Siliguri Institute of Technoogy
Department of Electrical Engineering

English Language and Technical Communication (HU101)

Course Outcomes	
CO 1	Write grammatically correct English to express in a lucid manner.
CO 2	Summarize technical and non-technical passages written in English.
CO 3	Understand and write the different organizational communication like memo, circular, agenda, minutes, job application letter, letter report
CO 4	Explain the various concepts of Technical Communication and its utility in profession.

CHEMISTRY-I (CH 101)

Course Outcomes	
CO 1	Recall the theoretical concepts of chemistry and their limitations in depth
CO 2	Explain chemical reactions and their properties in terms of energy transfer, time frame, synthesis and applications.
CO 3	Utilize the laws of chemistry to solve problems.
CO 4	Use working principles of basic chemistry to gain the knowledge on existing and future materials and technology.
CO 5	Explain the data of quantitative chemical analysis and make use of simple model, equations to solve problems related to basic chemistry.

MATHEMATICS-I (M 101)

Course Outcomes	
CO 1	Summarize the concepts of matrix algebra
CO 2	Solve the problems of Successive differentiations; Mean value theorems, Reduction formula
CO 3	Understand the theory of functions of several variables
CO 4	Determine the convergence of Infinite series.
CO 5	Describe and Utilize the concepts of Vector algebra and calculus for solving problems

BASIC ELECTRICAL & ELECTRONICS ENGINEERING (ES 101)

Course Outcomes	
CO1	Solve DC Networks by identifying appropriate network Theorems.
CO2	**Understand the fundamentals of AC circuit & find various AC parameters.**
CO3	Describe different Laws of Electromagnetism and differentiate between Electrostatic field and Magneto Static Field .

Siliguri Institute of Technoogy
Department of Electrical Engineering

ENGINEERING MECHANICS (ME 101)

Course Outcomes	
CO 1	Defining the basic theories of statics, dynamics and stress, strain
CO 2	Explaining the theories of friction and resolution of forces and related problem solving
CO 3	Study the practical significance of C.G. And M.O.I. And solving related problems.
CO 4	Explaining the concept of kinetics and kinematics for rigid body and related problem solving
CO 5	Calculate the effect of stress and strain on simple structure

ENGINEERING DRAWING AND COMPUTER GRAPHICS (ME 191)

Course Outcomes	
CO 1	Defining the basic theories of statics, dynamics and stress, strain
CO 2	Explaining the theories of friction and resolution of forces and related problem solving
CO 3	Study the practical significance of C.G. And M.O.I. And solving related problems.
CO 4	Explaining the concept of kinetics and kinematics for rigid body and related problem solving
CO 5	Calculate the effect of stress and strain on simple structure

Language Laboratory (HU181)

Course Outcome	
CO 1	Develop listening and reading skills for better comprehension ability.
CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence.

Extra Curricular Activities (XC 181)

Course Outcome	
CO 1	Engage themselves to serve the community while studying in the Institution.

CO 2	Associate themselves to work effectively for the community in and around the institute campus.
CO 3	Carry out creative and constructive social action by enhancing knowledge of oneself and the community through a confrontation with reality.

Course Title: Basic Computation & Principles of Computer programming (CS201/CS291)

Course Outcome	
CO 1	**Recognize** fundamental knowledge on basics of computers hardware, operating system and number systems. Illustrate flowchart and algorithm for a given problem. (BT Level-2)
CO 2	**Describe** about the basic concept of C character set, keyword, variable, data type, operator, expression through fundamentals of C programming language. (BT Level-1)
CO 3	**Solve** different problems like Flow of Control, loop control ,case control using C programming language. (BT Level-3)
CO 4	**Implement** the basic knowledge of C functions, pointers, array, string, c preprocessor using C programming.(BT Level-3)
CO 5	**Evaluate** dynamic memory allocation, structure, union and file handling program by implementing real life projects. (BT Level-4)

Physics I (PH201/PH291)

Course Outcome	
CO 1	**Describe** the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	**Explain** different physical phenomenon by mathematical formulations.
CO 3	**Implement** different theoretical formulation for quantitative solutions of problems.
CO 4	**Employ** data analysis techniques, including errors and representing data graphically by different experimental methods.

Mathematics II (M-201)

Course Outcome	
CO 1	**Summarize** the various solution techniques of ordinary differential equations (ODE).
CO 2	**Explain** the concept of graph theory, trees and their application.
CO 3	**Determine** the convergence of improper integrals and describe beta and gamma functions.
CO 4	**Discuss** the theory of Laplace transform and use to solve ordinary differential equations (ODE).

Engineering Thermodynamics & Fluid Mechanics (ME201)

Course Outcome	
CO 1	**Recognize** the basic concept of Thermodynamics, Heat and Work Transfer, Ideal, real gas and properties of pure substance.

CO 2	**Understand** principles of conservation of energy & work done for different process, 1st Law of Thermodynamics and their application for closed systems, control volume & transient systems.
CO 3	**Calculate** thermal efficiency for a heat engine, coefficient of performance for a refrigerator, heat pump and understanding second law of thermodynamics, Carnot cycle, Carnot theorem and entropy change for a system.
CO 4	**Explain** the Air Standard Cycle for different Internal Combustion engines and Rankin cycle for Thermal Power Plant.
CO 5	**Explain** the properties of Fluids and understanding Fluid Statics and Dynamics.

Basic Electrical & Electronics Engineering – II (ES201) &Basic Electrical & Electronics Engineering Lab – II (ES291)

Course Outcome	
CO 1	Recall different Laws and their Application in Electronics.
CO 2	Understand the Working Principle of Different Electrical Machines.
CO 3	Classify different methods of speed control of DC Shunt Motor.
CO 4	Categorize balanced and unbalanced three phase system with star and delta connected system.
CO 5	Illustrate the general Topology of the structure of electrical power system.

Workshop practice (ME291)

Course Outcome	
CO 1	**Carrying out** the fitting process to make a gauge.
CO 2	**Executing** the machining process to make a pin from M.S rod.
CO 3	**Using** the Gas welding process to produce a butt joint.
CO 4	**Implementing** the Arc welding process to produce butt joint.
CO 5	**Executing** the resistance welding process to make a lap joint.

Analog Electronic Circuit (ES(EE) 301)

Course Outcome	
CO 1	Discuss the fundamental analog electronic circuits like filters, voltage regulator, transistor biasing, RC coupled amplifier, feedback amplifier, operational amplifier, multivibrator etc.
CO 2	Solve problems on basic analog electronic circuits.
CO 3	Study, compare and explain the structure and function of basic and integrated circuits.

CO 4	Verify the principle, operation and limitation of analog electronic circuits.
CO 5	Design various fundamental analog circuits.

DIGITAL ELECTRONIC CIRCUIT   EC (EE) 302/392

Course Outcomes	
CO 1	Discuss different types of number system and logic gates and exemplify minimization of Boolean expression using K-map Method.
CO 2	Implement different combinational and sequential circuit using logic gates and execute their performances.
CO 3	Compare the performance of different logic families and explain the operation of different type of converter and memory devices.
CO 4	Identify different types of logic gates and Study their truth table.
CO 5	Design test bench for different digital combinational and sequential circuits.

Numerical Methods M(CS)301 & M(CS)391

Course Outcomes	
CO1	Describe the concepts of error due to approximation.
CO2	Explain the concepts of Interpolation and solve the related problems.
CO3	Execute the idea of Numerical Integration for solving relevant problems.
CO4	Utilize various techniques to determine the solution of Algebraic equations, transcendental equations and system of linear equations.
CO5	Solve Ordinary differential equations by various numerical techniques.

FIELD THEORY EE- 302

Course Outcomes	
CO1	Calculate various electrical parameters related to electric field from various charges and charge distributions by applying the concept of co-ordinate systems and vector calculus.
CO2	Implement Biot-Savart's law & Ampere's law in magnetic field and identify the effect of magnetism.
CO3	Employ the laws of electromagnetism in analyzing the given problem.
CO4	Solve problem using the concept of Boundary conditions.
CO5	Describe time-varying electromagnetic field as governed by Maxwell's equations and apply them to monitor the phenomena of wave propagation in different media.

Circuit Theory and Networks & Circuit Theory and Networks Laboratory
EE-301& EE-391

Course Outcomes

Siliguri Institute of Technoogy
Department of Electrical Engineering

CO1	Solve electrical networks using network theorems and graph theory.
CO2	Explain the Laplace Transformation and its application in electrical circuit analysis.
CO3	Apply the technique of Fourier Series and transform in circuit analysis.
CO4	Determine relationship between parameters of two port network.
CO5	Select various filter circuits for different applications.

Mathematics III M-302

Course Outcomes	
CO1	Utilize the concepts of Fourier series and Fourier Transform to solve the relevant problems.
CO2	Explain the concepts of Complex Analysis and solve the problems related to it.
CO3	Describe and use the idea of Probability Theory and Probability Distribution to solve problems.
CO4	Solve Partial and Ordinary Differential Equation using Fourier Transform, Separation of variable and Series solution and identify the Bessel and Legendre function.

Technical Report Writing and Language Laboratory HU 381

Course Outcomes	
CO1	Develop listening and reading skills for a better comprehensive ability.
CO2	Coordinate in a group on contemporary topics to enhance their speaking ability and presentation skills.
CO3	Build vocabulary to enhance speaking and writing skills.
CO4	Demonstrate proper body language while expressing one's ideas or opinions.
CO5	Interpret their views in English so as to overcome stage fear and build self confidence.

Basic Environmental Engineering & Elementary Biology CH 401

Course Outcomes	
CO1	Describe the basic principles and structure of ecology and environment.
CO2	Summarize the problems that mankind is facing or will face in future due to continuous environmental degradation.
CO3	Explain the importance of resources and their conservation for the interest of future generation.
CO4	Utilize basic laws of science to understand and solve problems related to environment.

Electric Machine-I EE-401

Siliguri Institute of Technoogy
Department of Electrical Engineering

Course Outcome	
CO1	Recall and explain the basic electromechanical energy conversion process and principle of torque production related to different types of Motors and DC Generators.
CO2	Identify different parts of D.C Generators and execute the performance characteristics by utilising the experimental results.
CO3	Classify different methods of speed control of a D.C Motor and find out speed regulation.
CO4	Develop the equivalent circuit of a 3 phase Induction Motor and find out different kinds of losses by studying and testing the experimental results.
CO5	Justify different vector and connection diagrams of 3-phase transformer circuit and utilize it for successful parallel operation.

Electrical & Electronic Measurement EE 402

Course Outcome	
CO1	Describe the basic concept of various electrical quantities and **identify** different types of instruments.
CO2	Explain the working principle of Sensors and Transducers and **correlate** its real life applications.
CO3	Calculate Power, Resistance and Energy and **verify** by performing experiments.
CO4	Understand the working of CRO with proficiency and **estimate** the voltage, current, frequency and phase with the help of it.
CO5	Analyse and experiment with different AC bridges, potentiometers and instrument transformers and **find errors** while finding the unknown values.

VALUES AND ETHICS IN PROFESSION HU 401

Course Outcome	
CO1	Recall Ethical issues in Engineering Practice, Codes of Professional Ethics, Canons of Ethics**.**
CO2	Correlate practice of different values such as societal values aesthetic values Morale and ethical values in Engineering profession and social Development.
CO3	Analyze the problems of man machine interaction, technology transfer and contrast Reports of Club of Rome and Appropriate Technology Movement Of Schumacher.
CO4	Justify the importance of Renewable Energy Resources, Eco Friendly Technology for sustainable development.

Thermal Power Engineering ME (EE) 411

Course Outcome	
CO1	**Explain** the components of Steam Boiler with working principle, classification and **describe** the combustion system and Environmental Protection system.
CO2	**Determine** the Draught and performance of Steam Boilers.
CO3	**Explain** the Rotary Thermodynamic devices with classifications, determining performance, compounding and condensing system.
CO4	**Describe** Internal combustion engines with classification, Air Standard cycles on which it works, characteristic of fuel used and **determining** the performance.

CO5	**Discuss** the Gas turbine Analysis with Regeneration and Reheating.

Physics II PH (EE) 401 /491

Course Outcome	
CO1	Recognize and identify real life examples from the basic fundamentals of Physics such as classical, quantum, statistical mechanics, dielectric and magnetic properties and solid state
CO2	Explain the concepts of Physics required for technology.
CO3	Utilize different theoretical formulation of Physics in solving engineering problems.
CO4	Compare the quantitative and qualitative results obtained from various Physical phenomena.

Economics for Engineers HU 501

Course Outcomes	
CO1	Explain the basic concept & terminology used in engineering economics.
CO2	Estimate the effect of cost, revenue and benefit of a financial transaction.
CO3	Implement various financial methods and techniques to compare multiple financial alternatives.
CO4	Identify the feasible alternatives based on estimated values.
CO5	Judge the financial feasibility of the alternative selected.

Electric Machine-II EE-501/EE-591

Course Outcomes	
CO1	Discuss working and performance characteristics of a single phase induction motor.
CO2	Explain the construction and working principle of a Synchronous machine.
CO3	Examine different operating characteristics and process of synchronization of an alternator.
CO4	Demonstrate proficiency in working of synchronous motor.
CO5	Classify and determine the performance of special electromechanical devices.

Power System I & Power System I Laboratory EE-502 & EE-592

Course Outcomes	
CO1	Discuss different aspects of Overhead Transmission Line and Underground Cables.
CO2	Determine the line parameters (L, C etc.) of transmission lines.

CO3	Calculate ABCD parameter of different types of transmission lines.
CO4	Discuss different types of power generation.
CO5	Differentiate between various types of tariffs and calculate accordingly.

Control System-I EE503

Course Outcomes	
CO1	Identify different types of control system
CO2	Determine the mathematical model and transfer function for LTI system.
CO3	Evaluate transient & stability of LTI System.
CO4	Study of frequency response analysis and stability of LTI system.
CO5	Select suitable controllers and compensators for LTI system.

MICROPROCESSR & MICROCONTROLLER EE504C

Course Outcome	
CO1	Describe the internal organization of some popular microprocessors/microcontrollers.
CO2	Determine the interrupt and subroutine call mechanism of microprocessor.
CO3	Use some popular microprocessors/microcontrollers addressing modes, registers and instruction sets Timing Diagram and apply them in writing assembly language program.
CO4	Develop assembly language programs of 8085.
CO5	Study the microprocessors/microcontrollers-based systems.

Seminar EE-581

Course Outcome:	
CO1	Gain knowledge about recent trends, issues and developments in technology.
CO2	Develop technical reports.
CO3	Develop interpersonal skills, software skills as well as communication skills.
CO4	Deliver presentation with the help of ICT.
CO5	Evolve as a self-learner.

Control System-II EE-601, EE-691

Siliguri Institute of Technoogy
Department of Electrical Engineering

Course Outcome	
CO1	Transform continuous dynamic system into State Variable Model.
CO2	Test Controllability and Observability of a given State variable model of LTI system.
CO3	Transfer LTI system into Z - domain.
CO4	Employ state variable technique in analysis of sampled data system.
CO5	Identify and analysis different non linear systems.

