor, magnetic, dielectric, optical and quantum devices in engineering field

Course:Circuit Theory-[EE8251]

Upon completion of the course, the students will.../ will be able to...

CO1 : Analyse electrical circuits
CO2 : Apply Network theorems

CO3 : Analyze the transient response of circuits CO4 : Analyze three phase AC circuits CO5 : Explain resonance and coupled circuits
Course:Electric Circuits Laboratory-[EE8261]
Upon completion of the course, the students will.../ will be able to... CO1 : Apply KVL, KCL & Network theorems to simple and Complex circuits and verify their calculation using simulation. CO2 : Determines the time constant of RC circuit and verify their calculation using simulation. CO3 : Determines frequency response of the RLC circuits and verify their calculation using simulation. CO4 : Use software to simulate three-phase balanced, unbalanced circuits. CO5 : Demonstrates the working CRO and to simulate series, parallel resonant circuits.

Semester:3

Course:Electron Devices and Circuits-[EC8353]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the construction and characteristics of diodes CO2 : Explain the construction and characteristics of Transistors and Thyristors CO3 : Analyze the gain and frequency response of transistor amplifiers CO4 : Analyze the gain and frequency response of multistage amplifiers CO5 : Synthesize the frequency of oscillation for different type of oscillators CO6 : Simulate electronic circuits using esim software
Course:Digital Logic Circuits-[EE8351]
Upon completion of the course, the students will.../ will be able to... CO1 : Demonstrate the different number system and logic families. CO2 : Apply K-maps for the implementation of combinational circuits. CO3 : Solve synchronous sequential circuits by using flip flops. CO4 : Solve asynchronous sequential circuits by using flip flops and explain about different PLDs. CO5 : Write VHDL coding for Combinational and Sequential circuits.
Course:Electromagnetic Theory-[EE8391]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the different coordinate systems, laws, theorems and characterizing parameters. CO2 : Explain the concepts about electrostatic fields, electrical potential, energy density and their applications. CO3 : Explain the concepts in magneto static fields, magnetic flux density, vector potential and its applications. CO4 : Derive Maxwell's equations for electromagnetic fields. CO5 : Derive Electromagnetic wave equation for different media and Poynting theorem.
Course:Transforms and Partial Differential Equations-[MA8353]
Upon completion of the course, the students will.../ will be able to... CO1 : Solve first, second order homogeneous and non homogeneous partial differential equations using standard methods and Fourier series method CO2 : Find the Fourier series of a given function satisfying Dirchlet's condition CO3 : Determine Fourier transform and z transforms of some standard functions

CO4 :	Apply Fourier transform to evaluate certain definite Integrals and z transform to solve difference equations
CO5 :	Formation of partial differential equations and difference equations

Course:Electronics Laboratory-[EC8311]

Upon completion of the course, the students will.../ will be able to...

CO1 : Examine the characteristics of semiconductor devices

CO2 : Design of common emitter amplifier, differential amplifier and oscillator and examine the frequency response characteristics.

CO3 : Examine the characteristics of light acivated devices and passive filters

CO4 : Construct rectifier circuit using diode and illustrate the result with and without filters

CO5 : Determine frequency and amplitude of given signals using CRO

CO6 : Simulate oscillator circuits using simulink and develop a mini project.

Course:Electrical Machines - I-[EE8301]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Outline the Magnetic circuits and its effects
CO2 :	Examine the performance of transformer and its applications
CO3 :	Illustrate the different methods of energy conversion in electromechanical system
CO4 :	Demonstrate the Performance and control of DC Machine
CO5 :	Analyze the performance of DC Machine

Course:Electrical Machines Laboratory - I-[EE8311]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Ability to find the performance of dc generator by conducting oc and load test
CO2 :	Ability to find the performance of dc motor by conducting oc and load test
CO3 :	Ability to find the performance and analysis of losses in transformer
CO4 :	Ability to practice the speed control methods of dc motor also determine the losses of dc machine
CO5 :	Ability to work in three phase transformer and determine its performance

Course:Power Plant Engineering-[ME8792]

Upon completion of the course, the students will.../ will be able to...

CO1 : Understanding of Thermal Power Plant Operation, turbines, different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems

CO2 : Understanding working of gas power Cycle and Combined Cycle Power Plants

CO3 : Gain knowledge of working of Nuclear power plant including working of different types of reactors and safety measures

CO4 : Understanding working of hydroelectric power plant and discussing various renewable energy systems

CO5 : Understanding of Power Plant Economics and Discussing environmental and safety aspects of power plant operation

Semester:4

Course:Electrical Machines - II-[EE8401]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze the performance of synchronous generator.
CO2 : Explain the principle of operation and performance of synchronous motor.
CO3 : Describe the Construction, principle of operation and performance of three phase induction motor.
CO4 : Compare the different Starting and speed control of three-phase induction motors.
CO5 : Explain the Construction, principle of operation and performance of single phase induction motors and special machines.
Course:Transmission and Distribution-[EE8402]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine transmission lines parameters.
CO2 : Model transmission lines and determine performance parameters
CO3 : Design sag, tension and insulator string efficiency of transmission lines
CO4 : Determine the parameters of underground cables
CO5 : Determine the distribution systems parameters and use of FACTS, HVDC
Course:Measurements and Instrumentation-[EE8403]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explains the functional elements of instrumentation
CO2 : Understand Fundamentals of electrical and electronic instruments..
CO3 : compare various measurement techniques
CO4 : Interprets Various storage and display devices.
CO5 : understand the concepts Various transducers and the data acquisition systems
Course:Electrical Machines Laboratory - II-[EE8411]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand and analyse EMF and MMF method
CO2 : Analyze the characteristics of V and inverted V curves
CO3 : Understand the importance of synchronous machines
CO4 : Understand the importance of induction machines
CO5 : Acquire knowledge on separation of losses
Course:Linear Integrated Circuits and Applications-[EE8451]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the IC fabrication procedures
CO2 : Design circuits using op-amp
CO3 : Analyse the applications of op-amp
CO4 : Realize the internal functional blocks of special ICs
CO5 : Understand the internal functional blocks of application ICs
Course:Linear and Digital Integrated Circuits Laboratory-[EE8461]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design and Implement boolean functions for the design of circuits using digital ICs
CO2 : Design and Implement the Applications of flip flops.
CO3 : Design and Implement Basic Applications of op-amp.
CO4 : Design and Implement Applications ICs.

CO5 : Design and Implement special ICs.
Course:Control Systems-[IC8451]
Upon completion of the course, the students will.../ will be able to... CO1 : Model a physical system to obtain transfer function. CO2 : Analyze the time response of systems. CO3 : Analyze the frequency response of systems. CO4 : Design compensator for system stability. CO5 : Analyze the state variable equation of systems.
Course:Numerical Methods-[MA8491]
Upon completion of the course, the students will.../ will be able to... CO1 : understant and apply the concepts of solution of linear equation and the simultaneous linear equations using direct and indirect methods CO2 : apllication of interpolation using Newton's and Lagrange's interpolation techneques with equal and un-equal intervals CO3 : application of numerical differentiation and numerical integration techniques using Newton's and Trapezoidal and also Simpson's method CO4 : Numerical solution of ordinary differential equation using single and multistep methods CO5 : numerical solution of partial differential equation using Laplace, Poission, Bender-Smidth's techniques and the explicit methods
Course:Technical Seminar-[EE8412]
Upon completion of the course, the students will.../ will be able to... CO1 : prepare and present technological developments CO2 : face the placement interviews

Semester:5

Course:Object Oriented Programming-[CS8392]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the basic concepts of OOP and fundamentals in Java. CO2 : Write simple programs in Java and analyze the OOP concepts. CO3 : Build Java applications using exceptions and I/O streams. CO4 : Develop Java applications with threads and generics classes. CO5 : Design interactive Java programs using swings.
Course:Power System Analysis-[EE8501]
Upon completion of the course, the students will.../ will be able to... CO1 : Model power system components based on per unit standards. CO2 : Apply Numerical methods to solve power system load flow problems. CO3 : Determine fault current and post fault parameters for symmetrical fault. CO4 : Determine fault current and post fault parameters for unsymmetrical faults. CO5 : Analyze the stability of a power system.
Course:Professional Communication-[HS8581]
Upon completion of the course, the students will.../ will be able to... CO1 : Make effective presentations CO2 : Participate cofidently in Group Discussion.

CO3 : Attend job interviews and be successful in them. CO4 : Develop adequate soft skills required for the workplace. CO5 : Develop a long term career-plan- Making career changes.
Course:Basics of Biomedical Instrumentation-[OMD551]
Upon completion of the course, the students will.../ will be able to... CO1 :Understand bio potential generation and its propagation. CO2 : Determine bio signal characteristics and electrode placement for physiological recording. CO3 : Understand the concepts of bio amplifier for physiological recording. CO4 :Understand measurement techniques for non-electrical physiological parameters. CO5 :Understand different biochemical measurement techniques. CO6 : Design bio amplifier for physiological recording.
Course:Microprocessors and Microcontrollers-[EE8551]
Upon completion of the course, the students will.../ will be able to... CO1 : Illustrate the architecture and timing diagram of 8085 processor CO2 : Apply 8085 instruction set to program a 8085 microprocessor CO3 : Illustrate the architecture and timing diagram of 8051 microcontroller CO4 : Illustrate the architecture peripheral interfacing devices CO5 : Apply 8051 instruction set to program a 8051 microcontroller
Course:Digital Signal Processing-[EE8591]
Upon completion of the course, the students will.../ will be able to... CO1 : Classify Signals and Systems CO2 : Analyze Discrete Time Systems using Z-Transform CO3 : Compute Discrete Fourier Transform of Signals CO4 : Design Digital Filters CO5 : Understand Digital Signal Processors
Course:Basics of Biomedical Instrumentation-[OMD551]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand bio potential generation and its propagation. CO2 : Determine bio signal characteristics and electrode placement for physiological recording. CO3 : Understand the concepts of bio amplifier for physiological recording. CO4 : Understand measurement techniques for non-electrical physiological parameters. CO5 : Understand different biochemical measurement techniques. CO6 : Design bio amplifier for physiological recording.

Semester:6

Course:Design of Electrical Apparatus-[EE8002]
Upon completion of the course, the students will.../ will be able to... CO1 : Analyze the magnetic circuit parameters of electrical machines CO2 : Design the core, yoke, windings and cooling systems of transformers. CO3 : Design the armature, windings and field systems of DC Machines CO4 : Design of stator and rotor of induction machines and synchronous machines. CO5 : Computer aided design of electrical machines.
Course:Special Electrical Machines-[EE8005]
Upon completion of the course, the students will.../ will be able to...

CO1 : Ability to acquire the knowledge on construction and operation of stepper motor. CO2 : Ability to acquire the knowledge on construction and operation of switched reluctance motors. CO3 : Ability to acquire the knowledge on construction and operation of permanent magnet brushless D.C. motors. CO4 : Ability to acquire the knowledge on construction and operation of permanent magnet synchronous motors and synchronous reluctance motor. CO5 : Explain the construction and operation of sensor less special machines.
Course:Protection and Switchgear-[EE8602]
Upon completion of the course, the students will.../ will be able to... CO1 : Summarize the abnormal operating conditions of the apparatus and understand the need of protective schemes. CO2 : Illustrate the characteristics and functions of relays and its protection schemes CO3 : Analyze the various electrical apparatus protection CO4 : Outline static and numerical relays CO5 : Interpret cicuit breakers in the protection schemes
Course:Mini Project-[EE8611]
Upon completion of the course, the students will.../ will be able to... CO1 : To develop their own innovative prototype of ideas CO2 : To find solution by formulating proper methodology CO3 : To train the students in preparing mini project reports and examination. CO4 : To Solve challenging practical problems
Course:Microprocessors and Microcontrollers Laboratory-[EE8681]
Upon completion of the course, the students will.../ will be able to... CO1 : Execute ALP using 8085 microprocessors to perform basic arithmetic, code conversion and sorting operations. CO2 : Demonstrate the interfacing of 8085 with A/D and D/A converter. CO3 : Demonstrate the interfacing of 8085 with traffic light and I/O Ports. CO4 : Execute simple ALP programs and demonstrate the interfacing of 8051 and 8085 with stepper motor. CO5 : Demonstrate the interfacing of A/D, D/A converter with 8085 processor and hardware development.
Course:Embedded Systems-[EE8691]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the structural units of embedded processor and different components of embedded system. CO2 : Classify the different types of networking devices of embedded system. CO3 : Model the Embedded product using different computational models CO4 : Understand the concept of Real Time Operating System and its scheduling. CO5 : Apply the concepts of embedded system to develop an embedded product.

