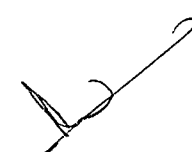


Department Of Electronics and Communication Engineering

Regulation: MLR22


Course Code & Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6HS01 English for skill Enhancement	CO1	Develop language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/compose clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
	CO5	Develop language components to communicate effectively in formal and informal situations
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6EE62 Basic Electrical	CO1	Evaluate current and voltage values in resistive circuits with independent sources.


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Engineering	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6HS02 English Language and Communication skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.
A6BS14 Engineering Chemistry Lab	CO1	Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
	CO2	Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
	CO3	Students are able to prepare polymers like bakelite and nylon-6,6.
	CO4	Estimations saponification value, surface tension and viscosity of lubricant oils.
A6EE63 Basic Electrical Engineering Lab	CO1	Analyze the circuit using Kirchhoff's law and Resonance of series and parallel network simplification theorems.
	CO2	Evaluate the efficiency of single-phase alternating quantities.
	CO3	Evaluate the efficiency and critical speed and critical field resistance of DC Machine
	CO4	Evaluate the Torque-Slip characteristics of 3 phase Induction Motor
A6ME04 Engineering Work	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.


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Shop	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6BS11 Environmental Science	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life.
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection.
	CO3	Study the impact of conservation of biodiversity.
	CO4	Analyze the reasons for environmental pollution.
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future.
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace transforms of functions
	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for


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		secure information Technology
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.
	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.
A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6EC01 Electronic Devices and Circuits	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Understand the importance of application of diodes.
	CO3	Know the applications of Bipolar Junction Transistor.
	CO4	Analyze the concept on Junction Field Effect Transistor.
	CO5	Acquire the knowledge about the role of special purpose devices and their applications.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.


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	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6CS03 Programming for Problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
A6EC02 Electronic Devices and Circuits Lab	CO1	Acquire the knowledge of various semiconductor devices and their use in real life.
	CO2	Design aspects of biasing and keep them in active region of the device for functional circuits
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
A6EC05 Analog Circuits	CO1	Analyze various transistor amplifier circuits and their frequency responses at low, mid and high frequencies.
	CO2	Designing amplifier circuits using BJTs.
	CO3	Analyze the concepts of both positive and negative feedback in electronic circuits.


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	CO4	Design, construct & analyze oscillator circuits to generate signals in various frequency ranges.
	CO5	Elucidate and design the linear and non-linear applications of an op-amp and special application ICs
A6CS05 Data Structures	CO1	Use arrays, pointers and structures to formulate algorithms and programs.
	CO2	Design and implement applications of Linked List.
	CO3	Design and implement Stack ADT using Array and Linked List.
	CO4	Design and implement Queue ADT using Array and Linked List.
	CO5	Solve problems involving graphs and trees.
	CO6	Analyze searching and sorting techniques based on time and space complexity.
A6EC06 Signals and Systems	CO1	Analyze the different types of signals and systems
	CO2	Represent continuous and discrete systems in time and frequency domain using different transforms
	CO3	Investigate the stability and causality of systems
	CO4	Apply various transforms and its properties to analyze the CT and DT signals and systems
	CO5	Characterize LTI systems in the Time domain and various Transform domains
A6EC07 Electronic Measurements and Instrumentation	CO1	Apply knowledge of electronic instruments for measurement of electrical quantities.
	CO2	Understand the concepts of digital instruments.
	CO3	Understand the working principles of various oscilloscopes.
	CO4	Identify the usage of various instruments for different measurements.
	CO5	Analyze the applications of transducer and data acquisition systems.
A6EC08 Probability	CO1	Understand the various probability function and theorem.
	CO2	Analyze the application of random variable.