Power System II EE-602

Course Outcomes	
CO1	Determine the complicated Power System networks into simpler way and perform per unit calculations.
CO2	Discuss about Substations and Distribution systems and also design practical cases.
CO3	Solve Load Flow problems & aware the concepts of Power System Stability.
CO4	Discuss about different faults in Power System and apply symmetrical component concepts in fault analysis.
CO5	Forming different protection schemes for various Power System elements with the help of the concepts of different kinds of Protective Relays.

POWER ELECTRONICS EE603

Course Outcome	
CO1	Explain working principle, construction and characteristics of various Power semiconductor devices.
CO2	Classify various types of Thyristor family members with their symbols and understand different characteristics with various operations of turn on and off process.
CO3	Infer different types of single phase and three phase rectifiers and inverters to identify characteristic behaviour with their applications and control.
CO4	Illustrate the topologies of dc-dc converters and extend this to control the speed of the motor.
CO5	Infer the operation of AC voltage controller as well as cycloconverter.
CO6	Detect the application of specific power converters in commercial and industrial application.

Software Engineering EE 604 (A)

Course Outcomes	
CO1	**Identify** the basic component of software process models and **explain** software project planning activities.
CO2	Classify different implementation of software metrics. Determine various concepts of UML techniques.

CO3	Construct software process using software development tools.
CO4	Verify different testing and debugging techniques on some basic programming codes and Determine the quality of software.
CO5	Find software requirements specifications for different projects and discover software risks and risk management Strategies**.**

Object Oriented Programming EE-604C

Course Outcomes	
CO1	1. **Recognize** the fundamental concepts of Object Oriented Programming.
CO2	2. **Compare** OOP and other conventional programming languages and explain different forms of implementation of object oriented concept.
CO3	3. **Implement** programs through JAVA utilizing the concepts of object oriented programming.
CO4	4. **Execute** applet and event-handling mechanisms through programs.

Wireless Communication EE 605 A

Course Outcomes	
CO1	To **describe** the fundamental concept of discrete time signals. [BT Level 1 & 2]
CO2	To **understand** the meaning and implications of the properties of discrete time systems. [BT Level 2]
CO3	To **utilize** transforms such as ZT and DFT for discrete time signals. [BT level 3]
CO4	To **apply** several design techniques for realization of FIR and IIR type digital filters. [BT level 3]

Communication Engineering EE-605 B

Course Outcomes	
CO 1	Recognize the type of modulation scheme by finding the carrier and message signal frequencies from Amplitude modulated and Angle modulated signal
CO2	Explain the generation and detection process of different digital modulation schemes and compare their merits and short comings.
CO3	Implement the sampling theorem for generating different types of pulse modulation schemes and practice different types of line coding techniques.
CO4	Calculate information content, entropy of different communication system and execute efficiency of digital coding techniques.

PRINCIPLE OF MANAGEMENT HU 601

Course Outcomes	
CO 1	Explain different Concepts of management related to effective functioning of organisation.
CO2	Compare and contrast concepts closely related for decision making Forecasting.

CO3	Solve complex problems related to quality control, production management.
CO4	Appraise or critique different managerial decision related to people management, Marketing management, Financial management.

Utilization of Electric Power EE-702

Course Outcomes	
CO1	Understand different Electric Traction methods and mechanism of Train movement by plotting trapezoidal and quadrilateral speed time curves.
CO2	Describe the working of Electric Drives and Control of Drives.
CO3	Explain different types of Electric heating and design heating element.
CO4	Discuss about Electrolytic process and its relevent application.
CO5	Illustrate various Illumination techniques and design Illumination scheme in efficient way.

RENEWABLE & NON-CONVENTIONAL ENERGY EE 704(D)

Course Outcomes	
CO1	Identify different Renewable and Non Renewable Energy Sources and realize their environmental impact.
CO2	Illustrate Solar geometry and describe different methods of solar energy conversion.
CO3	Demonstrate knowledge about Working Principles of Wind Power generation and its application.
CO4	Explain generation & harnessing of power from Biomass, Geothermal, ocean energy.
CO5	Discuss about different direct energy conversion systems like MHD & Fuel cells.

ELECTRIC DRIVES EE 701

Course Outcomes	
CO1	Describe dynamics of electrical drive system selecting suitable rotating machine.
CO2	Analyze the effect of starting and braking operation on electric drives system.
CO3	Explain operation and control schemes for DC motor drives.
CO4	Apply suitable control mechanism for AC motor drives.
CO5	Identify suitable electrical drive systems for Industrial applications.

Power System III EE 703 A

Course Outcomes

Siliguri Institute of Technoogy
Department of Electrical Engineering

CO1	Discuss the environmental aspects of electric power generation.
CO2	Explain Economic Operation of Energy Generation System.
CO3	Use suitable control technique to maintain power system stability.
CO4	Describe different compensation techniques used in power system.
CO5	Interpret the effect of transient due to lighting and surges and discuss protection scheme accordingly.

COMPUTER NETWORKS EE705A/792A

Course Outcomes	
CO1	**Recognize** the concepts of Computer Network, its issues and layered architectures to identify error and collision during transmission of data and producing free flow of data by utilizing different protocols.
CO2	**Implement** the concept of IP Addressing to solve problems on subnetting and calculate the best possible path in an internetwork by executing different routing algorithms.
CO3	Monitor process to process delivery of data by employing UDP, TCP protocols and verify Quality of Service.
CO4	**Experiment** with network tools and design network programming and administration.

Seminar on Industrial Training EE 781

Course Outcomes	
CO1	Gain knowledge about recent trends, issues and developments in industry.
CO2	Apply the engineering knowledge to real industrial situations and exercise responsibilities as engineers professionally &ethically.
CO3	Develop technical reports and presentation with the help of modern computing tools.
CO4	Demonstrate communication skills and time management.
CO5	Able to evolve as a self-learner.

Electrical System Design -1 EE782

Course Outcomes	
CO1	Recall and estimate basic requirement of designing heating elements with specified operating voltage, wattage and ambient temperature.
CO2	Explain the characteristics and performance of Transmission lines and design a Transmission line for a given voltage level and power (MVA) transfer.
CO3	Develop design procedure and Fabricate a reactor with specified operating voltage, nominal current and fault current.
CO4	Design a 3 phase Induction Motor and find out different efficiencies and losses of the Motor.

CO5	Determine the output equation of a three phase Transformer and Design a Distribution Transformer.

Grand Viva EE883

Course Outcomes	
CO1	Demonstrate systematic understanding of knowledge related to 4 years study of B. Tech. in EE .
CO2	Utilise the knowledge and ideas to deal with real world problems and issues clearly.
CO3	Show verbal communication and presentation skills.
CO4	Demonstrate confidence and versatility in answering the varieties of questions posed by a group of interviewer in a moderately short duration.

Electrical System Design II EE882

Course Outcomes	
CO1	Design a controller for speed control of D.C Machine and analyse the results to reach substantiated conclusions.
CO2	Explain the characteristics and performance of three phase wound rotor Induction Motor and design with given specifications.
CO3	Describe the functions of Substations and justify the requirements for substation planning, design & functionality and equipment selection.
CO4	Design a split phase single phase Induction Motor and understand the procedural steps to design a 3 phase squirrel cage Induction Motor.
CO5	Identify different parts of a A.C Machine and design the controller for speed control of A.C Machine.

Project II EE881

Course Outcomes	
CO1	Explain the basic concepts related to the design of electrical and electronic circuits and engage in life-long learning.
CO2	Illustrate the working principles of a complex circuit based project work and modify the circuit for further up gradation.
CO3	Design, fabricate and troubleshoot different circuit based project works thus improving technical and employability skills.
CO4	Demonstrate knowledge and understanding of the project work and commitment towards professional ethics.
CO5	Perform project works in groups and prepare a report of the same thereby developing their communication and interpersonal skills.
CO6	Verify **and interpret** the results of project works by simulation of systems or process using modern tools/devices.

HVDC Transmission EE 801A

Course Outcomes	
CO1	Understand the importance of HVDC Transmission and HVDC Converters.

CO2	Obtain sufficient knowledge of Power Conversion between AC to DC and DC to AC
CO3	Understand the importance of Firing angle of HVDC system
CO4	Understand the Reactive Power Control of HVDC system
CO5	Obtain sufficient knowledge about the Power Factor improvement of HVDC system

Energy Management and Audit EE 801C

Course Outcomes	
CO1	Demonstrate knowledge about Energy management and energy auditing approaches.
CO2	Explain Energy Scenario.
CO3	Understand the importance of energy conservation and related policies.
CO4	Explain reasons for climate change and related protocols & adaptations for sustainable development.
CO5	Discuss about different energy efficient technologies in electrical systems.

Sensor and Transducers EE 802B

Course Outcomes	
CO1	Recalling the typical measurement systems, errors associated with the different kinds of calibration and the use of different sensors and transducers in suitable applications.
CO2	Understand the basic principles of various kinds of Capacitive sensors their characteristics, different terminologies related to the operation.
CO3	Describing various Magnetic sensors for different measurement systems.
CO4	Employing Thermal sensors and transducers in different environmental aspects for various engineering applications.
CO5	Utilizing of modern Integrated and SMART related sensors and their applications in different science and engineering areas.

Director
Siliguri Institute of Technology

Siliguri Institute of Technology
Department of Electronics and Communication Engineering

ECE 1ˢᵗ Semester

Course Code: CH101

Course Name: Chemistry-1

	Course Outcomes
CO 1	Recall the theoretical concepts of chemistry and their limitations in depth
CO 2	Explain chemical reactions and their properties in terms of energy transfer, time frame, synthesis and applications.
CO 3	Utilize the laws of chemistry to solve problems
CO 4	Use working principles of basic chemistry to gain the knowledge on existing and future materials and technology
CO 5	Explain the data of quantitative chemical analysis and make use of simple model, equations to solve problems related to basic chemistry

Course Code:ES101

Course Name: Basic Electronics

	Course outcome
CO 1	Understand different types of semiconductor and explain their properties.
CO 2	Explain the junction properties of pn junction and its application in rectifiers and other circuits.
CO 3	Discuss the working principle of Transistor and explain its different characteristics.
CO 4	Study the operating principles of different electronic components and devices.
CO 5	Study the V-I characteristics of P-N Junction Diode, Zener Diode, operation of rectifiers and input output characteristics of BJT.

Course Code: HU101

Course Name: English Language and Technical Communication

	Course outcome
CO 1	Write grammatically correct English to express in a lucid manner
CO 2	Summarize technical and non technical passages written in English
CO 3	Understand and write different organizational communications like Notice, Memorandum, Circular, Agenda Job Application letter CV, Resume , Business Letters, Technical Reports.
CO 4	Explain the various concepts of Technical Communication and its utility in profession.

Course Code: HU181

Course Name: Language Laboratory

Course outcome	
CO 1	Develop listening and reading skills for a better comprehensive ability.
CO 2	Coordinate in a group on contemporary topics to enhance their speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills
CO 4	Demonstrate proper body language while expressing one's ideas or opinions
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence

Course Code: M101

Course Name: Mathematics I

Course outcome	
CO 1	Summarize the concepts of matrix algebra
CO 2	Solve the problems of Successive differentiations; Mean value theorems, Reduction formula
CO 3	Understand the theory of functions of several variables
CO 4	Determine the convergence of Infinite series.
CO 5	Describe and Utilize the concepts of Vector algebra and calculus for solving problems

Course Code: ME101

Course Name: Engineering Mechanics

Course outcome	
CO 1	Defining the basic theories of statics, dynamics & stress strain
CO 2	Explain theories on Friction , resolutaion of forces and related problems solving
CO 3	Explaining the concept of C.G.M.O.I of rigid body with related problems
CO 4	Utilizing the concept of kinetics and kinematics for rigid body to solve probles
CO 5	Calculate the effect of stress and strain on simple structure

Course Code: ME191

Course Name: Engg Drawing & Computer Graphics

	Course outcome
CO 1	Identifying various types of lines, lettering, geometrical curves and specify their use.
CO 2	Describing the principal of projection of point ,lines , simple solids
CO 3	Describing of an isometric view from orthogonal view of simple solids
CO 4	Explaining development of surface of solids
CO 5	Discussing basic of computer aided drafting

Course Code: XC181

Course Name: Extra curricular

	Course outcome
CO 1	Engage themselves to serve the community while studying in the Institution.
CO 2	Associate themselves to work effectively for the community in and around the institute campus.
CO 3	Carry out creative and constructive social action by enhancing knowledge of oneself and the community through a confrontation with reality.

Course Code: CS201

Course Name: Basic Computation & Principles of Computer Programming

	Course outcome
CO 1	Recognize fundamental knowledge on basics of computers hardware, operating system and number systems. Illustrate flowchart and algorithm for a given problem.
CO 2	Describe about the basic concept of C character set, keyword, variable, data type, operator, expression through fundamentals of C programming language.
CO 3	Solve different problems like Flow of Control ,loop control ,case control using C programming language.
CO 4	Implement the basic knowledge of C functions, pointers, array, string, c preprocessor using C programming.
CO 5	Evaluate dynamic memory allocation, structure, union and file handling program by implementing real life projects.

Course Code: PH201

Course Name: Physics-I

	Course outcome

CO 1	Describe the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	Explain different physical phenomenon by mathematical formulations.
CO 3	Implement different theoretical formulation for quantitative solutions of problems.
CO 4	Employ data analysis techniques, including errors and representing data graphically by different experimental methods.

Course Code: M201

Course Name: Mathematics II

Course outcome	
CO 1	Summarize the various solution techniques of ordinary differential equations (ODE).
CO 2	Explain the concept of graph theory, trees and their application.
CO 3	Determine the convergence of improper integrals and describe beta and gamma functions.
CO 4	Discuss the theory of Laplace transform and use it to solve ordinary differential equations

Course Code: ES201

Course Name: Basic Electronics

Course outcome	
CO 1	Understand and describe the different structure and applications of field effect transistors.
CO 2	Analyze the different feedback topologies and OPAMP circuits and apply the knowledge of network theory to OPAMP circuits.
CO 3	Describe number system and verify truth tables for different logic operations, and design Gates and simple digital circuits using the Gates.
CO 4	Study the V-I characteristics of transistors and FETs.
CO 5	Apply the knowledge of network theory to design various circuits using OPAMP and able to design simple digital circuits using the Gates.

Course Code: ME201

Course Name: Engineering Thermodynamics & Fluid mechanics

Course outcome	
CO 1	Recognizing the basic concept of Thermodynamics, Heat and Work Transfer, Ideal, real gas and properties of pure substance.
CO 2	Understanding principles of conservation of energy & work done for different process, 1st Law of Thermodynamics and their application for closed systems, control volume & transient systems.

CO 3	Calculating thermal efficiency for a heat engine, coefficient of performance for a refrigerator, heat pump and understanding second law of thermodynamics, Carnot cycle, Carnot theorem and
CO 4	Explaining the Air Standard Cycle for different Internal Combustion engines and Rankine cycle for Thermal Power Plant.
CO 5	Explaining the properties of Fluids and understanding Fluid Statics and Dynamics.