Semester:7

Course:High Voltage Engineering-[EE8701]
Upon completion of the course, the students will.../ will be able to...
CO1 : understand transients and various types of over voltages in power system.
CO2 : understand the breakdown mechanisms of various dielectrics
CO3 : understand the various generation methods of high voltages and currents
CO4 : understand the various measurement methods of high voltages and currents
CO5 : test power apparatus and insulation coordination
Course:Power System Operation and Contro-[EE8702]
Upon completion of the course, the students will.../ will be able to...
CO1 : understand the operation of electric power system and analyse the control actions to be implemented on the system to meet the variation of system demand
CO2 : model and design power frequency controller and analyze its static and dynamic characteristics
CO3 : understand the reactive power-voltage interaction.
CO4 : find solution for Economic dispatch and unit commitment problems
CO5 : understand and analyse power system stability and protection
Course:Renewable Energy Systems-[EE8703]
Upon completion of the course, the students will.../ will be able to...
CO1 : Interpret to create awareness and future role of renewable Energy Sources and technologies.
CO2 : Illustrate the characteristics and functions of Wind energy harvesting techniques.
CO3 : Investigate the various power harvesting methods and the applications of solar systems.
CO4 : Outline construction and operation of biomass, geothermal and hydro power plant.
CO5 : Understand the concept about tidal energy, ocean thermal energy conversion, fuel cell, energy storage and hybrid energy systems.
Course:Renewable Energy Systems Laboratory-[EE8712]
Upon completion of the course, the students will.../ will be able to...
CO1 : Interpret to create awareness and simulation study of the characteristics of renewable energy sources.
CO2 : Design and analyze the characteristics and the harvesting techniques of wind energy.
CO3 : Investigate the various power harvesting methods and its losses due to partial shading of solar systems.
CO4 : Analyze the characteristics and operation of hybrid system.
CO5 : Examine the synchronization issues and the grid tie techniques of various renewable energy sources.
Course:Disaster Management-[GE8071]
Upon completion of the course, the students will.../ will be able to...
CO1 : Differentiate the types of disasters, causes and their impact on environment and society
CO2 : Assess vulnerability and various methods of risk reduction measures as well as mitigation.
CO3 : Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.
CO4 : To enhance awareness of institutional processes in the country, Waste Management and Disaster Damage Assessment

CO5 : To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity
Course:Signals and Systems-[OEC753]
Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate the properties of signals and systems.
CO2 : Apply Fourier series, Fourier Transform and Laplace transform for continuous time signals and systems.
CO3 : Analyze continuous time LTI system using Fourier and Laplace transforms.
CO4 : Characterize the effects of discrete time signals using DTFT and Z-transform.
CO5 : Design recursive and non-recursive discrete and continuous time systems.
Course:Power Systems Transients-[EE8010]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basic concepts of different types of transients in power systems.
CO2 : Describe the types of switching transients in a Power system
CO3 : Analyze the mathematical model of lightning and protection of power systems from lightning
CO4 : Explain the concept of travelling waves
CO5 : Interpret the impacts of transients and EMTP for transient computations.
Course:Power System Simulation Laboratory-[EE8711]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop SCILAB programs to solve various power system problems.
CO2 : Evaluate the performance of power systems using computational tools.
CO3 : Create the one line diagrams of power systems in ETAP and Power world simulator
CO4 : Summarize the results of the program and print necesssary results.
CO5 : Create analysis reports of a power system in ETAP.

Semester:8

Course:Project Work-[EE8811]
Upon completion of the course, the students will.../ will be able to...
CO1 : develop the ability to solve a specific problem right from its identification
CO2 : To develop the ability to solve a specific problem right from literature review
CO3 : develop the ability to solve a specific problem till they find successful solution
CO4 : To train the students in preparing project reports
CO5 : To train the students to face reviews
Course:Biomedical Instrumentation-[EI8073]
Upon completion of the course, the students will.../ will be able to...
CO1 :to understand the philosophy of the heart, lung, blood circulation and respiration system.
CO2 :to provide latest ideas on devices of non-electrical devices
CO3 :to gain knowledge on various sensing and measurement devices of electrical origin
CO4 :to understand the analysis systems of various organ types
CO5 :to explain the medical assistance/techniques, robotic and therapeutic equipments
Course:Professional Ethics in Engineering-[GE8076]
Upon completion of the course, the students will.../ will be able to...

CO1 : Awareness on human values for professional excellence stress management CO2 : Knowledge on engineering ethics and moral issues CO3 : Role of engineers as responsible experiments along with courses of ethics CO4 : Assessment of safety and risk and understanding of risk benefit analysis CO5 : Knowledge on global issues and ethics
Course:Smart Grid-[EE8019]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the fundamentals of smart grids. CO2 : Describe functional components of Smart grid Technologies. CO3 : Understand the fundamentals of smart meters. CO4 : Describe power quality management in smart grid. CO5 : Describe computing for smart grid applications

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Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Control and Instrumentation

Semester:3

Course:Renewable Energy Systems-[CL5004]
Upon completion of the course, the students will.../ will be able to...
CO1 : Investigate the various power harvesting methods and the applications of solar systems.
CO2 : Illustrate the operational techniques, characteristics and energy scenario of Wind energy harvesting.
CO3 : Analyze the construction and operation of biomass power plant and its Indian energy scenario.
CO4 : Understand the concept and awareness about the characteristics and operational techniques of Ocean Thermal Energy Conversion, Wave energy, Tidal energy, Hydro, Geothermal and Fuel cell renewable energy sources and its energy scenario.
CO5 : Interpret to create awareness and future role of renewable energy sources by direct conversion of thermal energy to electrical energy.

Course:Digital Instrumentation-[IN5092]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze working of A/D and D/A converters, use display devices for digital circuits, use digital meters for measurements
CO2 : Analyze various instrument communication techniques
CO3 : Understand the virtual instrumentation basics.
CO4 : Configure programmable instrumentation basics using control techniques.
CO5 : Improve Employability and entrepreneurship capacity due to knowledge up gradation on recent trends in embedded systems design

Course:Smart Grid-[PS5091]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the challenges and benifits of smart grid
CO2 : Explain smart grid technologies
CO3 : Understand smart metering and Advanced metering infrastructure
CO4 : Understand power quality issues and power management in smart grid
CO5 : Understand high performance computing system for smart grid applications

Semester:4

Course:Project Work Phase II-[CL5411]
Upon completion of the course, the students will.../ will be able to...
CO1 : Take up any challenging practical problems and find solution by formulating proper methodology.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:M.E. Power Electronics and Drives

Semester:1

Course:Analysis and Design of Power Converters-[PX5152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze various single phase and three phase power converters
CO2 : Explains dc-dc converter topologies for a broad range of power conversion applications.
CO3 : Describe the design of power converter components.
CO4 : Explains about resonant converters
CO5 : Describes ac-ac converters

Semester:3

Course:Energy Management and Auditing-[PS5072]
Upon completion of the course, the students will.../ will be able to...
CO1 : Ability to learn about the need for energy management and auditing process
CO2 : Ability to learn about basic concepts of economic analysis and load management.
CO3 : Ability to understand the energy management on various electrical equipments.
CO4 : Ability to get knowledge on the concepts of metering and factors influencing cost function
CO5 : Ability to learn about the concept of lighting systems, light sources and various forms of cogeneration
Course:Smart Grid-[PS5091]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the challenges and benefits of smart grid
CO2 : Explain smart grid technologies
CO3 : Understand smart metering and advanced metering infra structure
CO4 : Understand power quality issues and power management in smart grid
CO5 : Explain smart grid applications
Course:Project Work Phase I-[PX5311]
Upon completion of the course, the students will.../ will be able to...
CO1 : Acquire practical knowledge within the chosen area of technology for project development
CO2 : Identify, analyze, formulate and handle programming projects with a comprehensive and systematic approach
CO3 : Contribute as an individual in development of technical projects
CO4 : Develop effective communication skills for presentation of project related activities

Semester:4

Course:Project Work Phase II-[PX5411]
Course Outcomes
Upon completion of the course, the students will.../ will be able to...
CO1 Take up any challenging practical problems and find solution by formulating proper

:	methodology.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Communication and Networking

Semester:3

Course:Internet of Things-[CP5292]
Upon completion of the course, the students will.../ will be able to...
CO1 : To understand the fundamentals of Internet of Things
CO2 : To learn about the basics of IOT protocols
CO3 : To build a small low cost embedded system using Raspberry Pi.
CO4 : To apply the concept of Internet of Things in the real world scenario.

Course:Optical Networks-[CU5192]
Upon completion of the course, the students will.../ will be able to...
CO1 : Recall the basics of optical networks and optical transport networks
CO2 : Describe the transmission basics and SONET/SDH
CO3 : Explain the various techniques and components used in optical networks
CO4 : Explain transmission system engineering and optical internets
CO5 : Summarize the non linear effects in optical networks and architecture of optical transport networks
CO6 : Analyze WDM,Network topologies,MPLS and optical networks
CO7 : Differentiate network topologies and protection schemes
Course:Soft Computing Techniques-[MP5092]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basics of artificial neural network, fuzzy logic and genetic algorithm
CO2 : Explain the operation of feed forward and feedback neural networks, fuzzy logic systems and genetic algorithm
CO3 : Apply the concept of neural network, fuzzy logic and genetic algorithm to solve practical problems
CO4 : Model systems using neural network and fuzzy logic
CO5 : Implement neural networks, fuzzy systems and genetic algorithm to solve problems
Course:Project Work Phase I-[NC5311]
Upon completion of the course, the students will.../ will be able to...
CO1 : To enable graduates to pursue research and have a successful career
CO2 : To provide students with strong foundational concepts in communication and networking
CO3 : To prepare students to critically analyze existing literature in an area of specialization
CO4 : To prepare students to simulate real time problems in an area of research
CO5 : To develop innovative and research oriented methodologies to solve the real world problems

Semester:4

Course:Project Work (Phase-II)-[NC5411]
Upon completion of the course, the students will.../ will be able to... CO1 : enable graduates to pursue research and have a successful career CO2 :To provide students with strong foundational concepts in communication and networking CO3 :To prepare students to critically analyze existing literature in an area of specialization CO4 :To prepare students to simulate real time problems in an area of research CO5 :Develop innovative and research oriented methodologies to solve the real world problems

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:B.Tech. Information Technology

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulii of elasticity used in day to day engineering applications
CO2 : Estimate the optical parameters of visible and laser sources along with their applications in various fields
CO3 : Calculate the thickness of thin wire using Air wedge
CO4 : Determine the water quality parameters(DO, Chloride, Cu content, Alkalinity and hardness) of the given water sample.
CO5 : Analyse quantitatively the metals (Fe, Na, Cu) in the given sample using potentiometer, flame photometer and Understand how conductometric titrations are better than volumetric titrations and the skill to do the experiment

Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : describe the methods of water purification
CO2 : define the terms in phase rule and adsorption
CO3 : explain the types of energy resources
CO4 : determine the composition and characteristics of fuels and alloys
CO5 : classify the types of water, fuels and alloys

Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 :Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 :Write and execute simple Python programs.
CO3 :Develop Python programs for complex problems.
CO4 :Apply basic and compound data types, functions and files to implement Python programs
CO5 :Design and analyse algorithms, modules and packages.

Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 :Exposed to existing national standards related to technical drawings
CO2 :Understand the given Engineering drawing and interpret a three dimensional drawing
CO3 :Apply the fundamentals and standards in engineering drawing through drafting exercises of geometrical solids
CO4 :Identify methods of development of surfaces of different solids and understand some of the hidden geometry of the cut object
CO5 :Analyze the three dimensional view of objects as perceived by the human eye

Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write, test and debug simple Python Programs
CO2 : Implement Python Programs with conditionals and looping statements
CO3 : Develope Python Programs using functions
CO4 : Use Python lists,tuples ,dictionaries for representing compound data
CO5 : Read and write data from/to files and write programs using python packages

Course:Communicative English-[HS8151]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Learn vocabulary,skim and scan passages and share information related to one /oneself /family and friends.
CO2 :	Improve their telephonic conversation skills,general reading and free writing skills and language skills through preposition and conjunction
CO3 :	Acquire language skills through degrees of comparision , pronouns and direct /indirect questions comprehend short and long passages ,describe products and express opinions
CO4 :	Improve their language skills through reading ,draft e-mails and personal letters and use correct tenses in the language usage
CO5 :	Write short essays and dialogues and participate in group activities

Course:Engineering Mathematics - I-[MA8151]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Explain the representation of a function, limit and continuity of a function.
CO2 :	Describe the techniques of differentiation, partial differentiation, integration and D.E.
CO3 :	Solve maxima and minima of one variable and two variables.
CO4 :	Compute proper integral, improper integral and multiple integrals.
CO5 :	Apply various techniques in solving differential equations.

Course:Engineering Physics-[PH8151]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge
CO2 :	mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials
CO3 :	illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues
CO4 :	summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals
CO5 :	determine the Moduli of elasticity of different materials, Eigen value and Eigen function of particles, Working of thermal devices and Functioning of Scanning Tunneling Microscope to enhance the development of society

Semester:2

Course:Basic Electrical,Electronics and Measurement Engineering-[BE8255]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Investigate the different AC/DC Electric Circuits.
CO2 :	Illustrate the characteristics and functions of Electric Machines and Transformers
CO3 :	Investigate the Renewable Sources, Domestic Loads and Protection.
CO4 :	Comprehend the fundamentals of Electronic Circuit and applications.
CO5 :	Understand the concept about Measurement and Metering for electric circuits

Course:Programming in C-[CS8251]	
Upon completion of the course, the students will.../ will be able to...	
CO1 :	Develop simple applications in C using basic constructs

CO2 : Design and implement applications using arrays and strings
CO3 : Develop and implement applications in C using functions and pointers.
CO4 : Develop applications in C using structures
CO5 : Design applications using sequential and random access file processing

Course:Engineering Practices Laboratory-[GE8261]

Upon completion of the course, the students will.../ will be able to...
CO1 : Develop carpentry components and pipe connections
CO2 : Demonstrate basic machining operations
CO3 : Construct the models using sheet metal.
CO4 : Create basic electrical circuits for home applications.
CO5 : Infer foundry, smithy and soldering works.