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Theory and Stochastic Processes	CO3	Understand the operations on single random variable.
	CO4	Analyze the temporal characteristics in stochastic process.
	CO5	Analyze the spectral characteristics in stochastic process.
A6EC09 Analog Circuits Lab	CO1	Design BJT and FET amplifiers.
	CO2	Analyze various BJT Feedback amplifiers.
	CO3	Design various BJT Oscillators and multivibrators.
	CO4	Simulate various power amplifiers and tuned amplifiers.
	CO5	Implement Linear and Non Linear wave shaping circuits
A6CS06 Data Structures Lab	CO1	Use appropriate data structure for given problem.
	CO2	Use compilers include library functions, debuggers and troubleshooting.
	CO3	Execute write programs in C to implement various types Linked Lists.
	CO4	Execute programs using data structures such as arrays, linked lists to implement stacks.
	CO5	Execute programs using data structures such as arrays, linked lists to implement queues.
	CO6	Execute write programs in C to implement various sorting and searching.
A6EC10 Basic Simulation Lab	CO1	Perform various operations on the signals including Time shifting, Scaling, Reversal, Amplitude Scaling To generate various signals and systems.
	CO2	Determine the correlation & Convolution between Signals and sequences.
	CO3	Verification of Weiner-Khinchine Relations i.e., Auto Correlation and Power Spectral Density forms Fourier transform pair.
	CO4	Determine the Fourier and Laplace transform of a signal
A6HS05 Gender sensitization	CO1	Students will have developed a better understanding of important issues related to gender in contemporary India.
	CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.


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	CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
	CO5	Men and women students and professionals will be better equipped to work and live together as equals.
	CO6	Students will develop a sense of appreciation of women in all walks of life. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
A6EC11	CO1	Design a basic circuit using Op-amp.
Linear and Digital Integrated Circuit Applications	CO2	Design linear, non-linear applications and active filters circuits.
	CO3	Realize waveform generators using 555 timer and develop A/D and D/A converters.
	CO4	Construct a Verilog code in gate level modelling.
	CO5	Construct a basic Verilog program in dataflow and behavioural modelling.
A6EC12	CO1	Understand the various numeric information in different forms
Digital System Design	CO2	Minimize simple Boolean expressions using the theorems and postulates of Boolean algebra
	CO3	Design and analyze combinational circuits and to use standard combinational functions to build more complex circuits.
	CO4	Design and analyze sequential circuits and to use standard sequential functions to build more complex circuits
	CO5	Understand the concept of finite state machine.
A6EC13	CO1	Understand the need of modulation and the types of Amplitude Modulation.
Analog and Digital Communication	CO2	Apply the concepts of Frequency Modulation in real time applications.
	CO3	Evaluate the performance of digital signaling schemes for digital communication channels.


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	CO4	Review the key characteristics of various digital carrier modulation,
	CO5	Know the concepts of minimizing the effects of errors due to channel noise.
A6BS04 Vector Calculus And Complex Analysis	CO1	The concepts of finite differences, operators and relations between them.
	CO2	Evaluation of integrals by using numerical methods.
	CO3	Evaluation of the line integrals along piece wise smooth paths.
	CO4	Concepts of Taylors and Maclaurin's series.
	CO5	Finding Residues using Laurent series.
	CO6	Concept of bilinear transformation and mapping it to the given points..
A6EC14 Electromagnetic and Transmission Lines	CO1	Understand the concepts of electric and magnetic fields.
	CO2	Apply the knowledge on Magneto statics
	CO3	Analyze the fundamental theory of electromagnetic waves in transmission lines.
	CO4	Apply the propagation characteristics of electromagnetic wave in bounded and unbounded media.
	CO5	Justify the various line parameters by conventional and graphical methods.
A6EC15 Analog & Digital IC Applications Lab	CO1	Design various applications using op-amp
	CO2	Design various applications with 555 timer IC
	CO3	Deign various sequential and combinational circuits using Verilog HDL.
A6EC16 Digital System Design Lab	CO1	Verify the functionality of various Digital ICs.
	CO2	Design any digital logic circuits using ICs
	CO3	Design and verify the functionality of combinational circuits
	CO4	Design and verify the functionality of sequential circuits.
A6EC17 Analog and Digital Communications Lab	CO1	Perform Analog and Digital modulation techniques.
	CO2	Analyse the modulated wave forms.
	CO3	Observe receiver characteristics.
	CO4	Design Time and Frequency division multiplexing Techniques.