Course Code: ME292

Course Name: WORKSHOP PRACTICE

Course outcome	
CO 1	Carrying out the fitting process to make a gauge
CO 2	Executing the machining process to make a pin from M.S rod
CO 3	Using the Gas welding process to produce a butt joint
CO 4	Implementing the Arc welding process to produce butt joint
CO 5	Executing the resistance welding process to make a lap joint

Course Code: EC 301

Course Name: Circuit Theory and Networks, Circuit Theory and Networks Lab

Course outcome	
CO 1	Describe different circuits and signals and calculate various circuit parameters.
CO 2	Explain the concept of magnetic coupling and modelling of coupled circuits.
CO 3	Study the time response of various circuits using Transient Analysis and solve electrical networks using the concept of Graph Theory.
CO 4	Use Laplace transform and Fourier transform to interpret different electrical circuit.
CO 5	Measure the parameters of two port networks.

Course Code: EC302

Course Name: Solid State Device

Course outcome	
CO 1	Identify the different kinds of semiconductors and explain different properties of different types of materials.
CO 2	Describe the junction properties of P-N junction and utilize them to make rectifiers and other circuits.

CO 3	Explain the structure, the input and output characteristics and applications of BJTs, JFETs and MOSFETs.
CO 4	Verify the basic theories and solve problems related with Solid State Devices circuits.
EC302.5	Check and justify the operation of electronic devices like FET and MOSFET by constructing real electronic circuits and also with computer simulation.

Course Code: EC303

Course Name: Signals and Systems

Course outcome	
CO 1	Describe the basic concepts of systems and the way signals interact with the physical systems.
CO 2	Determine the signal frequency content and the system representation in the frequency domain using Fourier Series / Transform.
CO 3	Apply the Laplace Transform and Z-Transform for analyzing the response of LTI systems.
CO 4	Generate various types of signals and perform basic signals operations.
CO 5	Obtain the response of various systems and perform analysis in transformed domain.

Course Code: EC304

Course Name: Analog Electronic Circuits

Course outcome	
CO 1	Discuss the fundamental analog electronic circuits like filters, voltage regulator, transistor biasing, RC coupled amplifier, feedback amplifier, operational amplifier, multivibrator etc.
CO 2	Solve problems on basic analog electronic circuits.
CO 3	Study, compare and explain the structure and function of basic and integrated circuits.
CO 4	Verify the principle, operation and limitation of analog electronic circuits.
CO 5	Design various fundamental analog circuits.

Course Code: M(CS)301

Course Name: Numerical Methods

Course outcome	
CO 1	Describe the concepts of error due to approximation.
CO 2	Explain the concepts of Interpolation and solve the related problems.

CO 3	Execute the idea of Numerical Integration for solving relevant problems.
CO 4	Utilize various techniques to determine the solution of Algebraic equations, transcendental equations and system of linear equations.
CO 5	Solve Ordinary differential equations by various numerical techniques.

Course Code: M302

Course Name: Mathematics III

Course outcome	
CO 1	Utilize the concepts of Fourier series and Fourier Transform to solve the relevant problems.
CO 2	Explain the concepts of Complex Analysis and solve the problems related to it.
CO 3	Describe and use the idea of Probability Theory and Probability Distribution to solve problems.
CO 4	Solve Partial and Ordinary Differential Equation using Fourier Transform, Separation of variable and Series solution and identify the Bessel and Legendre function.

Course Code: EC401

Course Name: ELECTROMAGNETIC THEORY & TRANSMISSION LINE

Course outcome	
CO 1	Describe the basic concept of Vector algebra, Maxwell's equations, and apply them in the problems related to static and time varying EM fields.
CO 2	Understand the wave propagation phenomena in different medium like dielectric, conductor and free space.
CO 3	Analyze wave propagation in transmission line and to understand the concept of basic transmission line parameters & Smith Chart.
CO 4	Understand the idea of basic radiating structures, and few primary antennas like, dipole, loop, Yagi Uda and array antennas.
CO 5	Investigate the basic parameters of different antennas and study the standing wave pattern of transmission line.

Course Code: EC402

Course Name: Digital Electronics & Integrated Circuit

Course outcome	
CO 1	represent numerical values in various number systems and perform number conversions between different number systems
CO 2	explain the operation of logic gates (AND, OR, NAND, NOR, XOR, XNOR) , Boolean algebra including algebraic manipulation/simplification, Karnaugh Map simplification and application of
CO 3	analyze and design combinational circuits like decoders, encoders, multiplexers, and de-multiplexers including arithmetic circuits (half adder, full adder)

CO 4	analyze and design sequential circuits like flip-flops, registers, counters
CO 5	classify the nomenclature and technology in the area of memory devices: ROM, RAM, PROM, PLD, FPGAs, etc.
CO 6	Describe the operation and specifications of different logic families, A/D & D/A converters.

Course Code: CH401

Course Name: Basic Env. Engg and Elemental Biology

	Course outcome
CO 1	Describe the basic principles and structure of ecology and environment
CO 2	Summarize the problems that mankind is facing or will face in future due to continuous environmental degradation.
CO 3	Explain the importance of resources and their conservation for the interest of future generation
CO 4	Utilizing basic laws of science and engineering to understand and solve problems related to environment.

Course Code: HU481

Course Name: Technical Report Writing and Language Laboratory

	Course outcome
CO 1	Develop listening and reading skills for a better comprehensive ability.
CO 2	Coordinate in a group on contemporary topics to enhance their speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence .

Course Code: HU401

Course Name: VALUES AND ETHICS IN PROFESSION

	Course outcome
CO 1	Recognize the importance of values in human life.
CO 2	Understand the professional and ethical responsibility of the workplace.
CO 3	IImplement the engineering solutions in a global and societal context.

CO 4	Identify the contemporary issues related to human and professional interactions at workplace.
CO 5	Grade the core values that shape the ethical behaviour of an engineer.

Course Code: PH401

Course Name: Physics-II

	Course outcome
CO 1	Describe the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	Explain different physical phenomenon by mathematical formulations.
CO 3	Implement different theoretical formulation for quantitative solutions of problems.
CO 4	Employ data analysis techniques, including errors and representing data graphically by different experimental methods.

Course Code: EC501

Course Name: Analog Communication

	Course outcome
CO 1	Describe the need for modulation and identify type of modulation and blocks s to be used in analog communication system.
CO 2	Explain about AM transmission and reception including noise analysis.
CO 3	Explain about FM transmission and reception including noise analysis.
CO 4	Implement the analog modulation and demodulation. techniques to real time applications like Radio Broadcasting and Radio receiver etc.
CO 5	Generate various types of modulated signals and perform their basic operations.
CO 6	Designs the analog modulator and demodulator circuits in communication system.

Course Code: EC502

Course Name: Microprocessor & Microcontroller

	Course outcome
CO 1	Learn the internal organization of 8085, 8086 microprocessors& 8051 microcontrollers.
CO 2	Understand the interrupt and subroutine call mechanism of microprocessor
CO 3	Use microprocessors & microcontrollers addressing modes, registers and instruction sets and apply them in writing assembly language program

CO 4	debug their assembly language programs
CO 5	Develop skills in interfacing A/D, D/A converter, stepper motor etc. With processor

Course Code: EC503

Course Name: Control System, Control System Lab

Course outcome	
CO 1	Define different types of control systems and to list the basic elements of feedback control systems and to develop the mathematical model of linear time invariant systems and to deduce the overall transfer function. Analysis and synthesis of different dynamic system into state variable form.
CO 2	Find the time response of linear time invariant systems and to evaluate the time response specifications.
CO 3	Find the frequency response of linear time invariant systems and to evaluate the frequency response specifications.
CO 4	Acquire the concept of stability of LTI systems applying Routh-Hurwitz criterion, Root Locus, Bode Plot and Nyquist Plot techniques.
CO 5	Design suitable controllers and compensators to improve the system performance.

Course Code: EC504B

Course Name: DATA STRUCTURE AND C

Course outcome	
CO 1	Recall the basic concept of C programming language and Explain the classification of data structure.
CO 2	Illustrate complex data structure and its Operation.
CO 3	Utilize the knowledge of data structure student can solve problem.
CO 4	Estimate the time and space complexity of sorting and searching technique.
CO 5	Develop algorithm and data structure using C programming.

Course Code: HU501

Course Name: Economics for Engineers

Course outcome	
CO 1	Understand the basic concepts and terminology used in engineering economics.
CO 2	Estimate the effect of cost, revenue & benefit associated with the acquisition and operation of the facility.

CO 3	Utilize financial methods and techniques to compare multiple financial /strategic alternatives.
CO 4	Identify the feasible alternatives based on estimated values.
CO 5	Verify the financial feasibility of the projects and draw inferences for investment decision.

Course Code: HU601

Course Name: Principles Of Management

Course outcome	
CO 1	Recognize the principles and theories of management .
CO 2	Describe the various functional aspects pertinent to different operational areas of the organization.
CO 3	Implement management concepts to resolve complex quantitative and qualitative problems .
CO 4	Study the organizational effectiveness and assess the necessary changes required in the existing organizational pattern.

Course Code: EC601

Course Name: Digital communication

Course outcome	
CO 1	Describe how to sample and digitized the analog signal.
CO 2	Understand about Digital Data transmission.
CO 3	Apply the concept of Eye pattern to analyze ISI analysis.
CO 4	Analyze about the digital modulation techniques including probability of error.
CO 5	Generate various types of modulated signals and perform their basic operations and Apply the concept of Symbol error to detect the error in digital data transmission.
CO 6	Design and implement the PN sequence in communication system.

Course Code: EC602

Course Name: Digital Signal Processing

Course outcome	
CO 1	Describe the fundamental concepts for classification of signals & systems, sampling & reconstruction and signal operations.
CO 2	Understand the use of transforms used for discrete time signals such as ZT and DFT.

CO 3	Apply several design techniques for realization of FIR & IIR type digital filters.
CO 4	Perform analysis of discrete time signals and systems.
CO 5	Design, analyze and implement digital signal processing systems such as digital filters.

Course Code: EC603

Course Name: Telecommunication Systems

	Course outcome
CO 1	Describe the historical processes in Telecommunication Switching.
CO 2	Understand various switching systems, signaling techniques, Traffic Engineering, Numbering Plan, Charging plan.
CO 3	Develop the knowledge of ISDN, Modem and Modern Telephony.

Course Code: EC604A

Course Name: Antenna Theory & Propagation

	Course outcome
CO 1	Describe different antenna parameters and basic radiation mechanism.
CO 2	Comprehend different types of low and high frequency antennas and array antennas.
CO 3	Explain the working principle of simple microwave horn antenna, phased array antenna and parabolic reflector.
CO 4	Recognize the concept of different wave propagation methods.

Course Code: EC605A

Course Name: Object Oriented Programming & Object Oriented Programming Lab

	Course outcome
CO 1	Recognize the fundamental concepts of Object Oriented Programming.
CO 2	Compare OOP and other conventional programming languages and explain different forms of implementation of object oriented concept.
CO 3	Implement programs through JAVA utilizing the concepts of object oriented programming.
CO 4	Execute applet and event-handling mechanisms through programs.

Course Code: EC681

Course Name: Seminar

Course outcome	
CO 1	Develop idea on preparing lectures, projects, workshops, technical writings , symposia, case studies etc.
CO 2	Deliver presentation with the help of software skill or ICT.
CO 3	Develop delivering skill of knowledge to become extrovert in nature & to maintain better interpersonal relationship on the job and off the job.
CO 4	Gain knowledge about recent trends, issues and developments in electronics communication system & technology & evolve as a self-learner.

Course Code: EC701

Course Name: Wireless Communication

Course outcome	
CO 1	Identifying various types of lines, lettering, geometrical curves and specify their use.
CO 2	Describing the principal of projection of point ,lines , simple solids
CO 3	Describing of an isometric view from orthogonal view of simple solids
CO 4	Explaining development of surface of solids
CO 5	Discussing basic of computer aided drafting

Course Code: EC702

Course Name: Microelectronics and VLSI Designs

Course outcome	
CO 1	Describe the basic concept of VLSI design: Microelectronic evaluation, Scale of Integration, Types of VLSI Chips, different design domains and design principles.the basic concepts of various systems and signal processing and the way the signals interact with the physical system.
CO 2	Understand Silicon Semiconductor Technology and CMOS processing technology: P- well, N-well, Twin Tub process, layout Design rules.
CO 3	Implement CMOS logic circuits, Complex logic circuits, Advanced Logic circuits and different sequential CMOS logic circuits.
CO 4	Experiment different combinational and sequential logic circuits and verify their behavior with Spice Simulation and EDA tools for VLSI Design.
CO 5	Design and develop CPLD/FPGA based small prototype.

Course Code: EC703A

Course Name: RF AND Microwave Engineering

Course outcome	

CO 1	Describe the RF & Microwave spectrum and its application along with the advantages of microwave signal.
CO 2	Understand the working principle of passive and active Microwave devices.
CO 3	Utilize scattering matrix in different microwave passive components to realize their behaviour.
CO 4	Analyze different modes of rectangular and circular waveguides, cavity resonators.

Course Code: EC704A

Course Name: RADAR ENGINEERING

Course outcome	
CO 1	Describe the basic concept and the essential principles of operation of radar systems.
CO 2	Explain the operation of CW , FM Radar , MTI & Pulse Doppler Radar, and clutter .
CO 3	Explain the issues related to radar signal theory.
CO 4	Study the concept of ambiguity function using matched filter.

Course Code: EC705A

Course Name: Database Management System

Course outcome	
CO 1	Ability to explain the fundamentals of DBMS and design of logical databases using design principles of ERD and implement the logic in Relational Data Model.
CO 2	Identify query processing methodologies of Relational Algebra and Calculus and query optimization techniques.
CO 3	Construct simple and moderately advanced database queries using SQL and PL/SQL blocks for ensuring data integrity and security.
CO 4	Design normalized database & understand the internal data Structure.
CO 5	Implement the basic issues of transaction processing, concurrency control and recovery mechanisms in applications.

Course Code: EC705D

Course Name: Power Electronics

Course outcome	
CO 1	Explain working principle, construction and characteristics of various Power semiconductor devices.
CO 2	Classify various types of Thyristor family members with their symbols and understand different characteristics as well as various operations of turn on tend off process.

CO 3	Infer different types of single phase and three phase Power electronic converters to illustrate characteristic behaviour with their applications.
CO 4	Utilize the implementation of power converters to be used in various industrial and commercial applications.
CO 5	Evaluate speed control methodology of AC and DC motors with the help of power converter devices.