Course:Technical English-[HS8251]

Upon completion of the course, the students will.../ will be able to...
CO1 : Read technical texts and write area specific texts effortlessly
CO2 : Listen and comprehend lectures and talks in their area of specilization successfully
CO3 : speak appropriately and effectively in varied formal and informal contexts
CO4 : Write reports and winning job applications
CO5 : Participate in group discussions

Course:Engineering Mathematics II-[MA8251]

Upon completion of the course, the students will.../ will be able to...
CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform.
CO2 : Explain the properties of matrices and vector differential operators.
CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions.
CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations.
CO5 : Evaluate analytic function, vector and complex integration using various methods.

Course:Physics for Information Sciences-[PH8252]

Upon completion of the course, the students will.../ will be able to...
CO1 : Mention the electron transport properties of conductors, basic principles of semiconductors and magnetic properties of materials
CO2 : Describe the optical properties of materials and principles of nano devices
CO3 : Summarize classical and quantum concepts of conducting materials, Physics of semiconducting devices and magnetic principles used in computer field
CO4 : Illustrate the functioning of various optoelectronic and nano devices
CO5 : Demonstrate the applications of semiconductor, magnetic, optical and quantum devices in engineering field

Course:Information Technology Essentials-[IT8201]

Upon completion of the course, the students will.../ will be able to...
CO1 : Design websites using HTML
CO2 : Design web applications using PHP
CO3 : Create database applications using PHP and MySQL
CO4 : Develop personal information systems
CO5 : Describe basics of networking and mobile communications

Course:Information Technology Essentials Laboratory-[IT8211]

Upon completion of the course, the students will.../ will be able to...

CO1 : Design interactive websites using HTML CO2 : Create client side and server side programs using PHP CO3 : Design dynamic web sites and handle multimedia components CO4 : Create applications with PHP connected to database CO5 : Create Personal Information System
Course:C Programming Laboratory-[CS8261]
Upon completion of the course, the students will.../ will be able to... CO1 : Develop C programs for simple applications making use of basic constructs, arrays and strings. CO2 : Develop C programs involving functions, recursion, pointers, and structures. CO3 : Design applications using sequential and random access file processing.

Semester:3

Course:Digital Principles and System Design-[CS8351]
Upon completion of the course, the students will.../ will be able to... CO1 : Perform arithmetic operations in any number system and simplify the Boolean expression using K-map. CO2 : Design and analyze combinational circuits. CO3 : Design the synchronous and asynchronous sequential circuits. CO4 : Analyze the synchronous and asynchronous sequential circuits. CO5 : Implement memory arrays using programmable logic devices.
Course:Data Structures Laboratory-[CS8381]
Upon completion of the course, the students will.../ will be able to... CO1 : Implement List ADT CO2 : Implement Non linear data Structures CO3 : Knowledge of heap, search tree data structures CO4 : Implement graph data structures CO5 : Implement searching, sorting and hashing techniques
Course:Digital Systems Laboratory-[CS8382]
Upon completion of the course, the students will.../ will be able to... CO1 : Implement simplified combinational circuits using basic logic gates CO2 : Implement combinational circuits using MSI devices CO3 : Implement sequential circuits like registers and counters CO4 : Implement asynchronous sequential circuits. CO5 : Simulate combinational and sequential circuits using HDL
Course:Object Oriented Programming Laboratory-[CS8383]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain concepts of classes, packages, interfaces, arraylist, exception handling and file processing. CO2 : Apply the concepts of classes, packages, interfaces, arraylist, exception handling and file processing. CO3 : Apply the concepts of multithreading to develop concurrent programs. CO4 : Create applications using file processing, generic programming and event handling. CO5 : Design interactive applications using Graphics packages.
Course:Data Structures-[CS8391]

Upon completion of the course, the students will.../ will be able to... CO1 : Implement the list ADT and apply for complex engineering issues CO2 : Implement stack and queue ADT for having a high level of understanding CO3 : Knowledge of heap, search tree data structures and implement tree ADT CO4 : Analyse and implement graph data structures CO5 : Apply searching, sorting and hashing techniques
Course:Object Oriented Programming-[CS8392]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe OOP concepts and characteristics in Java. CO2 : Apply the principles of packages, inheritance and interfaces to write java programs. CO3 : Develop Java applications using exceptions and I/O streams. CO4 : Develop Java applications with threads and generics classes. CO5 : Develop interactive Java applications using graphics packages.
Course:Analog and Digital Communication-[EC8394]
Upon completion of the course, the students will.../ will be able to... CO1 : Apply analog communication techniques CO2 : Find the data and pulse communication techniques CO3 : Apply digital communication techniques CO4 : Analyze Source and Error Control Coding CO5 : Utilize multi user radio communication systems

Course:Interpersonal Skills/Listening and Speaking-[HS8381]
Upon completion of the course, the students will.../ will be able to... CO1 : Listen and respond appropriately CO2 : Speak clearly with proper stress and intonation CO3 : Make effective presentations CO4 : Participate in group discussions CO5 : Participate confidently and appropriately in conversations both formal informal
Course:Discrete Mathematics-[MA8351]
Upon completion of the course, the students will.../ will be able to... CO1 : Have knowledge of the concepts needed to test the logic of a program CO2 : Be aware of the counting principles CO3 : Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science. CO4 : Be exposed to concepts and properties of algebraic structures such as groups, rings and fields CO5 : Have an understanding in identifying structures on many levels and being exposed to concepts and properties of algebraic structures such as groups, rings and fields

Semester:4

Course:Design and Analysis of Algorithms-[CS8451]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the algorithm design techniques to solve the problems.

CO2 : Explain the algorithm analysis techniques to assess the complexity of an algorithm.
CO3 : Identify algorithm design techniques to solve real world problems.
CO4 : Solve problems using suitable algorithm design techniques.
CO5 : Analyze the time and space complexity of different computing algorithms.

Course:Operating Systems Laboratory-[CS8461]

Upon completion of the course, the students will.../ will be able to...
CO1 : Workwith UNIX commands and shell programming
CO2 : Implement the various scheduling algorithms
CO3 : Implement process creation and Inter process communication
CO4 : Implement Deadlock avoidance and Deadlock Detection algorithms
CO5 : Implement Page replacement algorithms, File organization and File alocation starategies

Course:Database Management Systems Laboratory-[CS8481]

Upon completion of the course, the students will.../ will be able to...
CO1 : Understand data definitions and data manipulation commands
CO2 : Apply the use of nested and join queries
CO3 : Apply the use of nested and join queries
CO4 : Familiar with the use of a front end tool
CO5 : Understand design and implementation of typical database applications

Course:Computer Architecture-[CS8491]

Upon completion of the course, the students will.../ will be able to...
CO1 : describe the basic structure and operations of a digital Computer.
CO2 : Design arithmetic and logic unit
CO3 : Design and analyze pipelined control units
CO4 : Evaluate the concept of parallel processing Architecture
CO5 : Classify the various memory systems and I/O communication.

Course:Database Management Systems-[CS8492]

Upon completion of the course, the students will.../ will be able to...
CO1 : Classify the modern and futuristic database applications based on size and complexity.
CO2 : Classify the modern and futuristic database applications based on size and complexity.
CO3 : Write queries using normalization criteria and optimize queries.
CO4 : Compare indexing strategies in different database systems.
CO5 : Appraise how advanced databases differ from traditional databases.

Course:Operating Systems-[CS8493]

Upon completion of the course, the students will.../ will be able to...
CO1 : Define process, scheduling, memory and file systems.
CO2 : Explain semaphore, memory management ,directory management and virtualization techniques.
CO3 : Apply the CPU scheduling, page replacement, deadlock detection and disk scheduling algorithms.
CO4 : Compare the memory management schemes, file systems and different OS.
CO5 : Analyze CPU scheduling, page replacement, and disk scheduling algorithms.

Course:Environmental Science and Engineering-[GE8291]

Upon completion of the course, the students will.../ will be able to...
CO1 : Outline the importance of environmental education and ecosystem.

CO2 : Explain Environmental Pollution and it's prevention CO3 : Disscus the conservation of natural resources CO4 : Categorize the social and environmental problems CO5 : Summarize the need to control population for sustainable development
Course:Advanced Reading and Writing-[HS8461]
Upon completion of the course, the students will.../ will be able to... CO1 : At the end of the course learners will be able to :Write different types of essays CO2 : Write winning job applications CO3 : Read and evaluate texts critically CO4 : Display critical thinking in various professional contexts. CO5 : provide more opportunities to develop project and proposal writing skills.
Course:Probability and Statistics-[MA8391]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. CO2 : Understand the basic concepts of one and two dimensional random variables and apply in engineering applications. CO3 : The students will have a clear perception of the power of numerical techniques and ideas. CO4 : The students would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields. CO5 : Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

Semester:5

Course:Software Engineering-[CS8494]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the software development and testing principles. CO2 : Summarize the concepts of requirements analysis and software design. CO3 : Compare different software process models and testing methods. CO4 : Apply systematic procedure for software design and deployment. CO5 : Explain project management, project cost estimation techniques.
Course:Networks Laboratory-[CS8581]
Upon completion of the course, the students will.../ will be able to... CO1 : Implement protocols using TCP and UDP. CO2 : Compare the performance of transport layer protocols. CO3 : Analyze the performance of network protocols using simulation tools. CO4 : Analyze network layer routing algorithms. CO5 : Implement error correction codes
Course:Computer Networks-[CS8591]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the seven layers of osi reference model in computer networks. CO2 : Compute the performance of a network using packet drop and throughput. CO3 : Analyze the data flow in network layer of computer networks CO4 : Apply the routing algorithms in transport layer of the network

CO5 : Analyze the working principle of application layer protocols.
Course:Microprocessors and Microcontrollers Laboratory-[EC8681]
Upon completion of the course, the students will.../ will be able to... CO1 : Write ALP Programmes for fixed and Floating Point and Arithmetic operations CO2 : Interface different I/Os with processor CO3 : Generate waveforms using Microprocessors CO4 : Execute Programs in 8051 CO5 : Explain the difference between simulator and Emulator
Course:Microprocessors and Microcontrollers-[EC8691]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand programs based on 8086 microprocessor CO2 : Describe the Memory Interfacing circuits CO3 : Interface Input/output circuits CO4 : Realize architecture and programming language of 8051 microcontroller CO5 : Design 8051 microcontroller based systems
Course:Web Technology-[IT8501]
Upon completion of the course, the students will.../ will be able to... CO1 : Design simple web pages using markup languages like HTML and XHTML. CO2 : Create dynamic web pages using DHTML and JavaScript. CO3 : Implement server side scripts to process request from client side web pages. CO4 : Develop web pages using JSP representing web data using XML. CO5 : Describe various web services and the interaction between them.
Course:Web Technology Laboratory-[IT8511]
Upon completion of the course, the students will.../ will be able to... CO1 : Design simple web pages using HTML and CSS CO2 : Create dynamic web pages using HTML and JavaScript CO3 : Generate server-side scripting to process request from the client CO4 : Develop JSP pages with web data representation using XML CO5 : Design web services using WSDL and SOAP
Course:Algebra and Number Theory-[MA8551]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the efficient use of advanced algebraic techniques and Number theory CO2 : Prove simple theorems about the statements proven by the text in advanced algebraic techniques and Number theory CO3 : Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts CO4 : Apply the basic notions of groups,rings,fields which will then be used to solve related problems CO5 : Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject
Course:Air Pollution and Control Engineering-[OCE551]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the nature and characteristics of air pollution,noise pollution and basic concepts of air quality management CO2 : explain and solve air and noise pollution problems

CO3 : design stack and particulate air pollution control devices CO4 : detect air pollution control equipments CO5 : design indoor air pollution control devices

Semester:6

Course:Big Data Analytics-[CS8091]
Upon completion of the course, the students will.../ will be able to... CO1 : Work with big data tools and its analysis techniques CO2 : Analyze data by utilizing clustering and classification algorithms CO3 : Learn and apply different mining algorithms and recommendation systems for large volumes of data CO4 : Perform analytics on data streams CO5 : Learn NoSQL databases and management.
Course:Computer Graphics and Multimedia-[CS8092]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the basic concepts of computer graphics and multimedia CO2 : Explain the concepts of illumination, color models and clipping techniques CO3 : Apply two dimensional and three dimensional transformations for graphics primitives CO4 : Apply clipping techniques for graphics primitives CO5 : Develop applications based on multimedia and hypermedia
Course:Object Oriented Analysis and Design Laboratory-[CS8582]
Upon completion of the course, the students will.../ will be able to... CO1 : Illustrate OO analysis and design for a given problem specification. CO2 : Draw Unified Modelling Language diagrams for a given real world problem. CO3 : Analyse the software quality using design patterns. CO4 : Applying specific design patterns for a given problem specification. CO5 : Examine the compliance of the real world system with the software requirement specification.
Course:Object Oriented Analysis and Design-[CS8592]
Upon completion of the course, the students will.../ will be able to... CO1 : Draw Unified Modelling Language based diagrams for the real world systems CO2 : Design given real world system with object oriented concepts. CO3 : Identify use cases from real world systems. CO4 : Design creational, structural and behavioural design patterns. CO5 : Use software testing methodologies for object oriented software.
Course:Mobile Application Development Laboratory-[CS8662]
Upon completion of the course, the students will.../ will be able to... CO1 : Identify the components and structure of mobile application development frameworks for Android and Windows OS based mobile CO2 : Design basics concepts and issues of development of mobile applications CO3 : Implement various mobile applications using emulators CO4 : Summarize the capabilities and limitations of mobile devices CO5 : Deploy applications to hand-held devices
Course:Intellectual Property Rights-[GE8075]
Upon completion of the course, the students will.../ will be able to...