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A6EC18 Real Time Projects/Field based Projects	CO1	Demonstrate a sound technical knowledge of their selected project topic.
	CO2	Undertake problem identification, formulation and solution.
	CO3	Design engineering solutions to complex problems utilising a systems approach.
	CO4	Conduct an engineering project.
	CO5	Communicate with engineers and the community at large in written and oral forms.
	CO6	Demonstrate the knowledge, skills and attitudes of a professional engineer
A6HS06 Constitution of India	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution.
	CO2	List fundamental rights and fundamental duties of Indian citizens.
	CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
	CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels.
	CO5	Explain the functions and responsibilities of election commission of india and union public service commission.



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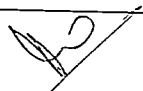

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Department Of Electronics and Communication Engineering

Regulation: MLR22 (M.Tech-ES)


Course Code & Name	CO Number	Course Outcomes
B55501 Microcontrollers for Embedded System Design	CO1	Compare and select ARM processor core based SoC with several features/peripherals based on requirements of embedded applications.
	CO2	Identify and characterize architecture of Programmable DSP Processors
	CO3	Develop small applications by utilizing the ARM processor core and DSP processor based platform.
B55502 RTL Simulation And Synthesis With PLDs	CO1	Familiarity of Finite State Machines, RTL design using reconfigurable logic.
	CO2	Design and develop IP cores and Prototypes with performance guarantees
	CO3	Use EDA tools like Cadence, Mentor Graphics and Xilinx .
B55514 CMOS Design VLSI	CO1	Design of combinational MOS logic and sequential MOS logic circuits
	CO2	Design of different Memories using MOS transistors
	CO3	Design a circuits based on dynamic logic
	CO4	Use CMOS transmission gates in various applications
B55515 Pattern Recognition and Machine Learning	CO1	Familiar the basics of pattern classes and functionality
	CO2	Construct the various linear models.
	CO3	Use the different kernel methods.
	CO4	Design the Markov and Mixed models.
B55516 Wireless Sensor Networks	CO1	Analyze and compare various architectures of Wireless Sensor Networks
	CO2	Understand Design issues and challenges in wireless sensor networks
	CO3	Analyze and compare various data gathering and data dissemination methods
	CO4	Design, Simulate and Compare the performance of various routing and MAC protocol
B55517 Embedded Real Time Operating System	CO1	Write an UNIX programming language.
	CO2	Create scheduling of tasks in RTOS.
	CO3	Develop case studies for real time applications


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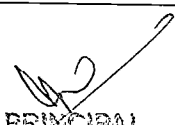
B55518 Advanced Computer Architecture	CO1	Familiarize the instruction set, memory addressing of Computer
	CO2	Handle the issues in pipelining and parallelism
	CO3	Familiarize the practical issues in inter network
B55519 CMOS Analog IC Design	CO1	Design basic building blocks of CMOS analog ICs.
	CO2	Carry out the design of single and two stage operational amplifiers and voltage references.
	CO3	Determine the device dimensions of each MOSFETs involved.
	CO4	Design various amplifiers like differential, current and operational amplifiers
B55503 Microcontrollers for Embedded System Design Lab	CO1	Design of embedded systems design tools and hardware programmers
	CO2	Equip the skills in both simulation and practical implementation of the basic building blocks
	CO3	Practice to write code and compile in ARM
B55504 VLSI Design Verification and Testing Lab	CO1	Simulate any digital function in Verilog HDL
	CO2	Know the difference between synthesizable and non-synthesizable code
	CO3	Learn design techniques as per current industrial needs.
	CO4	Design and test the logic verification using CADENCE simulation tools.
B55505 Research Methodology and IPR	CO1	Explain research problem formulation. Analyze research related information. Follow research ethics.
	CO2	Know the today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CO3	Know IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
	CO4	Explain IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
B55506 System Design with Embedded Linux	CO1	Familiarity of the embedded Linux development model.
	CO2	Write, debug, and profile applications and drivers in embedded Linux.
	CO3	Understand and create Linux BSP for a hardware platform
B55507 VLSI Design Verification and	CO1	Understand the VLSI design flows and their Synthesis approach..
	CO2	Analyze the various Designing verification processes.