Course Code: EC781

Course Name: Industrial Training

Course outcome	
CO 1	To evaluate overall technical knowledge gained on all the subjects of Electronics and Communication Engineering.
CO 2	To check the degree of clarity and understanding of knowledge for solving real world problems and issues.
CO 3	To check the effectiveness of communication skill and degree of confidence in answering the varieties of questions asked by a group of faculty members, creating a virtual environment of

Course Code: EC782

Course Name: Project Part-I

Course outcome	
CO 1	Remember the basic theories related with the design of electrical and electronic circuits.
CO 2	Discuss and understand the basic theories to design simple and complex electronic circuits for real life problems.
CO 3	Design, construct and troubleshoot and create different electronic circuit based projects thus improving their technical and employability skills. .
CO 4	Analyze and Simulate a sequential machine for a system or process appropriate for required accuracy.
CO 5	Students will work in groups to create and solve the problems with electronic circuits thereby enhancing their communication and interperonal skills.
CO 6	Justify a specific project for a specific purpose or application.

Course Code: HU781

Course Name: GROUP DISCUSSION

Course outcome	
CO 1	Internalize the basic principles of group discussion like initiating, turn taking, creative intervening and closing.
CO 2	Co ordinate in a group on contemporary topics to enhance the speaking skills
CO 3	Demonstrate proper body language while expressing ones idea or opinion in a group

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Course Code: EC802B

Course Name: Materials Science & Enginnering

	Course outcome
CO 1	Remember basic knowledge and theories related with crystal structure and different properties of materials.
CO 2	Explain the origin and basic theories related with the dielectric, magnetic, superconducting and optical properties of different materials.
CO 3	Explain the basic theories of material science to analyze the use of different materials in optical communication and data storage.
CO 4	Analyze the use materials used in display devices and the use of advanced materials in electronic devices.

Course Code: EC881

Course Name: DESIGN LAB

	Course outcome
CO 1	To evaluate overall technical knowledge gained on all the subjects of Electronics and Communication Engineering.
CO 2	To check the degree of clarity and understanding of knowledge for solving real world problems and issues.
CO 3	To check the effectiveness of communication skill and degree of confidence in answering the varieties of questions asked by a group of faculty members, creating a virtual environment of

Course Code: EC882

Course Name: Project Part -II

	Course outcome
CO 1	Remember the basic theories related with the design of electrical and electronic circuits.
CO 2	Discuss and understand the basic theories to design simple and complex electronic circuits for real life problems.
CO 3	Design, construct and troubleshoot and create different electronic circuit based projects thus improving their technical and employability skills. .
CO 4	Analyze and Simulate a sequential machine for a system or process appropriate for required accuracy.
CO 5	Students will work in groups to create and solve the problems with electronic circuits thereby enhancing their communication and interpersonal skills.
CO 6	Justify a specific project for a specific purpose or application.

Course Code: EC893

Course Name: Grand Viva

	Course outcome
CO 1	To evaluate overall technical knowledge gained on all the subjects of Electronics and Communication Engineering.
CO 2	To check the degree of clarity and understanding of knowledge for solving real world problems and issues.
CO 3	To check the effectiveness of communication skill and degree of confidence in answering the varieties of questions asked by a group of faculty members, creating a virtual environment of

Course Code: EC801B

Course Name: *Digital Image Processing*

	Course outcome
CO 1	To recall, identify, compare and explain the fundamentals of Digital Image Processing.
CO 2	To determine, describe, explain and implement the different techniques of image processing like denoising, compression, representations of digital images.
CO 3	To employ, modify, study and find the mathematical treatments of Digital Image Processing.
CO 4	To be able to explain, resolve and justify the various algorithms.
CO 5	To propose and design various new application based concepts

Course Code: EC802C

Course Name: Renewable Energy

CO 1	Describe about different Renewable and Non Renewable Energy Source
CO 2	Recognize energy Scenario and the environmental aspects related to the utilization of energy sources
CO 3	Explain the Working Principle of Solar cell ,Solar collector and different Solar thermal application and Calculate the Solar radiation.
CO 4	Calculate the efficiency of Wind turbine and Explain the working principle of Wind power generation .
CO 5	Explain the working principle of Hydel , ocean ,Tidal ,Biomass and Geothermal power generation .
CO 6	Students Will be able to Explain the working Principle of Fuel cell and Magneto hydro dynamic generation.

Course Code: HU801

Course Name: Organisational Behaviour

CO 1	Establish relationship between personality, attitude and job satisfaction. Explain the link between decision making and perception.
CO 2	Appraise and apply different theories on motivation to boost the individual as well as group performance.

CO 3	Choose the best style of leadership, Conflict management strategies according to the particular situation.
CO 4	Design efficient and effective process of communication, Organizational structure to foster healthy organizational climate and culture.

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Department of Computer Science and Engineering

English language& technical communication (HU -101)

Course Outcomes	
CO 1	Write grammatically correct English to express in a lucid manner.
CO 2	Summarize technical and non-technical passages written in English.
CO 3	Understand and write the different organizational communication like memo, circular, agenda, minutes, job application letter, letter report
CO 4	Explain the various concepts of Technical Communication and its utility in profession.

Physics – 1 PH101 (CSE)

Course Outcomes	
CO 1	Describe the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	Explain different physical phenomenon by mathematical formulations.
CO 3	Implement different theoretical formulation for quantitative solutions of problems.
CO 4	Employ data analysis techniques, including errors and representing data graphically by different experimental methods.

Mathematics-1(M101)

Course Outcome:	
CO 1	**Summarize** the concepts of matrix algebra.
CO 2	**Solve** the problems of Successive differentiations; Mean value theorems, Reduction formula.
CO 3	**Understand** the theory of functions of several variables.
CO 4	**Determine** the convergence of Infinite series.
CO 5	Describe **and Utilize** the concepts of Vector algebra and calculus for solving problems.

Basic Electrical & Electronic Engineering – 1(ES101)

Course Outcomes	
CO 1	**Understand** different types of semiconductor and explain their properties.
CO 2	**Understand** the working principles of different diodes and use them in rectifier circuits.
CO 3	**Discuss** the working principle of Transistor and **explain** its V-I characteristics.
CO 4	**Carry Out** experiments to becomefamiliar with different electronic components, measuring and testing equipment.
CO 5	**Study** the V-I characteristics of P-N Junction Diode and Zener Diode and **calculate** ripple factor of a rectifier.

Electronics Part:

Course Outcomes	
CO 1	Classify different electric Circuits & apply network theorems in DC Circuits.

CO 2	Explain the Electrical and Magnetic field using Various laws of Electromagnetism
CO 3	Illustrate working of AC Circuit & Calculate different Parameters.

Engg. Mechanics(ME101)

Course Outcomes	
CO 1	Discuss the basics on representation of a Force as a vector and determine the effect of coplanar forces on rigid bodies.
CO 2	Estimate the effect of frictional forces on rigid bodies due to application of external forces.
CO 3	Use the concept of centroid, Centre of Gravity and Moment of Inertia for rigid bodies to study problems.
CO 4	Study effect of forces on rigid bodies in a state of motion.
CO 5	Determine effect of forces on bodies undergoing deformation.

Workshop Practice(ME192)

Course Outcomes	
CO1	Carrying out the fitting process to make a gauge
CO2	Executing the machining process to make a pin from M.S rod
CO3	Using the Gas welding process to produce a butt joint
CO4	Implementing the Arc welding process to produce butt joint
CO5	Executing the resistance welding process to make a lap joint

Language Laboratory (HU181)

Course Outcomes	
CO 1	Develop listening and reading skills for better comprehension ability.
CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence.

Extra Curricular Activities(NSS/NCC/NSO) XC181

Course Outcomes	
CO 1	Engage themselves to serve the community while studying in the Institution.
CO 2	Associate themselves to work effectively for the community in and around the institute campus.
CO 3	Carry out creative and constructive social action by enhancing knowledge of oneself and the community through a confrontation with reality.

Basic Computation and Principles of Computer Programming (BC & PCP) CS-201

Course Outcomes	
CO 1	Recognize fundamental knowledge on basics of computers hardware, operating system and number systems. Illustrate flowchart and algorithm for a given problem.
CO 2	Describe about the basic concept of C character set, keyword, variable, data type, operator, expression through fundamentals of C programming language.
CO 3	Solve different problems like Flow of Control, loop control, case control using C programming language.
CO 4	Implement the basic knowledge of C functions, pointers, array, string, c preprocessor using C programming.
CO 5	Evaluate dynamic memory allocation, structure, union and file handling program by implementing real life projects.

Chemistry-1(CH201)

Course Outcomes	
CO 1	Recall the theoretical concepts of chemistry and their limitations in depth.
CO 2	Explain chemical reactions and their properties in terms of energy transfer, time frame, synthesis and applications.
CO 3	Utilize the laws of chemistry to solve problems.
CO 4	Use working principles of basic chemistry to gain the knowledge on existing and future materials and technology.
CO 5	Analyze the data of quantitative chemical analysis and make use of simple model, equations to solve problems related to basic chemistry.

Mathematics II(M-201)

Course Outcomes	
CO 1	Summarize the various solution techniques of ordinary differential equations (ODE). [BT Level 2]
CO 2	Explain the concept of graph theory, trees and their application. [BT Level 2]
CO 3	Determine the convergence of improper integrals and describe beta and gamma functions. [BT Level 2]
CO 4	Discuss the theory of Laplace transform and use to solve ordinary differential equations (ODE). [BT Level 3]

Basic Electrical & Electronic Engineering-II (ES201)

Electronic Part:

Course Outcomes	
CO1	Comparing the different Gate isolation techniques; describing the operation and I-V characteristics of JFETs and MOSFETs; Appreciate the utility of CMOS.
CO2	Understand the feedback and summarizing different topologies of Feedback Amplifier circuits.
CO3	Analyze the different OPAMP circuits and apply the knowledge of network theory to OPAMP circuits.
CO4	Classifying different number systems and design Gates and simple digital circuits using the Gates.
CO5	Experimenting the I-V characteristics of BJT & JFET , apply the knowledge of network theory for designing various circuits using OPAMP and forming Gates and simple digital circuits using the Gates .

Electrical Part:

Course Outcomes

CO 1	Recall different Laws and their applications in Electrostatics.
CO 2	Understand the basic concept of DC and AC Machines
CO 3	Categorize 3 phase system and draw the layout of Gencos and Discos with Single line diagram

Engineering Thermodynamics & Fluid mechanics.(ME-201)

Course Outcomes	
CO1	Recognizing the basic concept of Thermodynamics, Heat and Work Transfer, Ideal, real gas and properties of pure substance.
CO.2	Understanding principles of conservation of energy & work done for different process, 1st Law of Thermodynamics and their application for closed systems, control volume & transient systems.
CO.3	Calculating thermal efficiency for a heat engine, coefficient of performance for a refrigerator, heat pump and understanding second law of thermodynamics, Carnot cycle, Carnot theorem and entropy change for a
CO.4	Explaining air Standard Cycles for different Internal Combustion engines and Rankine cycle for Thermal Power Plant.
CO5	Explaining the properties of Fluids and understanding Fluid Statics and Dynamics.

Engineering Drawing & Computer Graphics ME-291

Course Outcomes	
CO1	Identifying various types of lines, lettering, geometrical curves and specify their use.
CO2	Describing the principal of projection of point ,lines , surface , simple solids
CO.3	Describing of an isometric view from orthogonal view of simple solids
CO4	Explaining development of surface of solids
CO5	Discussing basic of computer aided drafting

Physics II (PH 301/PH391)

Course Outcomes	
CO 1	Identify the importance of the basic concepts of Physics.
CO 2	Classify different branches like electromagnetism, classical mechanics and quantum mechanics.
CO 3	Utilize theoretical formulation of different physical phenomena in solving problems.
CO 4	Analyze the data related to various physical phenomena both quantitatively and qualitatively.

Basic Environment Engineering & Elementary Biology (CH 301)

Course Outcomes	
CO1	Describe the basic principles and structure of ecology and environment.
CO2	Summarize the problems that mankind is facing or will face in future due to continuous environmental degradation.
CO3	Explain the importance of resources and their conservation for the interest of future generation.

CO4	Utilize basic laws of science and engineering to understand and solve problems related to environment.

Values and Ethics In Profession (HU 301)

Course Outcomes	
CO 1	Recognize the importance of values in human life.
CO 2	Understand the professional and ethical responsibility of the workplace.
CO 3	IImplement the engineering solutions in a global and societal context.
CO 4	Identify the contemporary issues related to human and professional interactions at workplac.
CO 5	Grade the core values that shape the ethical behaviour of an engineer.

Analog and Digital Electronics (CS 301)

Course Outcomes	
CO 1	Describe different types of number system and exemplify Boolean function minimization.
CO 2	Compare the advantages and limitations of analog to digital converters.
CO 3	Implement different combinational and sequential circuits to solve design problems.
CO 4	Demonstrate the construction of logic gates using different logic families
CO 5	Explain the operation of multivibrator circuits and compare the merits and demerits of different amplifiers.
CO 6	Design various analog and digital circuits and verify their outputs.

Data Structure & Algorithm (CS302/CS392)

Course Outcomes	
CO 1	**Describe** concepts of data structures, pseudo-code and define asymptotic notations to analyze the performance of algorithms.
CO 2	**Implement** various operations on array and linked list data structures.
CO 3	**Solve** different problems involving stack and queue data structures as well as problems of recursive nature.
CO 4	**Utilize** the knowledge of non-linear data structures like trees and graphs to design algorithms for various applications .
CO 5	**Verify** various algorithms for Sorting, Searching and Hashing.

Computer Organization (CS 303)

Course Outcomes	
CO 1	**Describe** about Stored Program Digital Computer System.
CO 2	**Identify** & **Apply** appropriate equipments and procedures / algorithms of Computer Arithmetic.
CO 3	**Explain & Design** different aspects of Central Processing Unit (CPU).
CO 4	**Describe** the fundamentals of Memory Unit and **Perform** memory operations.

CO 5	**Explain** models of I/O operations & design of the I/O subsystems.
CO 6	**Identify** the micro-instructions and basic of Computer Architecture.

COMMUNICATION ENGINEERING & CODING THEORY (CS 401)

Course Outcomes

CO 1	Recognize the type of modulation scheme by finding the carrier and message signal frequencies from Amplitude modulated and Angle modulated signal.
CO 2	Explain the generation and detection process of different digital modulation schemes and compare their merits and short-comings.
CO 3	Implement the sampling theorem for generating different types of pulse modulation scheme and practice different types of line coding techniques.
CO 4	Calculate information content, entropy of different communication system and execute efficiency of digital coding technique.
CO 5	Experiment analog modulation circuit like AM, FM, PAM and PWM by testing their performances.

Formal Language & Automata Theory - (CS 402)

Course Outcomes

CO 1	Recall the fundamental principles and also design finite state machines.
CO 2	Design finite automaton, regular expressions, context-free grammars and PDA for accepting or generating a certain language.
CO 3	Transform between DFA to NFA, RE to NFA-€/NFA/DFA and Moore machine to Mealy Machine /Mealy Machine to Moore Machine.
CO 4	Prove properties of languages, grammars and automata with formal mathematical methods.