CO1 : Define different types of Intellectual Property Rights CO2 : Classify different Intellectual Property Rights CO3 : Identify importance of Trademark & Copy Right Laws CO4 : Explain importance of Patents, Trade Secret Laws CO5 : Explain importance of Patents, Trade Secret Laws
Course:Professional Communication-[HS8581]
Upon completion of the course, the students will.../ will be able to... CO1 : Make effective presentations CO2 : Participate confidently in group discussion CO3 : Attend job interviews and be successful in them CO4 : Develop adequate Soft Skills required for the workplace CO5 : Develop a long term career plan- making career changes
Course:Software Testing-[IT8076]
Upon completion of the course, the students will.../ will be able to... CO1 : Define basic testing principles and techniques for software development CO2 : Explain various levels of testing and strategies for a test case design problem CO3 : Apply testing methods for any pseudo code. CO4 : Summarize test results based on test plan. CO5 : Describe test automation tools for different testing stages
Course:Computational Intelligence-[IT8601]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the fundamental goals, methods, and techniques in Computational Intelligence CO2 : Apply the Intelligent searching techniques for problem-solving CO3 : Solve the problems using perception, reasoning and learning techniques CO4 : Explore Computational Intelligence techniques for information retrieval CO5 : Compute intelligent computational system using machine learning techniques
Course:Mobile Communication-[IT8602]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the basics of mobile telecommunication system CO2 : Illustrate the generations of telecommunication systems in wireless network CO3 : Understand the architecture of Wireless LAN technologies CO4 : Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks CO5 : Explain the functionality of Transport and Application layer
Course:Mini Project-[IT8611]
Upon completion of the course, the students will.../ will be able to... CO1 : On Completion of the mini project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology

Semester:7

Course:Advanced Topics on Databases-[CS8071]
Upon completion of the course, the students will.../ will be able to... CO1 : Describe the relational databases concepts and skills to optimize database performance in practice.

CO2 : Compare the types of databases.
CO3 : Implement intelligent databases and data models.
CO4 : Explain the concepts of emerging databases.
CO5 : Design efficient algorithms in solving practical database problems

Course:Internet of Things-[CS8081]

Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the concept of IoT
CO2 : Analyze various protocols for IoT
CO3 : Design a PoC of an IoT system using Rasbperry Pi/Arduino
CO4 : Apply data analytics and use cloud offerings related to IoT
CO5 : Analyze applications of IoT in real-time scenario

Course:Cloud Computing-[CS8791]

Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the concept of cloud computing
CO2 : Explore the evolution of cloud from the existing technologies.
CO3 : Explain the various issues in cloud computing
CO4 : Use the current cloud technologies.
CO5 : Describe the emergence of cloud as the next generation computing paradigm

Course:Cryptography and Network Security-[CS8792]

Upon completion of the course, the students will.../ will be able to...
CO1 : Compare the fundamentals of networks security, security architecture, threats and vulnerabilities
CO2 : Apply the different cryptographic operations of symmetric cryptographic algorithms
CO3 : Apply the different cryptographic operations of public key cryptography
CO4 : Apply the various Authentication schemes to simulate different applications
CO5 : Summarize various Security practices and System security standards

Course:Total Quality Management-[GE8077]

Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the Quality concepts
CO2 : Summarize the TQM principles and continuous process improvement
CO3 : Apply TQM tools and techniques to measure the quality
CO4 : Apply TQM tools and techniques for continuous process improvement
CO5 : Discuss the challenges in Quality Management Systems

Course:FOSS and Cloud Computing Laboratory-[IT8711]

Upon completion of the course, the students will.../ will be able to...
CO1 : Configure various virtualization tools such as Virtual Box, VMware workstation
CO2 : Design and deploy a web application in a PaaS environment
CO3 : Learn how to simulate a cloud environment to implement new schedulers
CO4 : Install and use a generic cloud environment that can be used as a private cloud
CO5 : Manipulate large data sets in a parallel environment

Course:Security Laboratory-[IT8761]

Upon completion of the course, the students will.../ will be able to...
CO1 : Develop code for classical Encryption Techniques to solve the problems
CO2 : Analyze cryptosystems by applying symmetric and public key encryption algorithms
CO3 : Develop codes for authentication algorithms
CO4 : create a signature scheme using Digital signature standard

CO5 : Use open source tools to Demonstrate the network security system
Course:Principles of Management-[MG8591]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basics of management and its types, skills, management roles, types of business organization and current trends in business.
CO2 : Demonstrate the managerial functions.
CO3 : Explain the nature, types and purpose of planning, organizing, directing and controlling.
CO4 : Compare the organization structures, authorities and responsibilities, human resource management and training and development.
CO5 : Analyze individual and group behavior, motivation theories, job satisfaction types and theories of leadership and formulate best control methods.
Course:Systems Engineering-[OME753]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the process, methods, life cycle and practices of systems engineering.
CO2 : Apply fundamental methods and tools of systems engineering for developing simple, complex and real world projects.
CO3 : Analyze systems using systems engineering approaches to increase the performance and to make optimal decisions.
CO4 : Design a system, component, or process to meet desired needs within realistic constraints.
CO5 : Apply the techniques, skills, and modern engineering tools to design system or product.

Semester:8

Course:Information Retrieval Techniques-[CS8080]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the techniques and models of Information Retrieval Techniques
CO2 : Use an open source search engine framework and explore its capabilities
CO3 : Apply appropriate method of classification and clustering
CO4 : Infer the innovative features of search engine.
CO5 : Elaborate the working of recommender system.
Course:Professional Ethics in Engineering-[GE8076]
Upon completion of the course, the students will.../ will be able to...
CO1 : Interpret the core human values that shape the ethical behaviour of an engineer
CO2 : Develop skills to solve various moral issues using ethical theories
CO3 : Experiment with ethical issues related to engineering.
CO4 : Infer various social issues, industrial standards, code of ethics and role of professional ethics in engineering
CO5 : Illustrate the ethics of multinational cooperation and global social responsibility
Course:Project Work-[IT6811]
Upon completion of the course, the students will.../ will be able to...
CO1 : On completion of projct, the students will be in a position to take up a problem and find solution by formulating a proper methodology.
Course:Information Security-[IT8073]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the basic concepts of Information Security

CO2 : Explain the ethical and professional issues in Information Security CO3 : Explore the aspects of risk management CO4 : Illustrate standards in Information Security CO5 : Summarize the technological aspects of Information Security
Course:Web Design and Management-[IT8078]
Upon completion of the course, the students will.../ will be able to... CO1 : Design ebsite using HTML CO2 : Design website using CSS CO3 : Design website using JS CO4 : Design responsives sites CO5 : Manage web apps
Course:Project Work-[IT6811]
Upon completion of the course, the students will.../ will be able to... CO1 : On completion of projct, the students will be in a position to take up a problem and find solution by formulating a proper methodology.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:Master of Business Administration

Semester:1

Course:Economics Analysis for Business-[BA5101]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand basic economic problem facing society apply theory to practical problems in a business context
CO2 : Utilize the business cycle implications and determine the interaction of demand and supply in the marketplace.
CO3 :
CO4 : Analyse the interrelationships between economic variables and evaluate the major economic aggregates and how they are measured.
CO5 : Apply the appropriate economic tools to conduct a meaningful analysis of the economy in a professional ethical context.
Course:Accounting for Management-[BA5103]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will understand the basics of Accounting and preparation of financial statements
CO2 : Students will understand the Corporate Accounting system
CO3 : Students will understand the Financial statement analysis, ratios, Fund flow and cash flow analysis
CO4 : Students will understand the Costing system and control of costs
CO5 : Students will understand the Computerized Accounting system fundamentals and applications
Course:Legal Aspects of Business-[BA5104]
Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate knowledge and the students can understands the basic rules & the key terms involved in Indian contract Act.
CO2 : Ability to summarize the key legal provisions of Corporates function.
CO3 : Explore the laws relating to Industrial Act and the rights of employees.
CO4 : Describes the key elements in Corporate tax plan, GST and the students can analyze the income generation of Government.
CO5 : Outline the overall view of consumer rights, cyber crimes and IPR from a legal and managerial perspectives.
Course:Organizational Behavior-[BA5105]
Upon completion of the course, the students will.../ will be able to...
CO1 : Demonstrate the applicability of the concept of organizational behavior to understand the behavior of peoplein the organization.
CO2 : Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.
CO3 : Analyze the complexities associated with management of the group behavior in the organization.
CO4 : Demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.
CO5 Ability to engage all members of the team to work in coordination and are motivated to

work together to achieve the best results.
Course:Statistics for Management-[BA5106]
Upon completion of the course, the students will.../ will be able to... CO1 : To facilitate objective solutions in business decision making under subjective conditions CO2 : The students will have a fundamental knowledge of the probability concepts CO3 : Students will have acquired a mathematical foundation applicable to business and economics, and social sciences in general CO4 : It gives ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields. CO5 : Students should be able to develop the skills to identify the appropriate statistical technique such as Z-tests, t-tests, F-tests, correlation and simple regression for the analysis of data.
Course:Total Quality Management-[BA5107]
Upon completion of the course, the students will.../ will be able to... CO1 : To apply quality philosophies and tools to facilitate continuous improvement and ensure customer delight CO2 : Know about quality concepts, management and the contribution of quality gurus CO3 : Aware of the concepts of SPC, QFD, FMEA and process capability CO4 : Possess the thorough knowledge on the various quality tools and techniques CO5 : Able to design and implement the quality systems
Course:Spoken and Written Communication-[BA5111]
Upon completion of the course, the students will.../ will be able to... CO1 : Students will Get into the habit of writing regularly CO2 : Students can express themselves in different genres of writing from creative to critical to factual writing. CO3 : Students can take part in print and online media communication CO4 : Students will be able to read quite widely to acquire a style of writing CO5 : Students will be able to identify their area of strengths and weaknesses in writing. CO6 : Students will speak confidently with any speakers of English, including native speakers. CO7 : Students will speak effortlessly in different contexts – informal and formal
Course:Principles of Management-[BA5102]
Upon completion of the course, the students will.../ will be able to... CO1 : The students should be able to gain knowledge in elements of effective management CO2 : To gain knowledge how to apply planning process in organization CO3 : Students able to know the organizing techniques in business and company CO4 : To gain knowledge in communication and its process companies CO5 : To know the controlling process techniques and how to apply in organisation

Semester:2

Course:BUSINESS RESEARCH METHODS-[BA5202]
Upon completion of the course, the students will.../ will be able to... CO1 : Students will learn the Fundementals of Business Research CO2 : Students will Learn Research design and measrement CO3 : Studenrs will learn data collection for Business Research CO4 : Students will learn data analysis for the preparation of reports

CO5 : Students will learn report design and ethics in preparing the business research reporrt
Course:FINANCIAL MANAGEMENT-[BA5203]
Upon completion of the course, the students will.../ will be able to... CO1 : Students will gain knowledge and skills needed for management of financial resources. CO2 : Possess the techniques of managing finance in an organization. CO3 : Will secure knowledge on the running cost and efficiency in carrying on business. CO4 : Can able to prepare optimum capital structure for an organization CO5 : Gain knowledge about the various sources of finance available.
Course:HUMAN RESORCE MANAGEMENT-[BA5204]
Upon completion of the course, the students will.../ will be able to... CO1 : Ability to apply the business acumen gained in practice CO2 : Ability to understand and solve managerial issues. CO3 : Ability to communicate and negotiate effectively, to achieve organizational and individual goals. CO4 : Ability to upgrade their professional and managerial skills in their workplace. CO5 : Ability to explore and reflect about managerial challenges, develop informed managerial decisions in a dynamically unstable environment.
Course:INFORMATIONS MANAGEMENT-[BA5205]
Upon completion of the course, the students will.../ will be able to... CO1 : Student gains knowledge on effective applications of information systems in business CO2 : Ability to make system analysis and develop a system, system development life cycle CO3 : Explore and use various types Database management system CO4 : Gains knowledge on computer crimes, how it is controlled and various techniques of security and testing CO5 : Make use of new I.T initiatives and act ethically in the new business era
Course:MARKETING MANAGEMENT-[BA5207]
Upon completion of the course, the students will.../ will be able to... CO1 : Knowledge of analytical skills in solving marketing related problems CO2 : Awareness of marketing management process CO3 : Get a clear idea on consumer market and industrial market and consumers behavior. CO4 : Know the marketing mix decisions and its policies, methods and developments CO5 : Wide knowledge on marketing research, online marketing and behavior on online marketing consumers.
Course:DATA ANALYSIS AND BUSINESS MODELLING-[BA5211]
Upon completion of the course, the students will.../ will be able to... CO1 : Knowledge of spreadsheets and data analysis software for business modelling CO2 : Apply Spread sheets tools in the area of revenue management, forecasting and risk & sensitivity analysis CO3 : Analyze research data and apply statistical tools for data analysis and interpretation using SPSS software CO4 : Solve inventory and transportation problems using TORA & POM for creating managerial models and decision making
Course:APPLIED OPERATIONS RESEARCH-[BA5201]
Upon completion of the course, the students will.../ will be able to... CO1 : develop a fundamental understanding of linear programming models CO2 : solve transpotation models and assignment models

CO3 :	Conceptualize the principle of optimality and sub-optimization, formulation and computational procedure of integer programming
CO4 :	To facilitate quantitative solutions in business decision making under conditions of certainty, risk and uncertainty.
CO5 :	apply the basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

Course:OPERATIONS MANAGEMENT-[BA5206]

Upon completion of the course, the students will.../ will be able to...