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Testing	CO3	Design complex circuits and testing them using various Testing methods.
B55520 IoT Architecture and system design	CO1	Integrate the sensors and actuator depending on the applications
	CO2	Interface the IoT and M2M with value chains
	CO3	Write Python programming for Arduino, Raspberry Pi devices
	CO4	Design IoT based systems such as Agricultural IoT, Vehicular IoT etc.,
B55521 SoC Design	CO1	Apply the knowledge of entry-level industrial standard ASIC or FPGA designer
	CO2	Describe the issues and tools related to ASIC/FPGA Design and Implementation.
	CO3	Explain the basics of System on Chip and Platform based design.
B55522 Linux OS	CO1	Write an embedded C application of moderate complexity.
	CO2	Develop and analyze algorithms in C++.
	CO3	Differentiate interpreted languages from compiled languages.
B55523 Device Drivers of Embedded Systems	CO1	Draw and explain the architecture of Embedded Systems and Operating System Fundamentals.
	CO2	Describe the fundamentals of Real Time Operating Systems.
	CO3	Explain the internals of operating systems and its kernel.
	CO4	Describe the fundamentals of device drivers
	CO5	Develop the Device Drivers and Real Time Operating Systems.
B55524 Network Security and Cryptography	CO1	Remember the techniques involved to support real-time traffic and congestion control.
	CO2	Determine related hardware and software components to meet the designed network. Demonstrate the knowledge of network planning and optimization.
	CO3	Analyze critically and reflect on the relations and interrelations of the designed network.
	CO4	Provided with Protocol for quality of service (Qos) to different applications
B55525 Embedded Systems and IOT	CO1	Discuss the fundamentals of IoT and embedded system including essence, basic design strategy and process modeling.
	CO2	Introduce a set of advanced topics in embedded IoT and lead them to understand research in network.
	CO3	Develop comprehensive approach towards building small low cost embedded IoT system.
	CO4	Explain the fundamentals of security in IoT
	CO5	Implement secure infrastructure for IoT
	CO6	Apply real world application scenarios of IoT along with its societal and economic impact using case studies
B55508 Advanced Embedded Systems Lab	CO1	Explain the basic concepts and terminology of the target area, the embedded systems design flow.
	CO2	Draw the embedded system architecture.
	CO3	Write a code, test and practice
	CO4	Make measurements with the specified accuracy.
B55509	CO1	Design of embedded systems design tools and hardware programmers