Mathematics III (M-401)

Course Outcomes

CO 1	Summarize the concept of Probability theory, distribution and some properties of random variables.
CO 2	Understand the theory of sampling and estimation to solve the relevant problems.
CO 3	Compare different statistical information based on hypothesis.
CO 4	Classify various algebraic structures and use them to solve relevant problems.
CO 5	Identify the concepts of advance graph theory and its application.

Numerical Methods (M(CS) 401)

Course Outcomes

CO 1	Describe the concepts of error due to approximation.
CO 2	Explain the concepts of Interpolation and solve the related problems.
CO 3	Summarize the idea of Numerical Integration for solving relevant problems.
CO 4	Utilize various techniques to determine the solution of Algebraic equations, transcendental equations and system of linear equations.
CO 5	Solve Ordinary differential equations by various numerical techniques.

CO 6	Execute various numerical methods through programming tools.

Computer Architecture- (CS 403/CS493)

Course Outcomes	
CO 1	Describe the fundamental working principles of basic computer system architecture.
CO 2	Indentify the design of pipeline architecture
CO 3	Explain the memory hierarchy design and Perform memory operations
CO 4	Identify the design of a pipelined CPU and hypothetical parallel processor architecture.
CO 5	Explain the hardware design of multiprocessors systems and its CPU-Memory interconnection architecture.

Software Tools (CS 492)

Course Outcomes	
CO 1	Recognize different Controls and Properties of visual programming.
CO 2	Utilize various visual basic tools like textbox, combo box, list box, image box etc to solve the various computing problems.
CO 3	Solve database problem using ODBC data connections.

Technical Report Writing and Language Laboratory Practice (HU-481)

Course Outcomes	
CO 1	Develop listening and reading skills for better comprehension ability.
CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self-confidence.

Design and Analysis of Algorithm (CS501/CS591)

Course Outcomes	
CO 1	Memorize the fundamental principles of basic algorithms.
CO 2	Describe the notion of NP-completeness.
CO 3	Use the Asymptotic notations as well as Recurrences on simple algorithms, including those algorithms that are using complex loops and recursions.
CO 4	Estimate the time and space complexity of a given algorithm.
CO 5	Experiment and analysis on various algorithms on graph data structures as well as basic graph algorithms.
CO 6	Implement different known algorithms with the help of different programming design paradigm like divide & conquer, greedy method, dynamic programming , backtracking etc.

Microprocessor & Microcontroller (CS 502/CS 592)

Course Outcomes	
CO 1	Recognizing the internal architecture organization of 8085.
CO 2	Understand the interrupt and subroutine call mechanism of microprocessor & utilize 8255 / 8237/ 8259 /8251 for peripheral interfacing.
CO 3	Analyze 8086 microprocessors & 8051 microcontrollers , addressing modes, registers and instruction sets and apply them in writing assembly language program.
CO 4	Debug their assembly language programs.
CO 5	Design microprocessors/microcontrollers-based systems.

DISCRETE MATHEMATICS (CS 503)

Course Outcomes	
CO1	Describe notions of propositional logic and predicate logic to solve variety of problems
CO2	Utilize the idea of posets and lattices to solve relevant problems
CO3	Implement the concepts of theory of numbers on relevant problems.
CO4	Solve and explain problems based on basic counting principles and recurrence relation
CO5	Identify the concepts of graph colouring and matchings in solving relevant problems.

Object Oriented Programming- (CS504D/CS594D)

Course Outcomes	
CO 1	Recognize the fundamental concepts of Object Oriented Programming .
CO 2	Compare OOP and other conventional programming languages and explain different forms of implementation of object oriented concept.
CO 3	Implement programs through JAVA utilizing the concepts of object oriented programming.
CO 4	Execute applet and event-handling mechanisms through programs.

Programming Practices Using C++ (CS 593)

Course Outcomes	
CO 1	Memorize the basic UNIX commands and programming structures in context of Object Oriented Paradigms.
CO 2	Utilize various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems.
CO 3	Construct problems using Standard Template Libraries (STL)and manipulate error with the help of exception handling.

Database Management System (CS601 / CS691)

Course Outcomes	
CO 1	Describe the fundamental concepts of database system and construct Entity-Relationship (E-R) model from specifications and convert an E-R schema to relation schema using mapping algorithm.
CO 2	Identify query processing methodologies of Relational Algebra, Relational Calculus and determine the query optimization techniques.

CO 3	Construct simple and moderately advanced database queries using SQL and PL/SQL blocks for ensuring data integrity and security.
CO 4	Explain the concepts of normalization and apply such knowledge to the normalization of a database; and be able to identify basic database storage structures and access techniques.
CO 5	Implement the basic issues of transaction processing, concurrency control and recovery mechanisms in applications.

Computer Network (CS 602/CS692)

Course Outcomes	
CO 1	Recognize the concepts of Computer Network, its issues and layered architectures to identify error and collision during transmission of data and producing free flow of data by utilizing different protocols.
CO 2	Apply the concept of IP Addressing to solve problems on sub netting and calculate the best possible path in an internetwork by executing the different routing algorithms.
CO 3	Understand process to process delivery of data by employing UDP, TCP protocols and verify Quality of Service.
CO 4	Remember different protocols for real time network applications and analyzing the need of Cryptography in a network.

Operating System (CS 603 / CS 693)

Course Outcomes	
CO 1	Differentiate the working of an operating system and its components.
CO 2	Describe process management and analyze the synchronization process.
CO 3	Identify the working methodology of multithreaded applications and distinguish different scheduling algorithms.
CO 4	Identify the reasons of deadlocks and their remedial measures and explain different memory management techniques used in operating system.
CO 5	Classify different storage management and protection techniques used in operating system.

Computer Graphics (CS604B)

Course Outcomes	
CO 1	Recognize and compare the working procedure and efficiency of different graphics systems as well as the basic display technology and different shading models.
CO 2	Summarize the fundamental mathematics of computer graphics.
CO 3	Practice different types of scan conversion and filling algorithms.
CO 4	Construct curves and 2D & 3D modeling with appropriate geometric transformations as well as different types of projections.
CO 5	Detect valid clipping edges with different types of clipping algorithms.

Multimedia Technology (CS 605C)

Course Outcomes	
CO 1	Summarize the basic techniques for digital conversion of multimedia components.
CO 2	Utilize the fundamental knowledge of multimedia tools to support various multimedia application developments.
CO 3	Explain the fundamental concepts and techniques to manipulate multimedia data.
CO 4	Implement multimedia systems in various potential areas.

Seminar (CS 681)

Course Outcomes	
CO 1	Identify recent trends, issues and development in computer science and technology.
CO 2	Compose technical reports and presentation with the help of supporting tools.
CO 3	Demonstrate interpersonal skills, communication skills and time management.
CO 4	Evolve as a self learner.

Software Engineering (CS 701/CS791)

Course Outcomes	
CO 1	Identify the basic components of software and different phases of software development.
CO 2	Explain different project scheduling techniques and estimate various parameters related to the software development.
CO 3	Find software requirements specifications for different projects and study software risks and risk management strategies.
CO 4	Design software process using software development tools.
CO 5	Verify different testing and debugging techniques on some basic programming codes and Determine the quality of software

Compiler Design (CS-702)

Course Outcomes	
CO 1	Describe the different phases of a compiler design techniques.
CO 2	Implement Lexical analysis with the help of Finite Automata.
CO 3	Construct different types of parsing with error recovery techniques.
CO 4	Explain the run time environment and three address code generation of a compiler.
CO 5	Develop machine code with correct code optimization.

Artificial Intelligence (CS 703C/CS793C)

Course Outcomes	
CO 1	Explain the various types of AI agent and search algorithm (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms, game playing.
CO 2	Develop the basic knowledge-based system with the help of knowledge representation.
CO 3	Analyze the working knowledge of reasoning in the presence of probabilistic approaches.
CO 4	Implement basic programming knowledge in Prolog/Lisp.
CO 5	Describe the notion of machine learning techniques.

Internet Technology (CS 705A/CS 795A)

Course Outcomes	

CO 1	Summarize concepts of computer network, with various protocols.
CO 2	Design simple web pages using different web tools. Like JavaScript, HTML, XML, CGI script and PERL
CO 3	Study different aspect of legal, ethical, security and privacy issues related to the use of Internet based computer systems.
CO 4	Describe the importance of real time multimedia applications over IP and the concept of SEO.

Data Warehousing And Data Mining (CS 704C)

Course Outcomes	
CO 1	Describe the basic concept of data warehousing.
CO 2	Explain data warehouse architecture and infrastructure.
CO 3	Identify different data mining tools to analyze data.
CO 4	Make decision from classified data .

Industrial Training (CS 792)

Course Outcomes	
CO 1	Able to Identify the real world problems.
CO 2	Gain the knowledge of current trends in specific area of interest.
CO 3	Develop technical reports and demonstrate effectively to the solutions of the problems.

Project - 1 C408 (CS 794)

Course Outcomes	
CO 1	Utilize the basic theories of software designing model to calibrate application based software for real life problems within a specific time bound.
CO 2	Design, construct and test the evolving application model.
CO 3	Analyze and Simulate a system for required accuracy.
CO 4	Perform in groups to solve the problem and prepare a project report of the same there by enhancing their communication and presentation skills.
CO 5	Build up team spirit and leadership qualities.

E Commerce (CS802E)

Course Outcomes	
CO 1	Recall the fundamental principles of E-commerce.
CO 2	Design Business to Business E-Commerce.
CO 3	Explaining the Legal issues of E-Commerce.
CO 4	Describe the Security Issues of E-Commerce.

CO 5	Design Business to Consumer E-Commerce.
CO 6	Identify and Design E-business.

Cryptography & Network security(CS 801D)

Course Outcomes	
CO 1	Identify common network security vulnerabilities.
CO 2	Arrange cryptographic techniques that provide information and network security.
CO 3	Demonstrate detailed knowledge of the role of encryption to protect data.
CO 4	Examine the issues and structure of Authentication Service and Electronic Mail Security.
CO 5	Provide familiarity in Intrusion detection and Firewall Design Principles.

Project - 2 (CS 892)

Course Outcomes	
CO 1	Utilize the basic theories of software designing model to calibrate application based software for real life problems within a specific time bound.
CO 2	Design, construct and test the evolving application model.
CO 3	Analyze and Simulate a system for required accuracy.
CO 4	Perform in groups to solve the problem and prepare a project report of the same there by enhancing their communication and presentation skills.
CO 5	Build up team spirit and leadership qualities.

Grand Viva/CS 893

Course Outcomes	
CO 1	Recall knowledge of mathematics, science and explaining the engineering fundamental.
CO 2	Implement the engineering knowledge to solve the problem.
CO 3	Explain and design different problem based on algorithm.
CO 4	Make decision as a self-learner based on engineering tools.

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English language& technical communication (HU -101)

Course Outcomes	
CO 1	Write grammatically correct English to express in a lucid manner.
CO 2	Summarize technical and non-technical passages written in English.
CO 3	Understand and write the different organizational communication like memo, circular, agenda, minutes, job application letter, letter report
CO 4	Explain the various concepts of Technical Communication and its utility in profession.

Physics – 1 PH101 (CSE)

Course Outcomes	
CO 1	Describe the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	Explain different physical phenomenon by mathematical formulations.
CO 3	Implement different theoretical formulation for quantitative solutions of problems.
CO 4	Employ data analysis techniques, including errors and representing data graphically by different experimental methods.

Mathematics-1(M101)

Course Outcome:	
CO 1	**Summarize** the concepts of matrix algebra.
CO 2	**Solve** the problems of Successive differentiations; Mean value theorems, Reduction formula.
CO 3	**Understand** the theory of functions of several variables.
CO 4	**Determine** the convergence of Infinite series.
CO 5	Describe **and Utilize** the concepts of Vector algebra and calculus for solving problems.

Basic Electrical & Electronic Engineering – 1(ES101)

Course Outcomes	
CO 1	**Understand** different types of semiconductor and explain their properties.
CO 2	**Understand** the working principles of different diodes and use them in rectifier circuits.
CO 3	**Discuss** the working principle of Transistor and **explain** its V-I characteristics.
CO 4	**Carry Out** experiments to becomefamiliar with different electronic components, measuring and testing equipment.
CO 5	**Study** the V-I characteristics of P-N Junction Diode and Zener Diode and **calculate** ripple factor of a rectifier.

Electronics Part:

Course Outcomes	

CO 1	Classify different electric Circuits & apply network theorems in DC Circuits.
CO 2	Explain the Electrical and Magnetic field using Various laws of Electromagnetism
CO 3	Illustrate working of AC Circuit & Calculate different Parameters.

Engg. Mechanics(ME101)

Course Outcomes	
CO 1	Discuss the basics on representation of a Force as a vector and determine the effect of coplanar forces on rigid bodies.
CO 2	Estimate the effect of frictional forces on rigid bodies due to application of external forces.
CO 3	Use the concept of centroid, Centre of Gravity and Moment of Inertia for rigid bodies to study problems.
CO 4	Study effect of forces on rigid bodies in a state of motion.
CO 5	Determine effect of forces on bodies undergoing deformation.

Workshop Practice(ME192)

Course Outcomes	
CO1	Carrying out the fitting process to make a gauge
CO2	Executing the machining process to make a pin from M.S rod
CO3	Using the Gas welding process to produce a butt joint
CO4	Implementing the Arc welding process to produce butt joint
CO5	Executing the resistance welding process to make a lap joint

Language Laboratory (HU181)

Course Outcomes	
CO 1	Develop listening and reading skills for better comprehension ability.
CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence.

Extra Curricular Activities(NSS/NCC/NSO) XC181

Course Outcomes	
CO 1	Engage themselves to serve the community while studying in the Institution.
CO 2	Associate themselves to work effectively for the community in and around the institute campus.

CO 3	Carry out creative and constructive social action by enhancing knowledge of oneself and the community through a confrontation with reality.

Basic Computation and Principles of Computer Programming (BC & PCP) CS-201

Course Outcomes	
CO 1	Recognize fundamental knowledge on basics of computers hardware, operating system and number systems. Illustrate flowchart and algorithm for a given problem.
CO 2	Describe about the basic concept of C character set, keyword, variable, data type, operator, expression through fundamentals of C programming language.
CO 3	Solve different problems like Flow of Control, loop control, case control using C programming language.
CO 4	Implement the basic knowledge of C functions, pointers, array, string, c preprocessor using C programming.
CO 5	Evaluate dynamic memory allocation, structure, union and file handling program by implementing real life projects.

Chemistry-1(CH201)(CSE)

Course Outcomes	
CO 1	Recall the theoretical concepts of chemistry and their limitations in depth.
CO 2	Explain chemical reactions and their properties in terms of energy transfer, time frame, synthesis and applications.
CO 3	Utilize the laws of chemistry to solve problems.
CO 4	Use working principles of basic chemistry to gain the knowledge on existing and future materials and technology.
CO 5	Analyze the data of quantitative chemical analysis and make use of simple model, equations to solve problems related to basic chemistry.