CO1 :	To provide a broad introduction in the field of operations management
CO2 :	To explain the concepts, strategies, tools and techniques of planning in operations management
CO3 :	To provide details on the activities of production department
CO4 :	To make students understand the importance of materials management
CO5 :	To make students think how projects are carried out

Course:DATA ANALYSIS AND BUSINESS MODELLING-[BA5211]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Knowledge of spreadsheets and data analysis software for business modelling
CO2 :	Apply Spread sheets tools in the area of revenue management, forecasting and risk & sensitivity analysis
CO3 :	Analyze research data and apply statistical tools for data analysis and interpretation using SPSS software
CO4 :	Solve inventory and transportation problems using TORA & POM for creating managerial models and decision making

Semester:3

Course:Brand Management-[BA5001]

Upon completion of the course, the students will.../ will be able to...

CO1 :	Demonstrate knowledge and understanding of the nature and processes of branding, brand performance and key principles of strategic brand management.
CO2 :	Evaluate the scope of brand management activity across the overall organizational context and analyses how it relates to other business areas.
CO3 :	Appraise the key issues in managing a brand portfolio and making strategic brand decisions.
CO4 :	Analyze and discuss contemporary brand related problems and develop appropriate strategies and initiatives.
CO5 :	Ability to engage more confidently in and contribute brand building projects, developments and discussions.

Course:Consumer Behaviour-[BA5002]

Upon completion of the course, the students will.../ will be able to...

CO1 :	To understand the concepts of consumer behaviour and its application in purchase decisions
CO2 :	Students can gain knowledge in basic consumer models and its theories
CO3 :	To analyse the reasons and motives for consumer buying behaviour
CO4 :	To analyse the relationship between psychological social and cultural drives behind

consumer behaviour and marketing CO5 : To identify the dynamics of human behaviour and the basic factors that influence the consumers decision process
Course:Services Marketing-[BA5006]
Upon completion of the course, the students will.../ will be able to... CO1 : Will be able to apply the concepts of services marketing in promoting services CO2 : Utilize the market knowledge to tap the unearthed opportunities CO3 : Able to convert the idea conceived into a well-developed service product CO4 : Able to make the promotional strategies and delivery channels CO5 : Able to apply marketing strategies for different Industries
Course:Security Analysis and Portfolio Management-[BA5012]
Upon completion of the course, the students will.../ will be able to... CO1 : Possess a managerial outlook on investments**.** CO2 : Able to read and understand the outcomes out of fundamental analysis. CO3 : Ability to evaluate the technical analysis of reports. CO4 : Able to acquire the ability to ascertain the impact of portfolio construction. CO5 : Able to identify the profitable trade-off between risk and return.
Course:Entrepreneurship Development-[BA5014]
Upon completion of the course, the students will.../ will be able to... CO1 : Good knowledge about entrepreneurship and socio economic development CO2 : Knowledge about the financial institutions that promotes entrepreneurs CO3 : Knowledge about creative ideas in business valuation CO4 : To gain knowledge on entrepreneurial development programmes CO5 : Students gain knowledge about the market and its changing scenario
Course:Labour Legislations-[BA5016]
Upon completion of the course, the students will.../ will be able to... CO1 : To know the development and the judicial setup of Labour Laws. CO2 : To learn the salient features of welfare and wage Legislations. CO3 : To learn the laws relating to Industrial Relations, Social Security and Working conditions. CO4 : To understand the laws related to working conditions in different settings. CO5 : To learn the laws relating to Industrial Relations, Social Security and Working conditions
Course:Managerial Behaviour and Effectiveness-[BA5017]
Upon completion of the course, the students will.../ will be able to... CO1 : Students Will be to understand and adopt different models, methods and dimensions of Managerial job behavior CO2 : Students will learn to design, implement and measure the managerial job CO3 : Students can understand the environmental factors influencing the managerial job CO4 : Students will be able to understand the importance of self-management and Negotiation CO5 : Students will be able to study and adopt innovation and creativity for managing
Course:International Trade Finance-[BA5031]
Upon completion of the course, the students will.../ will be able to... CO1 : Possess good knowledge on international trade and export, import procedures CO2 : Knowledge on source and application of export import finance CO3 : Able to deal with Foreign Exchange dealings and Management CO4 : Practical knowledge in export import documentation and its usage

CO5 : Keep abreast of current export promotional measures of govt of India
Course:International Business Management-[BA5301]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students would be familiar with global business environment and concepts
CO2 : Helps the students formulate new strategies that would enhance the transformation process at International levels
CO3 : Enriches the importance of strategic management process for an organization
CO4 : Acquainted with functional domain practices.
CO5 : They would be familiar with conflicts situations and ethical issues in global business
Course:Strategic Management-[BA5302]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze the main structural features of an industry and develop strategies that position the firm most favorably in relation to competition and influence industry structure to enhance industry attractiveness.
CO2 : Recognize the different stages of industry evolution and recommend strategies appropriate to each stage
CO3 : Appraise the resources and capabilities of the firm in terms of their ability to confer sustainable competitive advantage and formulate strategies that leverage a firm's core competencies
CO4 : Demonstrate understanding of the concept of competitive advantage and its sources and the ability to recognize it in real-world scenarios
CO5 : The two primary types of competitive advantage: cost and differentiation and formulate strategies to create a cost and/or a differentiation advantage
Course:Summer Training-[BA5311]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand on job skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity.
CO2 : Get insight in working of the real organizations and learn actual supervised professional experience
CO3 : Understand the specific functional areas and match linkages among different functions and departments.
CO4 : Understand perspective about business organizations in their totality.
CO5 : Discover career opportunities to students in exploring in their areas of interest.

Semester:4

Course:Project Work-[BA5411]
Upon completion of the course, the students will.../ will be able to...
CO1 : Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
CO2 : Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
CO3 : Engage in systematic discovery and critical review of appropriate and relevant information sources

CO4 :	Appropriately apply qualitative and/or quantitative evaluation processes to original data
CO5 :	Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:Master of Computer Applications

Semester:1

Course:Advanced Database Technology-[MC5105]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design a distributed database system and execute distributed queries
CO2 : Use NoSQL database systems and manipulate the data associated with it.
CO3 : Design a data warehouse system and apply OLAP operations.
CO4 : Design XML database systems and validating with XML schema.
CO5 : Apply knowledge of information retrieval concepts on web databases.
Course:Object Oriented Software Engineering-[MC5106]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to identify the appropriate process model to develop the object oriented software
CO2 : Gain knowledge about requirement elicitation and analyzing techniques
CO3 : Able to choose and design suitable UML diagrams and methods
CO4 : Able to apply correct testing methods and maintain software systems.
CO5 : Able to estimate the object oriented application by applying metric data.
Course:Python Programming-[MC5107]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop algorithmic solutions to simple computational problems
CO2 : Structure simple Python programs for solving problems
CO3 : Read and write data from/to files in Python Programs.
CO4 : Represent compound data using Python lists, tuples, dictionaries.
CO5 : Decompose a Python program into functions.
Course:Research Methodology and Intellectual Property Rights-[MC5108]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the research problem and Literature review.
CO2 : Understand the various research designs and their characteristics.
CO3 : Prepare a well-structured research paper and scientific presentations.
CO4 : Explore on various IPR Components and process of filing.
CO5 : Develop awareness the patent law and procedural mechanismin obtaining a patent.
Course:Advanced Database Technology Laboratory-[MC5114]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design and Implement databases.
CO2 : Formulate complex queries using SQL
CO3 : Design and Implement applications that have GUI and access databases for backend connectivity
CO4 : To design and implement Mobile Databases
CO5 : To design and implement databases to store spatial and temporal data objects
Course:Advanced Data Structures and Python Programming Laboratory-[MC5115]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop algorithmic solutions to simple computational problems

CO2 : Develop and execute Python programs. CO3 : Decompose a Python program into functions. CO4 : Represent compound data using Python data structures. CO5 : Apply Python features in developing software applications.
Course:Communication Skills Enhancement ? I-[MC5116]
Upon completion of the course, the students will.../ will be able to... CO1 : Students will be able to make presentations and participate in Group discussions with confidence CO2 : Students will be able to perform well in the interviews CO3 : students will make effective presentations
Course:Advanced Data Structures and Algorithms-[MC5301]
Upon completion of the course, the students will.../ will be able to... CO1 : Implement a program using stack, queue and linked list data structures CO2 : Design and Implement Tree Data Structures and Sets CO3 : Apply the Graph Data structure and to find shortest path among the several possibilities CO4 : Perform Analysis of Various Algorithms CO5 : Analyze and design algorithms to appreciate the impact of algorithm design in practice

Semester:2

Course:Software Project Management-[MC5003]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the activities during the project scheduling of any software application. CO2 : Learn the risk management activities and the resource allocation for the projects. CO3 : Can apply the software estimation and recent quality standards for evaluation of the software projects CO4 : Acquire knowledge and skills needed for the construction of highly reliable software project CO5 : Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing.
Course:Internet Programming-[MC5206]
Upon completion of the course, the students will.../ will be able to... CO1 : To write client side scripting. CO2 : To implement the server side of the web application. CO3 : To implement Web Application using Spring. CO4 : To implement a Java application using Java Persistence API. CO5 : To implement a full-stack Single Page Application using React, Spring and JPA.
Course:Cloud Computing Technologies-[MC5207]
Upon completion of the course, the students will.../ will be able to... CO1 : Use Distributed systems in Cloud Environment CO2 : Articulate the main concepts, key technologies, strengths and limitations of Cloud computing CO3 : Identify the Architecture, Infrastructure and delivery models of Cloud computing CO4 : Install, choose and use the appropriate current technology for the implementation of Cloud CO5 : Adopt Microservices and DevOps in Cloud environment

Course:Artificial Intelligence and Machine Learning-[MC5208]
Upon completion of the course, the students will.../ will be able to...
CO1 : Apply the techniques of Problem Solving in Artificial Intelligence
CO2 : Implement Knowledge and Reasoning for real world problems
CO3 : Model the various Learning features of Artificial Intelligence
CO4 : Analyze the working model and features of Decision tree
CO5 : Apply k-nearest algorithm for appropriate research problem
Course:Mobile Application Development-[MC5209]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the basics of mobile application development frameworks and tools
CO2 : To be able to develop a UI for mobile application
CO3 : To design mobile applications that manages memory dynamically
CO4 : To build applications based on mobile OS like Android, iOs
CO5 : To build location based services
Course:Cyber Security-[MC5210]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop a set of risk and security requirements to ensure that there are no gaps in an organization's security practices.
CO2 : Achieve management, operational and technical means for effective cyber security.
CO3 : Audit and monitor the performance of cyber security controls.
CO4 : To spot gaps in the system and devise improvements.
CO5 : Identify and report vulnerabilities in the system.
Course:Internet Programming Laboratory-[MC5214]
Upon completion of the course, the students will.../ will be able to...
CO1 : To implement client and server side of the web application.
CO2 : To implement a real time application using WebSocket.
CO3 : To use Spring framework in web development
CO4 : To implement applications using Java Persistence API
CO5 : To implement applications using the Javascript framework React
Course:Artificial Intelligence and Machine Learning Laboratory-[MC5215]
Upon completion of the course, the students will.../ will be able to...
CO1 : Apply the techniques of Problem Solving in Artificial Intelligence.
CO2 : Implement Knowledge and Reasoning for real world problems.
CO3 : Model the various Learning features of Artificial Intelligence
CO4 : Analyze the working model and features of Decision tree
CO5 : Apply k-nearest algorithm for appropriate research problem.

Semester:3

Course:Advanced Data Structures and Algorithms-[MC5301]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe, explain and use abstract data types including stacks, queues and lists
CO2 : Design and Implement Tree data structures and Sets
CO3 : Able to understand and implement non linear data structures - graphs
CO4 : Able to understand various algorithm design and implementation.

Course:Web Programming Essentials-[MC5303]
Upon completion of the course, the students will.../ will be able to...
CO1 : Create a basic website using HTML and Cascading Style Sheets
CO2 : Design and implement dynamic web page with validation using JavaScript objects and by applying different event handling mechanisms
CO3 : Design rich client presentation using AJAX.
CO4 : Design and implement simple web page in PHP, and to present data in XML format.
CO5 : Design front end web page and connect to the back end databases
Course:Programming with Java-[MC5304]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to understand the basic concepts of core Java
CO2 : Implement Java programs
CO3 : Make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
CO4 : Able to write programs for database connectivity, Servlets, RMI and Swing
CO5 : Design and implement server side programs using JSP/Servlets and use the framework spring and Hibernate
CO6 : Able to understand java internals and java networking
Course:Web Programming Laboratory-[MC5312]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop simple web applications using scripting languages
CO2 : Implement server side and client side programming develop web applications with various web technology concepts
CO3 : Design a Web application using various technologies such as AJAX, JQuery and JSON
CO4 : Develop an application for social media using HTML5, CSS3, JQuery, AJAX & PHP
Course:Programming with Java Laborator-[MC5313]
Upon completion of the course, the students will.../ will be able to...
CO1 : Apply the Object Oriented features of Java for programming on the internet
CO2 : Implement, compile, test and run Java program
CO3 : Make use of hierarchy of Java classes to provide a solution to a given set of requirements found in the Java API
CO4 : Understand the components and patterns that constitute a suitable architecture for a web application using java servlets
CO5 : Demonstrate systematic knowledge of backend and front end by developing an appropriate application.
CO6 : Implement socket programming and Client side scripting in Java
Course:Computer Networks-[MC5302]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to trace the flow of information from one node to another node in the network
CO2 : Able to Identify the components required to build different types of networks
CO3 : Able to understand the functionalities needed for data communication into layers
CO4 : Able to choose the required functionality at each layer for given application
CO5 : Able to understand the working principles of various application protocols and fundamentals of security issues and services available.
Course:Object Oriented Analysis and Design-[MC5305]
Upon completion of the course, the students will.../ will be able to...

CO1 : Able to understand the object oriented concepts and to apply object oriented life cycle model for a project
CO2 : Able to design static and dynamic models using UML diagrams.
CO3 : Able to perform object oriented analysis to identify the objects from the problem specification.
CO4 : Able to identify and refine the attributes and methods for designing the object oriented system
CO5 : Able learn the open source CASE tools and to apply them in various domains.
Course:Data Structures and Algorithms Laboratory-[MC5311]
Upon completion of the course, the students will.../ will be able to...
CO1 :Work with basic data structures that are suitable for the problems to be solved efficiently.
CO2 :Design and implement linear, tree, and graph structures and its applications
CO3 :Design various sorting techniques,its algorithm design and analysis

Semester:4

Course:Security in computing-[MC5004]
Upon completion of the course, the students will.../ will be able to...
CO1 :Apply cryptographic algorithms for encrypting and decryption for secure data transmission
CO2 :Understand the importance of Digital signature for secure e-documents exchange.
CO3 :Understand the program threats and apply good programming practice.
CO4 :Get the knowledge about the security services available for internet and web applications.
CO5 :Understand data vulnerability and sql injection.
CO6 :Gain the knowledge of security models and published standards.
Course:Resource Management Techniques-[MC5401]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand and apply linear, integer programming to solve operational problem with constraints
CO2 : Apply transportation and assignment models to find optimal solution in warehousing and Travelling
CO3 : To prepare project scheduling using PERT and CPM
CO4 : Identify and analyze appropriate queuing model to reduce the waiting time in queue.
CO5 : Able to use optimization concepts in real world problems
Course:Mobile Computing-[MC5402]
Upon completion of the course, the students will.../ will be able to...
CO1 :Gain the knowledge about various types of Wireless Data Networks and Voice Networks
CO2 :understand the architectures, the challenges and the Solutions of Wireless Communication
CO3 :Realize the role of Wireless Protocols in shaping the future Internet.
CO4 :Able to develop simple Mobile Application Using Android
Course:Advanced Databases and Datamining-[MC5403]
Upon completion of the course, the students will.../ will be able to...
CO1 : Create relational data models
CO2 : Preprocess the data for mining applications
CO3 : Apply the association rules for mining the data.
CO4 : Design and deploy appropriate classification techniques & Cluster the high dimensional data for better organization of the data.

CO5 : Evolve Multidimensional Intelligent model from typical system & evaluate various mining techniques on complex data objects.
Course:Web Application Development-[MC5404]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design and implement Internet systems for enhancing education and engineering design
CO2 : Understand functionality of Internet system
CO3 : Design a system according to customer needs using the available Internet technologies
CO4 : Design and develop interactive, client-side, server-side executable web applications.
CO5 : Develop a rapid application in many areas on most platforms.
CO6 : Build better Web apps more quickly and with less code
Course:Web Application Development Laboratory-[MC5412]
Upon completion of the course, the students will.../ will be able to...
CO1 : Design and develop interactive, client-side, server-side executable web applications.
CO2 : Develop a simple online application using Spring MVC
CO3 : Create applications using web services such as JSON, WSDL and SOAP
CO4 : Develop a simple database application using Spring JDBC/Struts with CURD functionality
Course:Technical Seminar and Report Writing-[MC5413]
Upon completion of the course, the students will.../ will be able to...
CO1 : To study research papers for understanding of a new field, in the absence of a textbook , to summarise and review them
CO2 : To identify promising new directions of various cutting edge technologies
CO3 : To impart skills in preparing detailed report describing the project and results
CO4 : To effectively communicate by making an oral presentation before an evaluation committee
Course:Mobile Application Development Laboratory-[MP5411]
Upon completion of the course, the students will.../ will be able to...
CO1 : Install and configure Android application development tools.
CO2 : Design and develop user Interfaces for the Android platform
CO3 : Apply Java programming concepts to Android application development.
CO4 : Familiar with technology and business trends impacting mobile applications.
CO5 : competent with the characterization and architecture of mobile applications.

Semester:5

Course:Professional Ethics-[MC5006]
Upon completion of the course, the students will.../ will be able to...
CO1 : Helps to examine situations and to internalize the need for applying ethical principles, values to tackle with various situations
CO2 : Develop a responsible attitude towards the use of computer as well as the technology.
CO3 : Able to envision the societal impact on the products/ projects they develop in their career
CO4 : Understanding the code of ethics and standards of computer professionals
CO5 : Analyze the professional responsibility and empowering access to information in the work place.

Course:Service Oriented Architecture-[MC5012]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to know the structure of XML and to design and store data in XML
CO2 : Able to apply SOAP , HTTP and UDDI services in the web applications.
CO3 : Able to apply SOA architecture and the underlying design principles for the web projects
CO4 : Able to understand the role of SOA in J2EE and .NET
CO5 : Able to know the cloud computing architecture and the types of clouds
Course:Cloud Computing-[MC5501]
Upon completion of the course, the students will.../ will be able to...
CO1 : Compare the strengths and limitations of cloud computing
CO2 : Identify the architecture, infrastructure and delivery models of cloud computin
CO3 : Apply suitable virtualization concept.
CO4 : Choose the appropriate cloud player, Programming Models and approach.
CO5 : Address the core issues of cloud computing such as security, privacy and interoperability.
CO6 : Design Cloud Services and Set a private cloud
Course:Big Data Analytics-[MC5502]
Upon completion of the course, the students will.../ will be able to...
CO1 : Work with big data platform and Understand the fundamentals of various big data analysis techniques
CO2 : Analyze the big data analytic techniques for useful business applications.
CO3 : Design efficient algorithms for mining the data from large volumes.
CO4 : Analyze the HADOOP and Map Reduce technologies associated with big data analytics
CO5 : Explore the applications of Big Data
Course:Software Testing and Quality Assurance-[MC5503]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to test the software by applying various testing techniques.
CO2 : Able to debug the project and to test the entire computer based systems at all levels.
CO3 : Able to test the applications in the specialized environment using various automation tools.
CO4 : Able to evaluate the web applications using bug tracking tools.
CO5 : Able to apply quality and reliability metrics to ensure the performance of the software.
Course:Cloud and Big Data Laboratory-[MC5511]
Upon completion of the course, the students will.../ will be able to...
CO1 : Use the cloud and big data tool kits.
CO2 : Design and Implement applications on the Cloud environment
CO3 : Set up and implement Hadoop clusters
CO4 : Use the map reduce tasks for various applications
Course:Software Testing Laboratory-[MC5512]
Upon completion of the course, the students will.../ will be able to...
CO1 : Able to test the software by applying various testing techniques.
CO2 : Able to debug the project and to test the entire computer based systems at all levels.
CO3 : Able to test the applications in the specialized environment using various automation tools.
CO4 : Able to evaluate the web applications using bug tracking tools.
CO5 : Able to apply quality and reliability metrics to ensure the performance of the software.
Course:Mini Project-[MC5513]

Upon completion of the course, the students will.../ will be able to...
CO1 : To plan, analyze, design and implement a software project using SDLC model.
CO2 : To learn to work as a team and to focus on getting a working project done within a stipulated period of time.
CO3 : Gain confidence to implement small ideas into real life working software projects through testing
CO4 : To promote the concept of entrepreneurship.
CO5 : To inculcate innovative thinking and thereby preparing students for main project.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021

Course Outcomes

Program:B.E. Mechanical Engineering (Sec-A)

Semester:1

Course:Physics and Chemistry Laboratory-[BS8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Determine different modulii of elasticity used in dayto day engineering applications
CO2 : Estimate the optical parameters of visible and laser sources along with their applications in various fields
CO3 : Calculate the bandgap of semiconducting materials
CO4 : Determine the water quality parameters(DO, Chloride, Cu content, Alkalinity and hardness) of the given water sample
CO5 : Analyse quantitatively the metals (Fe, Na, Cu) in the given sample using potentiometer, flame photometer and Understand how conductometric titrations are better than volumetric titrations and the skill to do the experiment.
Course:Engineering Chemistry-[CY8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : describe the methods of water purification
CO2 : define the terms in phase rule and adsorption
CO3 : explain the types of energy resources
CO4 : determine the composition and characteristics of fuels and alloys
CO5 : classify the types of water, fuels and alloys
Course:Problem Solving and Python Programming-[GE8151]
Upon completion of the course, the students will.../ will be able to...
CO1 :Describe the concepts of algorithm, data types, operators, conditional statements and files.
CO2 :Write and execute simple Python programs.
CO3 :Develop Python programs for complex problems.
CO4 :Apply basic and compound data types, functions and files to implement Python programs
CO5 :Design and analyse algorithms, modules and packages.
Course:Engineering Graphics-[GE8152]
Upon completion of the course, the students will.../ will be able to...
CO1 : Exposed to existing national standards related to technical drawings
CO2 : Understand the given Engineering drawing and interpret a three dimensional drawing
CO3 : Apply the fundamentals and standards in engineering drawing through drafting exercises of geometrical solids
CO4 : Identify methods of development of surfaces of different solids and understand some of the hidden geometry of the cut object
CO5 : Analyze the three dimensional view of objects as perceived by the human eye
Course:Problem Solving and Python Programming Laboratory-[GE8161]
Upon completion of the course, the students will.../ will be able to...
CO1 : Write and execute simple Python programs.
CO2 : Implement Python programs with conditional and looping statements
CO3 : Develop Python programs by defining functions and calling them
CO4 : Use Python lists, tuples, dictionaries for representing compound data.
CO5 : Read and write data from/to files and write their own programs using Python packages

Course:Communicative English-[HS8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Learn vocabulary, skim and scan passages and share information related to one/oneself/family and friends.
CO2 : Improve their telephonic conversation skills, general reading and free writing skills and language skills through preposition and conjunction.
CO3 : Acquire language skills through degrees of comparison, pronouns and direct indirect questions, comprehend short and long passages, describe products and express opinions.
CO4 : Improve their language skills through reading, draft e-mails and personal letters and use correct tenses in the language usage.
CO5 : Write short essays and dialogues and participate in group activities.
Course:Engineering Mathematics - I-[MA8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the representation of a function, limit and continuity of a function.
CO2 : Describe the techniques of differentiation, partial differentiation, integration and D.E.
CO3 : Solve maxima and minima of one variable and two variables
CO4 : Compute proper integral, improper integral and multiple integrals.
CO5 : Apply various techniques in solving differential equations.
Course:Engineering Physics-[PH8151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will be describe the basics of Properties of matter, Waves, Laser, Optical fibers and Thermal behavior of materials to improve their engineering knowledge
CO2 : mention the Advanced Physics concepts of quantum theory and the Characteristics of crystalline materials
CO3 : illustrate Bending of beams, Oscillations, Thermal expansion joints and Fiber optic sensors to assess societal and safety issues
CO4 : summarize the Types of optical fibers and losses associated with them, Wave equations, Crystal growth techniques and imperfections of crystals

Semester:2

Course:Basic Electrical, Electronics and Instrumentation Engineering-[BE8253]
Upon completion of the course, the students will.../ will be able to...
CO1 : analyze the basic circuit laws and theorems
CO2 : analyze various types of Ac circuits
CO3 : understand the construction and operation of electrical machines
CO4 : Explain the basic semiconductor devices and circuits
CO5 : understand the principle of Tansducers and measuring instruments .