Mathematics II(M-201)

Course Outcomes	
CO 1	Summarize the various solution techniques of ordinary differential equations (ODE). [BT Level 2]
CO 2	Explain the concept of graph theory, trees and their application. [BT Level 2]
CO 3	Determine the convergence of improper integrals and describe beta and gamma functions. [BT Level 2]
CO 4	Discuss the theory of Laplace transform and use to solve ordinary differential equations (ODE). [BT Level 3]

Basic Electrical & Electronic Engineering-II (ES201)

Electronic Part:

Course Outcomes	
CO1	Comparing the different Gate isolation techniques; describing the operation and I-V characteristics of JFETs and MOSFETs; Appreciate the utility of CMOS.
CO2	Understand the feedback and summarizing different topologies of Feedback Amplifier circuits.
CO3	Analyze the different OPAMP circuits and apply the knowledge of network theory to OPAMP circuits.
CO4	Classifying different number systems and design Gates and simple digital circuits using the Gates.

CO5	Experimenting the I-V characteristics of BJT & JFET , apply the knowledge of network theory for designing various circuits using OPAMP and forming Gates and simple digital circuits using the Gates .

Electrical Part:

Course Outcomes	
CO 1	Recall different Laws and their applications in Electrostatics.
CO 2	Understand the basic concept of DC and AC Machines
CO 3	Categorize 3 phase system and draw the layout of Gencos and Discos with Single line diagram

Engineering Thermodynamics & Fluid mechanics.(ME-201)

Course Outcomes	
CO1	Recognizing the basic concept of Thermodynamics, Heat and Work Transfer, Ideal, real gas and properties of pure substance.
CO.2	Understanding principles of conservation of energy & work done for different process, 1st Law of Thermodynamics and their application for closed systems, control volume & transient systems.
CO.3	Calculating thermal efficiency for a heat engine, coefficient of performance for a refrigerator, heat pump and understanding second law of thermodynamics, Carnot cycle, Carnot theorem and entropy change for a
CO.4	Explaining air Standard Cycles for different Internal Combustion engines and Rankine cycle for Thermal Power Plant.
CO5	Explaining the properties of Fluids and understanding Fluid Statics and Dynamics.

Engineering Drawing & Computer Graphics ME-291

Course Outcomes	
CO1	Identifying various types of lines, lettering, geometrical curves and specify their use.
CO2	Describing the principal of projection of point ,lines , surface , simple solids
CO.3	Describing of an isometric view from orthogonal view of simple solids
CO4	Explaining development of surface of solids
CO5	Discussing basic of computer aided drafting

Subject: Values & Ethics in Profession (HU 301)

Course Outcomes	
CO 1	Recognize the importance of values in human life.
CO 2	Understand the professional and ethical responsibility of the workplace
CO 3	Implement the engineering solutions in a global and societal context
CO 4	Identify the contemporary issues related to human and professional interactions at workplace
CO 5	Grade the core values that shape the ethical behavior of an engineer.

Subject: Physics – 2 (PH 301)

Course Outcomes	
CO 1	Identify the importance of the basic concepts of Physics
CO 2	Classify different branches like electromagnetism, classical mechanics and quantum mechanics.
CO 3	Utilize theoretical formulation of different physical phenomena in solving problems.
CO 4	Analyze the data related to various physical phenomena both quantitatively and qualitatively

Subject: Basic Environmental Engineering & Elementary Biology (CH 301)

Course Outcomes	
CO 1	Describe the basic principles and structure of ecology and environment.
CO 2	Summarize the problems that mankind is facing or will face in future due to continuous environmental degradation.
CO 3	Explain the importance of resources and their conservation for the interest of future generation.
CO 4	Utilize basic laws of science and engineering to understand and solve problems related to environment.

Subject: SOLID MECHANICS (CE 301)

Course Outcomes	
CO 1	Remembering & Understanding of behavior of materials and the stresses and strains in the bars with varying sections, tapering sections, composite members etc.
CO 2	Explaining & Analyzing shear force and bending moment diagrams for beams with different support conditions and different load conditions.
CO 3	Determine the axial forces of Truss members.
CO 4	Analyzing the stresses on oblique sections when the direct stresses and shear stresses are given.
CO 5	Analyze both solid and hollow shafts subjected to torsion.
CO 6	Solve problems of columns and struts using different methods such as Rankine's formula, Euler's theory.

Subject: SURVEYING (CE 302)

Course Outcomes	
CO 1	Describing the importance of Survey with different branches as the basic integral part of Civil Engineering
CO 2	Explain the function of different branches like Surveying (Horizontal measurement), leveling (Vertical measurement), Tachometry (for vertical and angular measurement) required for purposes of land
CO 3	measurement, all details of land contouring, long and cross sections of land
CO 4	Remembering the theories and utilize the theoretical formulation of mathematical phenomena in solving the problem
CO 5	Testing in the field, analyze the data's related to mathematical phenomena qualitatively and qualitatively for the preparation of map

Subject: Building Materials & Construction (CE 303)

Course Outcomes	

CO 1	Identifying the various types of the building construction materials and various components of a building.
CO 2	Describing the various properties, classifications, applications, test for each type of building materials, elements, types & function of foundation, flooring, roof, door, window, balcony, stairs and their uses.
CO 3	Understanding the relationship between the structural form and material properties.
CO 4	Discussing the importance of painting, timbering, plastering etc.
CO 5	Implementing the theoretical knowledge, draw plan, sectional elevation of various structural components of a buildings and functional design of planning using T-Scale, Drawing table, instruments box etc.

Subject: Solid Mechanics Laboratory (CE 391)

Course Outcomes	
CO 1	Experimenting for Hardness property or the resistance to surface indentation
CO 2	Experimenting for Behavior of a mild steel/HYSD bar under tension
CO 3	Testing of a Brick/Concrete cube under Compression
CO 4	Torsion Test on Mild Steel Circular Bar
CO 5	Experimenting for closely coiled helical spring

Subject: Surveying Practice -1 (CE 392)

Course Outcomes	
CO 1	Describing the different branches of Surveying and Leveling to the students' chapter wise to explain about the subject before taking up Planning, Design and Execution.
CO 2	Explain the function of different units of branches and the necessity of measurement in Horizontal, Vertical and Oblique plane and the instrument used for individual purposes.
CO 3	Remembering the different theories and formulas already discussed in the theory class and their uses with demonstration.
CO 4	Experimenting the theories with the specific instrument in practical class and finding out the result.

Fluid Mechanics (CE 401)

Course Outcomes	
CO 1	Describe the basic principles of fluid statics, hydrostatic law and principle of floatation & submerged bodies.
CO 2	Explain the various theoretical concepts, working principles and mechanism of fluid flow through weirs and notches, circular pipes and open channel flow, Pumps & Turbines.
CO 3	Utilize the theoretical formulations for quantitative solutions of fluid statics and fluid flow problems, determine working efficiency of turbines & Pumps.
CO 4	Implementing the theoretical knowledge to determine the working efficiency of pumps and turbines, measure the flow through weirs, pipes, venturimeter, open channels hydraulics problems through

Structural Analysis (CE 402)

Course Outcomes	
CO 1	Understand the historical background of Structural Analyses and identify the determinant and in-determinant structures.
CO 2	To know the different techniques available for the analysis of structures

CO 3	To identify the best suitable method of analysis
CO 4	To understand the behavior of indeterminate structures
CO 5	Analyze structures for gravity loads, moving loads and lateral loads

Soil Mechanics (CE 403)

Course Outcomes	
CO 1	Identify the various physical properties, index properties & engineering properties of soils.
CO 2	Describe various physical & index properties, Explain the types of stresses on soil and understand behavior of water on soils, associate soil properties with engineering properties of soil
CO 3	Implement theoretical formulations for estimation of fluid flow through soil , stress distribution in soils under foundation loads, compaction & consolidation parameters of soil
CO 4	Implementing theoretical concepts & experimentally identifying soil based on its physical properties and index classification as per IS method, permeability characteristics of fluid flow through soil, compaction
CO 5	Classify soil based on index properties as per IS method, Construct flow nets for analyzing & estimating seepage through soil, Estimate the engineering properties & compressibility characteristics of soil for

Fluid Mechanics (CE 491)

Course Outcomes	
CO 1	Determination of orifice co-efficient
CO 2	Measurement of velocity of water in an open channel using a pitot tube
CO 3	Determination of efficiency of a hydraulic ram.
CO 4	Determination of efficiency of a Centrifugal pump, Pelton wheel turbine
CO 5	Determination of efficiency of a Reciprocating Pump, Francis turbine

Surveying Practice II (CE 492)

Course Outcomes	
CO 1	Describing the different branches of Surveying and Leveling to the students' chapter wise to explain about the subject before taking up Planning, Design and Execution.
CO 2	Explain the function of Theodolite different units of branches and the necessity of measurement in Horizontal, plane and the instrument used for individual purposes.
CO 3	Explaining the function and Experimenting the theories with the specific total station instrument in practical class and finding out the result.
CO 4	Explaining the function of Setting out of Simple curve

Soil Mechanics Lab – I (CE493)

Course Outcomes	
CO 1	Describing the experiments that are to be carried out along with respective equipments. Identification of different types of soil as per Indian standards.
CO 2	Finding the Natural Moisture Content and Specific Gravity of i) Cohesion less and ii) Cohesive soil, Insitu density by core cutter and Sand Replacement method
CO 3	Finding Atterberg's limit and Co-efficient of Permeability for Soil sample.

CO 4	Checking Compaction properties of Soil.

ECONOMICS FOR ENGINEERS (HU501)

Course Outcomes	
CO 1	Explain the basic concept & terminology used in engineering economics
CO 2	Estimate the effect of cost, revenue and benefit of a financial transaction
CO 3	Implement various financial methods and techniques to compare multiple financial alternatives
CO 4	Identify the feasible alternatives based on estimated values.
CO 5	Judge the financial feasibility of the alternative selected

Foundation Engineering (CE501)

Course Outcomes	
CO 1	Recollect the compressibility characteristics of soil & describe various types of settlement of soil profile
CO 2	Understand earth pressure theories , different parameters of bearing capacity of soil and settlement for shallow & deep foundation
CO 3	Implement earth pressure theories for determining stability of earth retaining walls, sheet piles structures.
CO 4	Calculate the safe bearing capacity of soil for Shallow & deep foundations from various bearing capacity theories.
CO 5	Analyze the stability check for slope stability problems and retaining walls, Settlement check of shallow foundations with safe bearing capacity with respect to IS codes. Estimate pile group capacity for any kind
CO 6	Carryout soil investigation in practical field and determine bearing capacity of soil for deep and shallow foundations using field tests.

Design of RC Structures (CE502)

Course Outcomes	
CO 1	Understand the properties and role of various constituent materials used in concrete making.
CO 2	Apply the fundamental concepts (LSM & WSM), techniques in analysis and design of reinforced concrete elements i.e. beam & slab.
CO 3	Outlining the basic concept of structural design
CO 4	Utilizing the various IS Codal requirements related to Design of RC members
CO 5	Design of sub-structure components like isolated footing & rectangular footing with relevant IS code requirements

Concrete Technology (CE503)

Course Outcomes	
CO 1	Recognize concrete as a structural material & identify its constituents. Describe cement, aggregates and various properties & types of cement & aggregates, admixtures & its types,.
CO 2	Describing the various properties, classifications, applications, test for cements, aggregates, admixtures and their uses in making concretes
CO 3	Implement the theoretical principles for determining the physical properties of cement, sand & aggregates through tests.

CO 4	Identify the various factors affecting the properties of fresh and hardened concrete and carryout various tests to identify & compare the properties through tests
CO 5	Design of concrete mix using IS method and ensuring quality control of concrete while sampling/testing and acceptance criteria.

Engineering Geology (CE504)

Course Outcomes	
CO 1	Identify the importance of Engg. Geology as related part of Civil Engineering and internal Structure of Earth.
CO 2	Classify different branches of Engg. Geology connected with Civil Engineering like Minerals, rocks, structural geology, Engg. Properties of rocks.
CO 3	Classify different natural phenomena's affect on Geology like Weathering, Rivers, Earthquake and Seismic effect, Tsunami and finally on Civil Engineering structures.
CO 4	Analyze the datas of various samples collected related with geological phenomena qualitatively and quantitatively to compare with the field situation.

Soil Mechanics Lab -II (CE591)

Course Outcomes	
CO 1	Understand the principles of working of equipments and applying theoretical knowledge for conducting experiments for finding compressibility characteristics and shear strength parameters .
CO 2	Prepare soil sample and find the initial properties of soil for determining compressibility characteristics, shear strength parameters of soil
CO 3	Calculate the various parameters of soil in the experiment by using mathematical formulations and theoretical concepts
CO 4	Make Graphical plots between the various parameters for determining compressibility properties and shear strength of as soil. Eg: to determine compression Index (Cc) of a soil, graphical plot has to be made
CO 5	Analyze and compare the graphical results for properties of soil obtained for different soil

Quantity Surveying, Specification and Valuation (CE593)

Course Outcomes	
CO 1	Learn about the estimate , items of work and measurement .
CO 2	Carry out the quantity estimate of a single storied building and bar bending schedule.
CO 3	Estimate the quantity of different items in road, underground reservoir, surface drain and septic tank.
CO 4	Analysis the schedule of rate of different items.
CO 5	Understand the specification and valuation and its different items.

Engineering Geology (CE594)

Course Outcomes	
CO 1	Identify the different branches of Engineering Geology explain the importance if the subject on big project of Civil Engineering.
CO 2	Explaining different branches of Engineering Geology connected with Civil Engineering like Minerals, rocks, structural geology, Engg. Properties of rocks, earthquake, Tsunami and their effect on bridges, Building, Tunnels, Dams etc.
CO 3	Classify different natural phenomena's affect on Geology like Weathering, Rivers, and Glaciers on Earth necessary for bog Engineering Structure.
CO 4	Experimenting different specimen and matching theories of Geological phenomena for prediction of sample in field and deep into earth.

Principal of Management (HU 601)

Course Outcomes	
CO 1	Recognize the principles and theories of management.
CO 2	Describe the various functional aspects pertinent to different operational areas of the organization.
CO 3	Implement management concepts to resolve complex quantitative and qualitative problems .
CO 4	Study the organizational effectiveness and assess the necessary changes required in the existing organizational pattern.

Highway & Transportation Engineering (CE 601)

Course Outcomes	
CO 1	Describing the various scopes of highway and traffic engineering and different terminologies associated with this.
CO 2	Explaining the various factors controlling highway alignment, geometric design, pavement design and transportation engineering.
CO 3	Understanding the theoretical knowledge and mathematical equations for solving various problems on geometric design, pavement design and transportation issues.
CO 4	Solving and designing various types of roads by considering the features associated with geometric design.
CO 5	Testing the various properties of the road materials in laboratories with specifications.

Design of Steel Structure (CE 602)

Course Outcomes	
CO 1	Introduce the Material & Specification and application of the I.S. Code of practice IS-800-2007 for the Design of Steel Structure.
CO 2	Analyze and design the bolted connection and welded connection
CO 3	Design compression and tension members using simple and built up section
CO 4	Analysis and design of plate girder and Gantry girder.
CO 5	Carry out design and drawing of different components of Roof truss

Construction Planning and Management (CE 603)

Course Outcomes	
CO 1	Identify the importance related with Public Civil Engineering Projects.
CO 2	Classify and explaining, Regulation and byelaws, fire protection , scheduling of project, uses of equipments, Management and procedure of execution of Departmental works.
CO 3	Utilize theories and Practical formulation of different land related Phenomena in implementing and solving problems related to effective planning with best utilization space, equipments, fund and time.
CO 4	Evaluate the planning during the progress of works and after comparing with the basic planning and part of execution done and replaning if necessary.

Professional Elective I: Prestressed Concrete (CE 604B)

Course Outcomes

CO 1	Introduce and describe Pre-stress concrete, pre-stressing system, shear and torsional resistance.
CO 2	Determining pre-stress losses, deflection of pre-stress member.
CO 3	Calculate stress distribution in end block and anchorage zone reinforcement.
CO 4	Compare between composite construction of pre-stress and in-situ concrete. Analysis the method of continuity and method of secondary moment.
CO 5	Design of section for compression and bending of poles and railway sleeper.

Highway & Transportation Engineering Lab (CE 691)

Course Outcomes

CO 1	Describing the experiments that are to be carried out along with respective equipments.
CO 2	Testing on highway materials – Aggregates- Impact value, Los-Angeles Abrasion value water absorption, Elongation &Flakiness Index. Bitumen & bituminous materials: Specific gravity, penetration value,
CO 3	Determining Stripping value and CBR Value
CO 4	Carrying out Marshal Stability and Benkelman Test

Detailing of RC and Steel Structure (CE 692)

Course Outcomes

CO 1	Introduction to Design principle of R.C.C. and Steel sections according to Limit state method of design loads and stresses, considered in IS 456:2000 and IS 800:2007 respectively.
CO 2	Discuss the general considerations and basic concepts of designing RCC and Steel structures
CO 3	Design of different units: Slab, beam, column, roofing and staircase from floor plan of a multistoried RCC frame building. Design of different components of a roof truss.
CO 4	Typical detailing of different units of a multistoried RCC frame building and of a roof truss.

CAD Laboratory (CE 693)

Course Outcomes

CO 1	Explaining the important features of a software (i.e. Staad Pro v8i)
CO 2	Creating frame model/ multistoried building using software (i.e. Staad Pro v8i)
CO 3	Analysis and Modifying frame model/ multistoried building using software with the application of load, section etc.
CO 4	Design of frame model/ multistoried building using software and making details drawing of different structural elements including ductility detailing.

Environmental Engineering (CE701)

Course Outcomes

CO 1	Identify the importance of the role of Water supply and Waste water Treatment in Environmental Engineering.
CO 2	Classify different branches like Planning, and Design, Collection Pumping Theory of Treatments and unit Treatment. Distribution and Disposal.
CO 3	Implementing the theories and theoretical formulation of different physical and Chemical phenomena in solving problems in the relevant field.

CO 4	Analyze the data related to various Physical and Chemical Phenomena both qualitatively and quantitatively.
CO 5	Evaluating after Testing about the quality and their effect on environment.

Water Resource Engineering (CE702)

Course Outcomes	
CO 1	Identify the types of irrigation system, method of irrigation and water requirement of crop.
CO 2	Describe and explain Hydrologic cycle, hydrograph and calculate rainfall, run-off with the help of unit hydrograph.
CO 3	Introduce the Kennedy's theory, Lacey,s theory and design a unlined alluvial channel and lined canals.
CO 4	Introduce the ground water flow Explain Darcy Law. Classify different types of well. Describe equilibrium test, recuperation test.
CO 5	Apprising causes , effects and prevention of water logging.

Soil Stabilization and ground improvement (CE703B)

Course Outcomes	
CO 1	Remembering the nomenclature of soil structure and its methods for determining soil properties.
CO 2	Discussing the various techniques of ground improvement.
CO 3	Implementing different methods of ground improvement by using different structure and materials and calculating the engineering properties of soil.
CO 4	Comparing and finding of soil stability by monitoring of the different ground improvement techniques.
CO 5	Construction procedure of various ground improvement techniques structure (stone coloumns, sand drains)and methods(viboflotation. grouting etc) by the appropriate designing.

Advances in Highway & Transportation Engineering (CE703C)

Course Outcomes	
CO 1	Determining some important terminology related to traffic engineering & planning and to introduce the impression of railway and airport engineering.
CO 2	Explaining the detailed concept of highway capacity, traffic characteristics and transportation planning.
CO 3	Finding the various types of docks and harbors, various components of airport and characteristics of aircraft.
CO 4	Carry out the various surveys for highways, railways and airports.
CO 5	Evaluating various methods of transportation planning methods.

Hydraulic Structure (CE704B)

Course Outcomes	
CO 1	Study about the diversion Head works, difference between Weir and barrage
CO 2	Know about the concept of Bligh's creep theory, Khosla's theory and design of Weir and barrage
CO 3	Select and design Canal falls and provide knowledge of Cross –drainage work.

| CO 4 | Introduce the various types of Earthen dam, its selection of suitable site and to assess the seepage control |
| CO 5 | Concept and design of High & Low gravity dam |

Group Discussion (HU781)

Course Outcomes	
CO 1	Internalize the basic principles of group discussion like initiating, turn taking, creative intervening and closing.(BT AD5.)
CO 2	Co ordinate in a group on contemporary topics to enhance the speaking skills. (BT PSY 5).
CO 3	Demonstrate proper body language while expressing ones idea or opinion in a group.(BT PSY 5)

Environmental Engineering Lab (CE791)

Course Outcomes	
CO 1	Identify the importance of the role of Water supply and Waste water Treatment in Environmental Engineering.
CO 2	Classify different units like collection, convence, treatment, pumping and distribution of potable water and its treatment including that of waste water.
CO 3	Implementing the theories and theoretical formulation of different physical and Chemical phenomena in solving problems in the relevant field.
CO 4	Analyze the data related to various Physical and Chemical Phenomena with the help of Theoretical formulation and guide both qualitatively and quantitatively.
CO 5	Evaluating after Testing about the quality of water and waste water and its effect on environment.

Civil Engineering Practice Sessional (CE792)

Course Outcomes	
CO 1	Analysis o slope and soil test report.
CO 2	Estimate of bearing capacity of soil and settlement of foundation.
CO 3	Describe and design of different graph of hydrology.
CO 4	Analysis and design of population forecasting.
CO 5	Determination of Highway capacity and design of flexible and rigid pavement.

Industrial Training (CE 782)

Course Outcomes	
CO 1	Obtain knowledge about present trends, development of the industry.
CO 2	Identify the Technical knowledge to exploit practical industrial situation.
CO 3	Develop Technical reports and presentation on actual field data.
CO 4	Develop communication skill and actual time management.
CO 5	Attribute to life-long learning in the field of technical changes.

Project Part- I (CE 783)

Course Outcomes	
CO 1	Study the basic concept design of any project on Civil Engineering.
CO 2	Demonstrate the methodology to design any experiment, study on project.
CO 3	Design and experiment the project work in Civil Engineering.
CO 4	Attribute knowledge and understanding of the project work and integrating professional ethics.
CO 5	Prepared a project work in groups and prepare a report of the sem

Organizational Behaviour (HU 801A)

Course Outcomes	
CO 1	Recognize the principles and fundamental theories of organizational behaviour.
CO 2	Understand human behaviour in the workplace from an individual, group and organizational perspective.
CO 3	Apply the essential theories and concepts to address relevant management issues.

Environmental Pollution and Control (CE 801A)

Course Outcomes	
CO 1	Identify the importance of basic concept of Environmental Pollution and Control in the context of today's worse environmental condition of the World.
CO 2	Classify different branches like Air and Noise pollution and control of their Global Environmental issues, Administrative control on Environment.
CO 3	Utilize theories and theoretical formation of different Environmental phenomena related with air and noise pollution in solving problems in the Environment.
CO 4	Analyze the data related to various physical, Chemical, environmental phenomena both quantitatively and qualitatively.
CO 5	Checking and evaluation the datas obtained for follow up action in connection with upgradation of Environment.

Pavement Design (CE 802 D)

Course Outcomes	
CO 1	Identify the various components and types of pavements.
CO 2	Estimating the stress and wheel loading pattern in flexible pavement.
CO 3	Explaining and comparing the flexible and rigid pavements
CO 4	Designing pavement using IRC and AASTHO guideline.
CO 5	Designing pavement using empirical and semi empirical methods.

Structural Engineering Design Practice(CE 891)

Course Outcomes	

CO 1	Design various sub-structure components like, Water Tanks, Beams curved in plan, Domes, Circular and Intze Tanks, Rectangular Tanks, Underground Tanks along with relevant IS code requirements
CO 2	Analysis & Design of Roof trusses
CO 3	Analysis & Design of RCC & Steel bridges
CO 4	Design various super-structure components like, Bunkers and Silos, Chimneys, Beams curved in plan

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English language& technical communication (HU -101)

Course Outcomes	
CO 1	Write grammatically correct English to express in a lucid manner.
CO 2	Summarize technical and non-technical passages written in English.
CO 3	Understand and write the different organizational communication like memo, circular, agenda, minutes, job application letter, letter report
CO 4	Explain the various concepts of Technical Communication and its utility in profession.

Physics – 1 PH101 (CSE)

Course Outcomes	
CO 1	Describe the basic concepts of physics in the areas of oscillations, optics, quantum physics and crystallography.
CO 2	Explain different physical phenomenon by mathematical formulations.
CO 3	Implement different theoretical formulation for quantitative solutions of problems.
CO 4	Employ data analysis techniques, including errors and representing data graphically by different experimental methods.

Mathematics-1(M101)

Course Outcome:	
CO 1	**Summarize** the concepts of matrix algebra.
CO 2	**Solve** the problems of Successive differentiations; Mean value theorems, Reduction formula.
CO 3	**Understand** the theory of functions of several variables.
CO 4	**Determine** the convergence of Infinite series.
CO 5	Describe **and Utilize** the concepts of Vector algebra and calculus for solving problems.

Basic Electrical & Electronic Engineering – 1(ES101)

Course Outcomes	
CO 1	**Understand** different types of semiconductor and explain their properties.
CO 2	**Understand** the working principles of different diodes and use them in rectifier circuits.
CO 3	**Discuss** the working principle of Transistor and **explain** its V-I characteristics.

CO 4	**Carry Out** experiments to becomefamiliar with different electronic components, measuring and testing equipment.
CO 5	**Study** the V-I characteristics of P-N Junction Diode and Zener Diode and **calculate** ripple factor of a rectifier.

Electronics Part:

Course Outcomes	
CO 1	Classify different electric Circuits & apply network theorems in DC Circuits.
CO 2	Explain the Electrical and Magnetic field using Various laws of Electromagnetism
CO 3	Illustrate working of AC Circuit & Calculate different Parameters.

Engg. Mechanics(ME101)

Course Outcomes	
CO 1	Discuss the basics on representation of a Force as a vector and determine the effect of coplanar forces on rigid bodies.
CO 2	Estimate the effect of frictional forces on rigid bodies due to application of external forces.
CO 3	Use the concept of centroid, Centre of Gravity and Moment of Inertia for rigid bodies to study problems.
CO 4	Study effect of forces on rigid bodies in a state of motion.
CO 5	Determine effect of forces on bodies undergoing deformation.

Workshop Practice(ME192)

Course Outcomes	
CO1	Carrying out the fitting process to make a gauge
CO2	Executing the machining process to make a pin from M.S rod
CO3	Using the Gas welding process to produce a butt joint
CO4	Implementing the Arc welding process to produce butt joint
CO5	Executing the resistance welding process to make a lap joint

Language Laboratory (HU181)

Course Outcomes	
CO 1	Develop listening and reading skills for better comprehension ability.

CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self confidence.

Extra Curricular Activities(NSS/NCC/NSO) XC181

Course Outcomes	
CO 1	Engage themselves to serve the community while studying in the Institution.
CO 2	Associate themselves to work effectively for the community in and around the institute campus.
CO 3	Carry out creative and constructive social action by enhancing knowledge of oneself and the community through a confrontation with reality.

Basic Computation and Principles of Computer Programming (BC & PCP) CS-201

Course Outcomes	
CO 1	Recognize fundamental knowledge on basics of computers hardware, operating system and number systems. Illustrate flowchart and algorithm for a given problem.
CO 2	Describe about the basic concept of C character set, keyword, variable, data type, operator, expression through fundamentals of C programming language.
CO 3	Solve different problems like Flow of Control, loop control, case control using C programming language.
CO 4	Implement the basic knowledge of C functions, pointers, array, string, c preprocessor using C programming.
CO 5	Evaluate dynamic memory allocation, structure, union and file handling program by implementing real life projects.

Chemistry-1(CH201)(CSE)

Course Outcomes	
CO 1	Recall the theoretical concepts of chemistry and their limitations in depth.
CO 2	Explain chemical reactions and their properties in terms of energy transfer, time frame, synthesis and applications.
CO 3	Utilize the laws of chemistry to solve problems.
CO 4	Use working principles of basic chemistry to gain the knowledge on existing and future materials and technology.
CO 5	Analyze the data of quantitative chemical analysis and make use of simple model, equations to solve problems related to basic chemistry.

Mathematics II(M-201)

Course Outcomes	
CO 1	Summarize the various solution techniques of ordinary differential equations (ODE). [BT Level 2]
CO 2	Explain the concept of graph theory, trees and their application. [BT Level 2]
CO 3	Determine the convergence of improper integrals and describe beta and gamma functions. [BT Level 2]
CO 4	Discuss the theory of Laplace transform and use to solve ordinary differential equations (ODE). [BT Level 3]

Basic Electrical & Electronic Engineering-II (ES201)

Electronic Part:

Course Outcomes	
CO1	Comparing the different Gate isolation techniques; describing the operation and I-V characteristics of JFETs and MOSFETs; Appreciate the utility of CMOS.
CO2	Understand the feedback and summarizing different topologies of Feedback Amplifier circuits.
CO3	Analyze the different OPAMP circuits and apply the knowledge of network theory to OPAMP circuits.
CO4	Classifying different number systems and design Gates and simple digital circuits using the Gates.
CO5	Experimenting the I-V characteristics of BJT & JFET , apply the knowledge of network theory for designing various circuits using OPAMP and forming Gates and simple digital

Electrical Part:

Course Outcomes	
CO 1	Recall different Laws and their applications in Electrostatics.
CO 2	Understand the basic concept of DC and AC Machines
CO 3	Categorize 3 phase system and draw the layout of Gencos and Discos with Single line diagram

Engineering Thermodynamics & Fluid mechanics.(ME-201)

Course Outcomes	
CO1	Recognizing the basic concept of Thermodynamics, Heat and Work Transfer, Ideal, real gas and properties of pure substance.
CO.2	Understanding principles of conservation of energy & work done for different process, 1st Law of Thermodynamics and their application for closed systems, control volume &
CO.3	Calculating thermal efficiency for a heat engine, coefficient of performance for a refrigerator, heat pump and understanding second law of thermodynamics, Carnot cycle,
CO.4	Explaining air Standard Cycles for different Internal Combustion engines and Rankine cycle for Thermal Power Plant.