Course:Basic Electrical, Electronics and Instrumentation Engineering Laboratory-[BE8261]
Upon completion of the course, the students will.../ will be able to...
CO1 : analyze circuit laws and theorems
CO2 : Analyze Ac circuits
CO3 : Evaluate the performance of various electrical machines

CO4 : construct simple circuits using electronic devices CO5 : Evaluate the characteristics of transducers and sensors
Course:Engineering Practices Lab-[GE8261]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand wiring procedures practically CO2 : Understand all the fundamental concepts involving electrical Engineering CO3 : Handle basic electrical and electronics equipments CO4 : Understand all the fundamental concepts involving Electronics Engineering CO5 : Assemble basic electronic Components
Course:Environmental Sciences and Engineering-[GE8291]
Upon completion of the course, the students will.../ will be able to... CO1 : Outline the importance of environmental educatiion and ecosystem CO2 : Explain the environmental pollution and its prevention CO3 : Discuss the conservation of natural resources CO4 : Categorize the social and environmental problems CO5 : Summarise the need to control population for sustainable development
Course:Engineering Mechanics-[GE8292]
Upon completion of the course, the students will.../ will be able to... CO1 : Illustrate the vectorial and scalar representation of forces and moments CO2 : Analyse the rigid body in equilibrium CO3 : Evaluate the properties of surface and solids CO4 : Calculate dynamic forces exerted in rigid body CO5 : Students will able to determine the friction and their effects
Course:Technical English-[HS8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Read technical texts and write area- specific texts effortlessly. CO2 : Listen and comprehend lectures and talks in their area of specialization successfully. CO3 : Speak appropriately and effectively in varied formal and informal contexts. CO4 : Write reports and winning job applications. CO5 : Participate in Group discussions
Course:Engineering Mathematics II-[MA8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Define the basic concepts of matrices, vectors, analytic function and Laplace transform CO2 : Explain the properties of matrices and vector differential operators CO3 : Understand the basics of Laplace transform for elementary functions and line integral of analytic functions CO4 : Apply diagonalization of matrices in quadratic form and Laplace transform in differential equations CO5 : Evaluate analytic function, vector and complex integration using various methods
Course:Material Science-[PH8251]
Upon completion of the course, the students will.../ will be able to... CO1 : Mention the various typeas of phase diagram,microconstituents of ferrous alloys and mechancal properties of engineering materials CO2 : List out the properties of magnetic ,dielectric,superconducting and new engineering materials CO3 : Illustrate the phase diagram of various system,phase transformation in ferrous alloys and

	mechanical testing methodes
CO4 :	Describe the behaviour of magnetic,dielectric,superconductng and new engineering materials using various theories
CO5 :	Demonstrate different mechanical testing methodes and application of engineering materiasl

Semester:3

Course:Electrical Drives and Controls-[EE8353]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the thermal rating of various electrical machines
CO2 : Explain the performance characteristics of electrical machines.
CO3 : Classify the starting methods of D.C motors and Induction motors.
CO4 : Compare conventional and solid state speed control of DC drives.
CO5 : Compare conventional and solid state speed control of AC drives.
Course:Electrical Engineering Laboratory-[EE8361]
Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze the characteristics of DC machines
CO2 : Examine the speed control of DC shunt motor
CO3 : Analysis the characteristics of single phase transformer
CO4 : Analyze the performance of synchronous machines.
CO5 : Examine the performance characteristics of Induction motor.
Course:Interpersonal Skills / Listening & Speaking-[HS8381]
Upon completion of the course, the students will.../ will be able to...
CO1 : Listen and respond appropriately
CO2 : Speak clearly with proper stress and intonation
CO3 : Make effective presentations
CO4 : Participate in group discussions
CO5 : Participate confidently and appropriately in conversations both formal informal Participate in group discussions
Course:Transforms and Partial Differential Equations-[MA8353]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the formation of PDE and difference equation
CO2 : Find the fourier series of a given function satisfying Dirichlet's condition
CO3 : Solve first, second order homogeneous and non-homogeneous PDE using standard methods and fourier series methods
CO4 : Determine fourier transform and z-transform of standard functions
CO5 : Apply z-transforms to solve difference equations and fourier transform to solve definite integrals
Course:Fluid Mechanics and Machinery-[CE8394]
Upon completion of the course, the students will.../ will be able to...
CO1 : Infer the properties and characteristics of a fluid.
CO2 : Apply the conservation laws to flow through pipes and hydraulic machines.
CO3 : Analyze fluid properties using dimensional analysis.
CO4 : Determine the performance of pumps for specific applications.

CO5 : Estimate the performance of turbines.
Course:Manufacturing Technology - I-[ME8351]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain different metal casting processes, associated defects, merits and demerits CO2 : Compare different metal joining processes CO3 : Summarize various hot working and cold working methods of metals CO4 : Explain various sheet metal making processes. CO5 : Distinguish various methods of manufacturing plastic components
Course: Manufacturing Technology Laboratory - I-[ME8361]
Upon completion of the course, the students will.../ will be able to... CO1 : emonstrate taper turning using centre lathe CO2 : Demonstrate external and internal thread cutting using centre lathe. CO3 : Demonstrate eccentric turning and knurling operation in centre lathe. CO4 : Make use of milling machine to fabricate polygon. CO5 : Make use of the shaper to fabricate polygon.
Course:Computer Aided Machine Drawing-[ME8381]
Upon completion of the course, the students will.../ will be able to... CO1 : Follow the drawing standards, Fits and Tolerances CO2 : Re-create part drawings, sectional views and assembly drawings as per standards CO3 : Make use of 2D drafting commands for 2D drawing CO4 : Develop 3D Part models using different features CO5 : Develop 3D assembly models using different features
Course:Engineering Thermodynamics-[ME8391]
Upon completion of the course, the students will.../ will be able to... CO1 : List the fundamental concepts in Thermodynamics and classify the thermodynamic processes around them. CO2 : Classify and apply Laws of Thermodynamics in practical situations when called for. CO3 : Apply mathematical fundamentals to analyse the properties of steam, gas and gas mixtures. CO4 : Evaluate various thermodynamic relations, tables and charts for problem solving. CO5 : Analyze different psychometric process and adapt the same for computing the properties of air-vapour mixture.

Semester:4

Course:Strength of Materials for Mechanical Engineers-[CE8395]
Upon completion of the course, the students will.../ will be able to... CO1 : Define stress, strain, Principal stresses and plane, Torsion, Thick and thin Cylinder CO2 : Compute Stress,shear force , bending moment, slope and deflection for beam. CO3 : Draw the Shear force , Bending moment diagram and conjugated beam Diagram. CO4 : Analyze and design thin and thick shells for the applied internal and external pressures. CO5 : Apply basic equation of simple torsion in designing of shafts and helical Spring.
Course:Advanced Reading and Writing-[HS8461]
Upon completion of the course, the students will.../ will be able to... CO1 : Read and Comprehend texts

CO2 : Read and Evaluate texts
CO3 : Write different types of essays
CO4 : Write winning job applications
CO5 : Display critical thinking in various professional contexts

Course:Statistics and Numerical Methods-[MA8452]

Upon completion of the course, the students will.../ will be able to...

CO1 : This course aims at providing the necessary basic concepts of a few statistical and numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology

CO2 : To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.

CO3 : To introduce the basic concepts of solving algebraic and transcendental equations.

CO4 : To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines

CO5 : To acquaint the knowledge of various techniques and methods of solving ordinary differential equations

Course:Engineering Metallurgy-[ME8491]

Upon completion of the course, the students will.../ will be able to...

CO1 : Infer properties of metal and alloys using phase diagram and its applications.
CO2 : Evaluate the importance of heat treatment processes and its applications.
CO3 : Analyze the properties, composition and applications of ferrous and non-ferrous alloys.
CO4 : Analyze the properties, composition and applications of non-metallic materials
CO5 : Evaluate different deformation mechanism, mechanical testing, and their importance for engineering materials

Course:Kinematics of Machinery-[ME8492]

Upon completion of the course, the students will.../ will be able to...

CO1 : Understand the principles of kinematic links, pairs, chains, mechanisms and its inversions, Degree of freedom of mechanisms
CO2 : Analyze the planar mechanisms for position, velocity and acceleration.
CO3 : Design cams and followers for specified motion profiles
CO4 : Evaluate gear tooth geometry and select appropriate gears for the required applications.
CO5 : Solve problems on friction in various machine elements like belt, chain, ropes, brakes and clutches

Course:Manufacturing TechnologynLab II-[ME8462]

Upon completion of the course, the students will.../ will be able to...

CO1 : Illustrate various machine tool operations to manufacture gears.
CO2 : Illustrate finishing operations using various machine tools.
CO3 : Demonstrate manufacture of cutting tools using cutter grinder.
CO4 : Infer the cutting forces in milling and turning process.
CO5 : Develop CNC part programming for machining process.

Course:Manufacturing TechnologynLab II-[CE8381]

Upon completion of the course, the students will.../ will be able to...

CO1 : Make use of different destructive testing machines for material characterization.
CO2 : Analyse different mechanical properties of metal and alloys.
CO3 : Estimate the frictional losses in pipes and fittings.

CO4 : Estimate the performance of pumps and turbines for specific applications. CO5 : Choose measuring devices and machineries for specific needs.
Course:Manufacturing Technology ? II-[ME8451]
Upon completion of the course, the students will.../ will be able to... CO1 : Explain the mechanism of material removal processes. CO2 : Describe the constructional and operational features of centre lathe and other special purpose lathes. CO3 : Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines. CO4 : Explain the types of grinding and other super finishing processes apart from gear manufacturing processes CO5 : Summarize numerical control of machine tools and write a part program.
Course:Thermal Engineering- I-[ME8493]
Upon completion of the course, the students will.../ will be able to... CO1 : Understand the basic concepts of various cycles, analyse them and compare the performance among them CO2 : Understand the concepts of IC engines, components, parts and the working and analyse the performance of the engine. CO3 : Identify the properties of substances while flowing through the turbine and the performance of the turbine are analysed. CO4 : Analyse the performance of the compressors with various configuration within and outside and under various atmospheric conditions. CO5 : Compute the solutions of psychrometric problem with the application of the relation between temperature and humidity conditions

Semester:5

Course:Metrology and Measurements-[ME8501]
Upon completion of the course, the students will.../ will be able to... CO1 : To understand the fundamentals of the basic properties of Metrological equipment's CO2 : To understand the importance and learn performance of Metrological equipment's CO3 : To understand the various Metrological equipment available to measure the dimension of the components. CO4 : To understand the correct procedure to be adopted to measure the dimension of the components. CO5 : To provide knowledge the measurement and the dimension of the components.
Course:Kinematics and Dynamics Laboratory-[ME8511]
Upon completion of the course, the students will.../ will be able to... CO1 : Compare the kinematics of various gears and joints. CO2 : Determine mass moment of inertia of various mechanical system CO3 : Infer gyroscopic effect and couple CO4 : Classify various governors and construct cam profile CO5 : Compare the frequency and vibrations in various dynamic systems
Course:Design of Machine Elements-[ME8593]
Upon completion of the course, the students will.../ will be able to...

CO1 : Explain the influence of steady and variable stresses in machine component design
CO2 : Apply the concepts of design to shafts, keys and couplings
CO3 : Apply the concept of design to temporary and permanent joint
CO4 : Apply the concept of design to energy absorbing member, connecting rod and crank shaft
CO5 : Apply the concepts of design to bearings

Course:Internal Combustion Engines-[OAT552]

Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the principles of operation of different SI Engines and components.
CO2 : Implementing the principles of operation of different CI Engines and components.
CO3 : Analyze the pollutant formation and control.
CO4 : Acquire the knowledge about engine modification required for the usage of alternate fuels.
CO5 : Evaluate the principles and trends in recent IC engines.

Course:Dynamics of Machines-[ME8594]

Upon completion of the course, the students will.../ will be able to...
CO1 : Able to describe the force-motion relationship in components subjected to external forces and analysis of standard mechanisms
CO2 Ability to take decisions by implementing the undesirable effects of unbalances resulting from prescribed motions in mechanism.
CO3 : Able to analyze the concepts of degrees of freedom
CO4 : Will acquire skills to take effect of dynamics of undesirable vibrations
CO5 : Able to evaluate principles in mechanisms used for speed control

Course:Thermal Engineering- II-[ME8595]

Upon completion of the course, the students will.../ will be able to...
CO1 : Classify and design steam nozzle
CO2 : Relate the functioning and features of different types of Boilers auxiliaries and calculate performance parameters
CO3 : Compare the types of steam turbines and calculate the performance
CO4 : Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers
CO5 : Explain and solve problems on refrigeration, air-conditioning, and psychometric processes

Course:Thermal Engineering Laboratory-[ME8512]

Course Outcomes
Upon completion of the course, the students will.../ will be able to...
CO1 : Illustrate the valve timing, port timing and actual p-v diagrams.
CO2 : Evaluate the performance and heat balance of petrol and diesel engine.
CO3 : Determine the thermal conductivity for various material profiles.
CO4 : Evaluate convective heat transfer coefficients for various modes.
CO5 : nalyze the performance of heat exchanger, refrigeration and air conditioning system.