CO5	Explaining the properties of Fluids and understanding Fluid Statics and Dynamics.
Engineering Drawing & Computer Graphics ME-291	
Course Outcomes	
CO1	Identifying various types of lines, lettering, geometrical curves and specify their use.
CO2	Describing the principal of projection of point ,lines , surface , simple solids
CO.3	Describing of an isometric view from orthogonal view of simple solids
CO4	Explaining development of surface of solids
CO5	Discussing basic of computer aided drafting

Physics II (PH 301/PH391)

Course Outcomes	
CO 1	Identify the importance of the basic concepts of Physics.
CO 2	Classify different branches like electromagnetism, classical mechanics and quantum mechanics.
CO 3	Utilize theoretical formulation of different physical phenomena in solving problems.
CO 4	Analyze the data related to various physical phenomena both quantitatively and qualitatively.

Basic Environment Engineering & Elementary Biology (CH 301)

Course Outcomes	
CO1	Describe the basic principles and structure of ecology and environment.
CO2	Summarize the problems that mankind is facing or will face in future due to continuous environmental degradation.
CO3	Explain the importance of resources and their conservation for the interest of future generation.
CO4	Utilize basic laws of science and engineering to understand and solve problems related to environment.

Values and Ethics In Profession (HU 301)

Course Outcomes	
CO 1	Recognize the importance of values in human life.
CO 2	Understand the professional and ethical responsibility of the workplace.

CO 3	IImplement the engineering solutions in a global and societal context.
CO 4	Identify the contemporary issues related to human and professional interactions at workplac.
CO 5	Grade the core values that shape the ethical behaviour of an engineer.

Analog and Digital Electronics (CS 301)

Course Outcomes	
CO 1	Describe different types of number system and exemplify Boolean function minimization.
CO 2	Compare the advantages and limitations of analog to digital converters.
CO 3	Implement different combinational and sequential circuits to solve design problems.
CO 4	Demonstrate the construction of logic gates using different logic families
CO 5	Explain the operation of multivibrator circuits and compare the merits and demerits of different amplifiers.
CO 6	Design various analog and digital circuits and verify their outputs.

Data Structure & Algorithm (CS302/CS392)

Course Outcomes	
CO 1	**Describe** concepts of data structures, pseudo-code and define asymptotic notations to analyze the performance of algorithms.
CO 2	**Implement** various operations on array and linked list data structures.
CO 3	**Solve** different problems involving stack and queue data structures as well as problems of recursive nature.
CO 4	**Utilize** the knowledge of non-linear data structures like trees and graphs to design algorithms for various applications .
CO 5	**Verify** various algorithms for Sorting, Searching and Hashing.

Computer Organization (CS 303)

Course Outcomes	
CO 1	**Describe** about Stored Program Digital Computer System.
CO 2	**Identify** & **Apply** appropriate equipments and procedures / algorithms of Computer Arithmetic.
CO 3	**Explain & Design** different aspects of Central Processing Unit (CPU).
CO 4	**Describe** the fundamentals of Memory Unit and **Perform** memory operations.

CO 5	**Explain** models of I/O operations & design of the I/O subsystems.
CO 6	**Identify** the micro-instructions and basic of Computer Architecture.

COMMUNICATION ENGINEERING & CODING THEORY (CS 401)

Course Outcomes

CO 1	Recognize the type of modulation scheme by finding the carrier and message signal frequencies from Amplitude modulated and Angle modulated signal.
CO 2	Explain the generation and detection process of different digital modulation schemes and compare their merits and short-comings.
CO 3	Implement the sampling theorem for generating different types of pulse modulation scheme and practice different types of line coding techniques.
CO 4	Calculate information content, entropy of different communication system and execute efficiency of digital coding technique.
CO 5	Experiment analog modulation circuit like AM, FM, PAM and PWM by testing their performances.

Formal Language & Automata Theory - (CS 402)

Course Outcomes

CO 1	Recall the fundamental principles and also design finite state machines.
CO 2	Design finite automaton, regular expressions, context-free grammars and PDA for accepting or generating a certain language.
CO 3	Transform between DFA to NFA, RE to NFA-€/NFA/DFA and Moore machine to Mealy Machine /Mealy Machine to Moore Machine.
CO 4	Prove properties of languages, grammars and automata with formal mathematical methods.

Mathematics III (M-401)

Course Outcomes

CO 1	Summarize the concept of Probability theory, distribution and some properties of random variables.
CO 2	Understand the theory of sampling and estimation to solve the relevant problems.
CO 3	Compare different statistical information based on hypothesis.
CO 4	Classify various algebraic structures and use them to solve relevant problems.
CO 5	Identify the concepts of advance graph theory and its application.

Numerical Methods (M(CS) 401)

Course Outcomes

CO 1	Describe the concepts of error due to approximation.
CO 2	Explain the concepts of Interpolation and solve the related problems.
CO 3	Summarize the idea of Numerical Integration for solving relevant problems.
CO 4	Utilize various techniques to determine the solution of Algebraic equations, transcendental equations and system of linear equations.
CO 5	Solve Ordinary differential equations by various numerical techniques.
CO 6	Execute various numerical methods through programming tools.

Computer Architecture- (CS 403/CS493)

Course Outcomes	
CO 1	Describe the fundamental working principles of basic computer system architecture.
CO 2	Indentify the design of pipeline architecture
CO 3	Explain the memory hierarchy design and Perform memory operations
CO 4	Identify the design of a pipelined CPU and hypothetical parallel processor architecture.
CO 5	Explain the hardware design of multiprocessors systems and its CPU-Memory interconnection architecture.

Technical Report Writing and Language Laboratory Practice (HU-481)

Course Outcomes	
CO 1	Develop listening and reading skills for better comprehension ability.
CO 2	Coordinate in a group on contemporary topics to enhance speaking ability and presentation skills.
CO 3	Build vocabulary to enhance speaking and writing skills.
CO 4	Demonstrate proper body language while expressing one's ideas or opinions.
CO 5	Interpret their views in English so as to overcome stage fear and build self-confidence.

Object Oriented Programming- (IT401/IT491)

Course Outcomes	
CO 1	Recognize the fundamental concepts of Object Oriented Programming .
CO 2	Compare OOP and other conventional programming languages and explain different forms of implementation of object oriented concept

CO 3	Implement programs through JAVA utilizing the concepts of object oriented programming.
CO 4	Execute applet and event-handling mechanisms through programs.

Software Tools (CS 492)

Course Outcomes	
CO 1	Recognize different Controls and Properties of visual programming.
CO 2	Utilize various visual basic tools like textbox, combo box, list box, image box etc to solve the various computing problems.
CO 3	Solve database problem using ODBC data connections.

Design and Analysis of Algorithm (IT501/IT591)

Course Outcomes	
CO 1	Memorize the fundamental principles of basic algorithms.
CO 2	Describe the notion of NP-completeness.
CO 3	Use the Asymptotic notations as well as Recurrences on simple algorithms, including those algorithms that are using complex loops and recursions.
CO 4	Estimate the time and space complexity of a given algorithm.
CO 5	Experiment and analysis on various algorithms on graph data structures as well as basic graph algorithms.
CO 6	Implement different known algorithms with the help of different programming design paradigm like divide & conquer, greedy method, dynamic programming , backtracking etc.

Computer Architecture- (IT502/IT592)

Course Outcomes	
CO 1	Describe the fundamental working principles of basic computer system architecture.
CO 2	Indentify the design of pipeline architecture
CO 3	Explain the memory hierarchy design and Perform memory operations
CO 4	Identify the design of a pipelined CPU and hypothetical parallel processor architecture.
CO 5	Explain the hardware design of multiprocessors systems and its CPU-Memory interconnection architecture.

Operating System (IT503 / IT593)

Course Outcomes	

CO 1	Differentiate the working of an operating system and its components.
CO 2	Describe process management and analyze the synchronization process.
CO 3	Identify the working methodology of multithreaded applications and distinguish different scheduling algorithms.
CO 4	Identify the reasons of deadlocks and their remedial measures and explain different memory management techniques used in operating system.
CO 5	Classify different storage management and protection techniques used in operating system.

Programming Practices Using C++ (IT504F/IT594F)

Course Outcomes	
CO 1	Memorize the basic UNIX commands and programming structures in context of Object Oriented Paradigms.
CO 2	Utilize various object oriented features like inheritance, data abstraction, encapsulation and polymorphism to solve various computing problems.
CO 3	Construct problems using Standard Template Libraries (STL)and manipulate error with the help of exception handling.

Database Management System (IT601 / IT691)

Course Outcomes	
CO 1	Describe the fundamental concepts of database system and construct Entity-Relationship (E-R) model from specifications and convert an E-R schema to relation schema using
CO 2	Identify query processing methodologies of Relational Algebra, Relational Calculus and determine the query optimization techniques.
CO 3	Construct simple and moderately advanced database queries using SQL and PL/SQL blocks for ensuring data integrity and security.
CO 4	Explain the concepts of normalization and apply such knowledge to the normalization of a database; and be able to identify basic database storage structures and access techniques.
CO 5	Implement the basic issues of transaction processing, concurrency control and recovery mechanisms in applications.

Computer Network (IT 602/IT692)

Course Outcomes	
CO 1	Recognize the concepts of Computer Network, its issues and layered architectures to identify error and collision during transmission of data and producing free flow of data by
CO 2	Apply the concept of IP Addressing to solve problems on sub netting and calculate the best possible path in an internetwork by executing the different routing algorithms.
CO 3	Understand process to process delivery of data by employing UDP, TCP protocols and verify Quality of Service.
CO 4	Remember different protocols for real time network applications and analyzing the need of Cryptography in a network.

Software Engineering (IT603/IT693)

Course Outcomes	
CO 1	Identify the basic components of software and different phases of software development.
CO 2	Explain different project scheduling techniques and estimate various parameters related to the software development.
CO 3	Find software requirements specifications for different projects and study software risks and risk management strategies.
CO 4	Design software process using software development tools.
CO 5	Verify different testing and debugging techniques on some basic programming codes and Determine the quality of software

Computer Graphics (IT604B)

Course Outcomes	
CO 1	Recognize and compare the working procedure and efficiency of different graphics systems as well as the basic display technology and different shading models.
CO 2	Summarize the fundamental mathematics of computer graphics.
CO 3	Practice different types of scan conversion and filling algorithms.
CO 4	Construct curves and 2D & 3D modeling with appropriate geometric transformations as well as different types of projections.
CO 5	Detect valid clipping edges with different types of clipping algorithms.

Artificial Intelligence (IT605D)

Course Outcomes	
CO 1	Explain the various types of AI agent and search algorithm (uninformed, informed, heuristic, constraint satisfaction, genetic algorithms, game playing.
CO 2	Develop the basic knowledge-based system with the help of knowledge representation.
CO 3	Analyze the working knowledge of reasoning in the presence of probabilistic approaches.
CO 4	Implement basic programming knowledge in Prolog/Lisp.
CO 5	Describe the notion of machine learning techniques.

Seminar (IT 681)

Course Outcomes	
CO 1	Identify recent trends, issues and development in computer science and technology.
CO 2	Compose technical reports and presentation with the help of supporting tools.

CO 3	Demonstrate interpersonal skills, communication skills and time management.
CO 4	Evolve as a self learner.

Internet Technology (IT701/IT791)

Course Outcomes	
CO 1	Summarize concepts of computer network, with various protocols.
CO 2	Design simple web pages using different web tools. Like JavaScript, HTML, XML, CGI script and PERL
CO 3	Study different aspect of legal, ethical, security and privacy issues related to the use of Internet based computer systems.
CO 4	Describe the importance of real time multimedia applications over IP and the concept of SEO.

Multimedia Technology (IT 702/IT792)

Course Outcomes	
CO 1	Summarize the basic techniques for digital conversion of multimedia components.
CO 2	Utilize the fundamental knowledge of multimedia tools to support various multimedia application developments.
CO 3	Explain the fundamental concepts and techniques to manipulate multimedia data.
CO 4	Implement multimedia systems in various potential areas.

E Commerce (IT703)

Course Outcomes	
CO 1	Recall the fundamental principles of E-commerce.
CO 2	Design Business to Business E-Commerce.
CO 3	Explaining the Legal issues of E-Commerce.
CO 4	Describe the Security Issues of E-Commerce.
CO 5	Design Business to Consumer E-Commerce.
CO 6	Identify and Design E-business.

Data Warehousing and Data Mining (IT 704C)

Course Outcomes

CO 1	Describe the basic concept of data warehousing.
CO 2	Explain data warehouse architecture and infrastructure.
CO 3	Identify different data mining tools to analyze data.
CO 4	Make decision from classified data .

Industrial Training (IT 794)

Course Outcomes	
CO 1	Able to Identify the real world problems.
CO 2	Gain the knowledge of current trends in specific area of interest.
CO 3	Develop technical reports and demonstrate effectively to the solutions of the problems.

Project - 1 (IT 795)

Course Outcomes	
CO 1	Utilize the basic theories of software designing model to calibrate application based software for real life problems within a specific time bound.
CO 2	Design, construct and test the evolving application model.
CO 3	Analyze and Simulate a system for required accuracy.
CO 4	Perform in groups to solve the problem and prepare a project report of the same there by enhancing their communication and presentation skills.
CO 5	Build up team spirit and leadership qualities.

Cryptography & Network security (IT 801D)

Course Outcomes	
CO 1	Identify common network security vulnerabilities.
CO 2	Arrange cryptographic techniques that provide information and network security.
CO 3	Demonstrate detailed knowledge of the role of encryption to protect data.
CO 4	Examine the issues and structure of Authentication Service and Electronic Mail Security.
CO 5	Provide familiarity in Intrusion detection and Firewall Design Principles.

Cyber Laws & Security Policies (IT802B)

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Course Outcomes	
CO 1	Describe the notion of Cybercrime and its categories
CO 2	Recognize the tools and methods used in cybercrime.
CO 3	Describe the phishing and Identity theft techniques
CO 4	Explain how cybercrime is carried out using wireless and mobile devices.
CO 5	Apply the legal implications of cybercrime for a given scenario in the perspective of existing IT laws

Project - 2 (IT 892)

Course Outcomes	
CO 1	Utilize the basic theories of software designing model to calibrate application based software for real life problems within a specific time bound.
CO 2	Design, construct and test the evolving application model.
CO 3	Analyze and Simulate a system for required accuracy.
CO 4	Perform in groups to solve the problem and prepare a project report of the same there by enhancing their communication and presentation skills.
CO 5	Build up team spirit and leadership qualities.

Grand Viva (IT 893)

Course Outcomes	
CO 1	Recall knowledge of mathematics, science and explaining the engineering fundamental.
CO 2	Implement the engineering knowledge to solve the problem.
CO 3	Explain and design different problem based on algorithm.
CO 4	Make decision as a self-learner based on engineering tools.

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