Course:Metrology and Measurements Laboratory-[ME8513]

Upon completion of the course, the students will.../ will be able to...
CO1 : Check the dimensions and the dimensional deviations of given parts.
CO2 : Inspect the dimensions, angularity and parallelism of a given component
CO3 : Evaluate the straightness of surfaces and determine size of irregularities on a machined surface
CO4 : Measure the vertical distances or height of objects, taper angle of slope for a given component, various parameters of threads and gear wheel

CO5 : Construct the torque characteristic curves to various loads at various distances

Semester:6

Course:Professional Communication-[HS8581]
Upon completion of the course, the students will.../ will be able to...
CO1 : Make effective presentations
CO2 : Participate confidentlyin group discussions
CO3 : Attend job interviews and be successful in them
CO4 : Develop adequate Softskills required for the work place
CO5 : Develop a long term career plan -making career changes
Course:Automobile Engineering-[ME8091]
Upon completion of the course, the students will.../ will be able to...
CO1 : Recognize the various parts of the automobile and their functions and materials
CO2 : Discuss the engine auxiliary systems and engine emission control
CO3 : Distinguish the working of different types of transmission systems
CO4 : Explain the Steering, Brakes and Suspension Systems.
CO5 : Predict possible alternate sources of energy for IC Engines
Course:Design of Transmission Systems-[ME8651]
Upon completion of the course, the students will.../ will be able to...
CO1 : apply the concepts of design to belts, chains and rope drives.
CO2 : apply the concepts of design to spur, helical gears.
CO3 : apply the concepts of design to worm and bevel gears.
CO4 : apply the concepts of design to gear boxes
CO5 : apply the concepts of design to cams, brakes and clutches
Course:Finite Element Analysis-[ME8692]
Upon completion of the course, the students will.../ will be able to...
CO1 : Summarize the basics of finite element formulation.
CO2 : Apply finite element formulations to solve one dimensional Problems.
CO3 : Apply finite element formulations to solve two dimensional scalar Problems.
CO4 : Apply finite element method to solve two dimensional Vector problems
CO5 : Apply finite element method to solve problems on iso parametric element and dynamic Problems.
Course:CAD / CAM Laboratory-[ME8681]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand and interpret the drawing views, symbols, standards and create a 2D drafting sketch using 3D modelling software.
CO2 : Create 3D model of machine elements by bottom-up approach using 3D modelling software.
CO3 : Develop an assembly of 3D model of machine elements using standard CAD modelling software.
CO4 : Demonstrate manual part programming with G and M codes using CAM
CO5 : Understand the application of CAPP in machining and turning centre and explain the basic concepts of CNC programming and machining.
Course:Heat and Mass Transfer-[ME8693]

Upon completion of the course, the students will.../ will be able to...
CO1 : Analyze steady & unsteady heat transfer in composite systems with & without heat generation and extended surfaces.
CO2 : Calculate free and force convection heat transfer in external and internal flows.
CO3 : Describe film wise & drop wise condensation, pool & flow boiling and analyze heat exchanger using LMTD and NTU approaches.
CO4 : Analyze radiation heat transfer between surfaces using shape factor algebra.
CO5 : Analyze diffusion and convective mass transfer occurring in different applications.
Course:Hydraulics and Pneumatics-[ME8694]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the Fluid power and operation of different types of pumps
CO2 : Summarize the features and functions of Hydraulic motors, actuators and Flow control valves
CO3 : Explain the different types of Hydraulic circuits and systems
CO4 : Explain the working of different pneumatic circuits and systems
CO5 : Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
Course:Design and Fabrication Project-[ME8682]
Upon completion of the course, the students will.../ will be able to...
CO1 : Summarize the literatureof previous research works and relate them to present project
CO2 : Formulate an work plan and methodology
CO3 : Explain the project outlining the approach and expected results using good oral and written presentation skills
CO4 : Develop a prototype/model or experimental set-up necessary to meet the objectives
CO5 : Compile the work done throughout the project and suggest the scope
Course:Computer Aided Design and Manufacturing [ME8691]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics
CO2 : Explain the fundamentals of parametric curves, surfaces and Solids
CO3 : Summarize the different types of Standard systems used in CAD
CO4 : Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines
CO5 : Summarize the different types of techniques used in Cellular Manufacturing and FMS

Semester:7

Course:Mechatronics-[ME8791]
Upon completion of the course, the students will.../ will be able to...
CO1 : Gain knowledge about the fundamentals of sensors with its characteristics
CO2 : Describe the working of microprocessor and microcontroller along with its components
CO3 : Gain understanding about various programmable peripheral interface along with its applications
CO4 : Comprehend the fundamentals of programmable logical control along with its characteristics and applications

CO5 : Understand the different actuator systems through various case studies
Course:Power Plant Engineering-[ME8792]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will have an understanding of the principle of the various vital components of a thermal power plant and the cogeneration.
CO2 : Students will have knowledge about the functioning of Diesel ,Gas turbine , Combined cycle & IGCC power plants
CO3 : Students will have ideas about the various types of Nuclear reactors, and the safety aspects related to them
CO4 : Students will have an understanding of the functioning of other renewable energy systems like Hydro , Wind, Solar ,Tidal , Geothermal , Bio-gas and Fuel Cell power plants
CO5 : . Students will have an understanding about the necessity and the methods of apportioning tariff and the different pollution control measures employed in thermal & Nuclear power plants
Course:Robotics-[OIE751]
Upon completion of the course, the students will.../ will be able to...
CO1 : Describe the physical basic components of robot
CO2 : Explain the various types of drive systems and end effectors
CO3 : Demonstrate the principles and applications of sensors and data reduction techniques
CO4 : Compile kinematics equations in robot programming languages
CO5 : Analyze the economics of robot for implementation in industries
Course:Mechatronics Laboratory-[ME8781]
Upon completion of the course, the students will.../ will be able to...
CO1 : Develop assembly language programming of 8085 microprocessor.
CO2 : Create interface to use microcontroller for various applications.
CO3 : Model basic hydraulic, pneumatic and electrical circuits using software.
CO4 : Develop interface with PID controller for various applications.
CO5 : Demonstrate programmable logic controller.
Course:Process Planning and Cost Estimation-[ME8793]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define the various components and functions of process planning.
CO2 : Estimate various production processess and its cost.
CO3 : Evaluate various methods of cost estimation.
CO4 : Evaluate the cost involved in various production process.
CO5 : Estimate machining time for various processess.
Course:Simulation and Analysis Lab-[ME8711]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define and illustrate the need for simulation and analysis for real world problems.
CO2 : Interpret and make use of different features in the simulation and analysis tools.
CO3 : Make use of the simulation software to construct and execute mechanical engineering problems.
CO4 : Model real world problems and analyze the effect of various mechanical and thermal forces through simulation.
CO5 : Analyze the model and apply the results to resolve critical issues in real world engineering problems.
Course:Unconventional Machining Processes-[ME8073]

Upon completion of the course, the students will.../ will be able to...
CO1 : Compare and contrast various unconventional machining processes
CO2 : Illustrate mechanical energy based process and the influence of process parameters.
CO3 : Illustrate electrical energy based process and the influence of process parameters.
CO4 : Illustrate chemical and electro-chemical energy based process and the influence of process parameters.
CO5 : Illustrate thermal chemical energy based process and the influence of process parameters.
Course:Technical Seminar-[ME8712]
Upon completion of the course, the students will.../ will be able to...
CO1 : Acquired the basic skills for performing literature survey and paper presentation.
CO2 : Provide students better communication skills.
CO3 : Describe the current topics in Mechanical and related areas based on current publications.
CO4 : Prepare the report.
CO5 : Acquired the basic skills for performing literature survey and paper presentation.
Course:Non Destructive Testing-[ME8097]
Upon completion of the course, the students will.../ will be able to...
CO1 : Explain the importance of material inspection in general and non-destructive testing methods.
CO2 : Explains nondestructive testing methods and types.
CO3 : Comprehend the properties of non-destructive testing methods and evaluate the importance of necessary properties
CO4 : Learn Eye Examination and Penetrant, Magnetic Particle, Eddy Flows, Acoustic Emission, Ultrasonic, X-ray Test Method
CO5 : Understands the importance of industrial applications (welding, casting), aviation industry and underwater applications.

Semester:8

Course:Professional Ethics in Engineering-[GE8076]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the meaning and purpose of profession, ethics and various civic virtues like sharnig, honesty, courage, commitment ,charaxter, time management and insights about yoga and how yoga could be used in stress management.
CO2 : Comprehend the senses of engineering ethics , moral issues , inquiries and dilemma, various theories about ethics and right action, awareness about customs and religion
CO3 : Apply ethics in the engineering profession and understand the code of ethics, how engineers could act as responsible experimenters and a balanced outlook of the law
CO4 : Assess the safety and risk, analyse the risks, methods to mitigate it, understand concepts like collective bargaining ,occupational crime, conflict of interest, employee, professional and intellectual property rights
CO5 : Understand about Multi- National corporations, Corporate Social responsibility, analyse ethical issues related to the environment ,computer use and weapons development , how an engineer could act sensibly in the shoes of a manager, consultant , expert witness
Course:Principles of Management-[MG8591]
Upon completion of the course, the students will.../ will be able to...

CO1 :To help the students gain understanding of the functions and responsibilities of managers.
CO2 :To provide them tools and techniques to be used in the performance of the managerial job.
CO3 :To enable them to analyze and understand the environment of the organization.
CO4 :To help the students to develop cognizance of the importance of management principles.
CO5 :Demonstrate the roles, skills and functions of management.

St. Xavier's Catholic College of Engineering, Chunkankadai, Nagercoil - 629003.

2020 -- 2021 ODD Semester

Course Outcomes, CO-PO and CO-PSO Mapping

Program:M.E. Energy Engineering

Semester:1

Course:Bio Energy Conversion Techniques-[EY5003]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand and apply energy balances, and thermodynamics in biomass conversion
CO2 : Understand unit processes/operations involved in biofuel/bioenergy production
CO3 : learn techno-economic analysis of various biofuel conversion technologies and their environmental attributes
CO4 : Develop experimental plan pertinent to biofuel production through gasification, pyrolysis and carbonisation
CO5 : Acquire knowledge about various biofuel conversion technologies and their environmental attributes

Course:Thermodynamic Analysis of Energy Systems-[EY5101]
Upon completion of the course, the students will.../ will be able to...
CO1 : Calculate the availability analysis of the energy systems and cycles
CO2 : Analyse the engineering systems to improve and optimize its performance
CO3 : Execute first and second law analysis of reacting systems, equilibrium constant and equilibrium composition of gaseous mixtures
CO4 : Summarize the limits of various fuels with its properties
CO5 : Relate thermodynamic systems with different combustion terminologies
Course:Advanced Numerical Methods-[MA5153]
Upon completion of the course, the students will.../ will be able to...
CO1 : Define linear & nonlinear equations, initial & boundary value problems and difference methods
CO2 : Understand the fundamental concepts of system of equations and identify the ODE
CO3 : Classify the finite difference methods for parabolic, hyperbolic and elliptic equations
CO4 : Apply various methods to solve system of equations and find the solution of ODE using IVP and BVP conditions
CO5 : Solve two dimensional differential equations using finite element methods
Course:Energy Laboratory-[EY5111]
Upon completion of the course, the students will.../ will be able to...
CO1 : Realize the principles of different renewable energy sources
CO2 : Quantify the properties of various fuels
CO3 : Adopt the procedure for performance analysis and optimization of energy utilities
CO4 : Inquire the various energy storage systems
Course:Fluid Mechanics and Heat Transfer-[EY5151]
Upon completion of the course, the students will.../ will be able to...
CO1 : Infer the concept of potential flow theory and boundary layer
CO2 : Analyze the fluid flow behavior of incompressible and compressible fluids
CO3 : Solve the equation and boundary condition of conduction and radiation heat transfer.
CO4 : Analyse the concept and model of turbulent forced convective heat transfer
CO5 : Infer the properties of phase change heat transfer and heat exchanger

Semester:2

Course:Power Generation, Transmission and Utilization-[EY5007]
Upon completion of the course, the students will.../ will be able to...
CO1 : Understand the Operation of Conventional Power Plants (Steam, Hydro, Nuclear and Gas Turbine plants Power generation.
CO2 : Understand the Operation of Renewable Energy Power generation.
CO3 : Analyze the electrical power transmission of power plants.
CO4 : Analyze the utilization of electrical energy of power plants.
CO5 : The Economics of Power generation and Utilization of Electrical Energy for Various
Course:Energy Conservation in Thermal Systems-[EY5201]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify the energy demand supply gap in the World & India and understand energy conservation opportunities available
CO2 : Quantify the energy conservation opportunities in different thermal systems
CO3 : Identify and evaluate the common energy conservation opportunities in different energy intensive industrial equipments
CO4 : improve the thermal efficieny by designing suitable systems for heat recovery and co-generation.
CO5 : guide the employees of the organization about the need and the methods of energy conservation.
Course:Thermal Systems Simulation Laboratory-[TE5261]
Upon completion of the course, the students will.../ will be able to...
CO1 : analyse the heat trasnsfer effect in a heat exchanger using analysis software
CO2 : make use of different boundary condition for a conventive heat transfer process using analysis
CO3 : solve the heat transfer effect by radiation using analysis software
CO4 : analyse the effect of conduction heat transfer using analysis software
CO5 : discover the efficency of insulation using analysis software

Semester:3

Course:Advanced Power Plant Engineering-[TE5074]
Upon completion of the course, the students will.../ will be able to...
CO1 : Students will be able to get an idea about the Indian power scenario, and will have an understanding about the load curves for various applications, different types of power plants and the factors based on which a particular power plant could be selected for a particular location
CO2 : Students will have understanding about the thermal power plant utilities -like Boilers, Nozzles, Turbines, Condensers, Cooling Towers, Water Treatment and Piping system and methods to augment the thermodynamic efficiency
CO3 : Students will be able to understand the different thermodynamic cycles of Internal and External combustion engines, analyse the various cycles and evaluate methods to improve the cycles.
CO4 : Students will understand the concept of cogeneration and its types and performances, other methods like Binary Cycle, Combined cycle, IGCC, AFBC / PFBC cycles,

CO5 :	Thermionic steam power plant and MHD. Students will be able to understand the power generation from renewable sources like hydro power, their types , nuclear power and. types of nuclear reactors

Semester:4

Course:Project work Phase II-[EY5411]
Upon completion of the course, the students will.../ will be able to...
CO1 : Identify solution to specific problems.
CO2 : identify the state of art for the specific problem
CO3 : Evaluate solution methodology to solve the specific problem
CO4 : Develop academic report writing skills
CO5 : Create communication skill to face review and interview

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