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System Design with Embedded Linux Lab	CO2	Equip the skills in both simulation and practical implementation of the basic building blocks
	CO3	Practice to write code
B55510 Seminar	CO1	Identify and study research article literature to review and summarize the content for discussion.
	CO2	Understand problem solving skills and theoretical knowledge about the topic.
	CO3	Apply the ability to speak, debate and write the report on the selected topic
	CO4	Illustrate the topic effectively by an oral presentation before the evaluation committee.
B55526 Data Communication Networks	CO1	Explain the function of OSI layer in communication
	CO2	Aware about the network security
	CO3	Implementation of secure networks for data communication
B55527 Digital Signal Processors and Architectures	CO1	Draw and explain fundamentals of digital signal processors and its architectures
	CO2	Identification of the functional blocks and features of DSP's .
	CO3	Interface the required hardware with DSP's. Use the DSP's in real-time applications
B55528 Embedded Networking	CO1	Acquire knowledge on communication protocols of connecting Embedded Systems.
	CO2	Master the design level parameters of USB and CAN bus protocols
	CO3	Design Ethernet in Embedded networks considering different issues
	CO4	Acquire the knowledge of wireless protocols in embedded domain
B55529 Principles of signal Processing	CO1	Identify various signals and systems.
	CO2	Apply various transformation techniques and apply them to find spectral domain representation of various signals.
	CO3	Apply convolution and correlation operations between various signals and systems.
	CO4	Develop the digital filter designs. Explain the Multirate digital signal processing concepts.
B55530 Applications of IoT	CO1	Understand the concept of IOT and M2M
	CO2	Study IOT architecture and applications in various fields
	CO3	Study the security and privacy issues in IOT.
B55531 Waste to Energy	CO1	Convert wastes into renewable energy •
	CO2	Aware about Energy sources
	CO3	Apply to tap the potential of renewable energy
B55511 Dissertation Work Review -I	CO1	Identify the research topic/area relevant to the field of Electronics and Communication Engineering to carry out independent research.
	CO2	Understand the process to carry out research in written format, results and conclusion with reference to existing literature
	CO3	Identify various technologies and fields for making project.
B55512	CO1	Analyze ethical practices and tools used for different technologies


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Dissertation Work Review -II	CO2	Apply engineering knowledge to solve various industrial problems
	CO3	Evaluate the performance on parameters like communication skills and technical knowledge etc.
B55513 Dissertation Viva-Voce	CO1	Analyze and synthesize research findings
	CO2	Demonstrate appropriate tools, references and writing skills for report writing.
	CO3	Evaluate the methods and knowledge to solve the specific research problem.


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Department of Computer Science and Engineering


Regulation: MLR22


Course code & Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.
	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.
A6HS01 English for Skill Enhancement	CO1	Will be able to acquire language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/ compose clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
	CO5	Use language components to communicate effectively in formal and informal situations
A6EE60 Basic Electrical and Electronics Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources.
	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifier
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.


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A6EC03 Electronic Devices and Applications	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Know the applications of various devices.
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
A6CS03 Programming for Problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
	CO4	Solve real world problems using matrices, searching and sorting.
A6HS02 English Language and Communication Skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.
	CO5	Apply language appropriately public speaking, group discussions and interviews
A6EC04 Introduction to Internet of Things	CO1	Introduction to basic electronic components and digital electronic
	CO2	Introduction to sensors and Actuators
	CO3	Introduction to microcontroller
	CO4	Introduction to Arduino IDE
A6HS04 Seminar	CO1	The seminar shall have topic allotted and approved by the faculty.
	CO2	The seminar is evaluated for 50 marks for internal only.
	CO3	The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
	CO4	Faculty shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
	CO5	Presentation schedules will be prepared by Department in line with the academic calendar.
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace tranforms of functions
	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of


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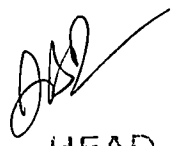
		band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for secure information technology
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
	CO4	Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.
	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6CS04 Python Programming Lab	CO1	Write, test, and debug simple Python programs.
	CO2	Implement Python programs with conditions and loops.
	CO3	Develop Python programs step-wise by defining functions and calling them.
	CO4	Use Python lists, tuples, dictionaries for representing compound data.
	CO5	Read and write data from/to files in Python
A6ME04 Engineering	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.


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Work Shop	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6CS01 Elements of Computer Science and Engineering	CO1	Know the working principles of functional units of a basic Computer
	CO2	Understand program development, the use of data structures and algorithms in problem solving.
	CO3	Know the need and types of operating system, database systems.
	CO4	Understand the significance of networks, internet, WWW and cyber security.
	CO5	Understand Autonomous systems, the application of artificial intelligence.
A6BS11 Environmental Science	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life.
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection.
	CO3	Study the impact of conservation of biodiversity.
	CO4	Analyze the reasons for environmental pollution.
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future.
A6BS03 Computer Oriented Statistical Methods	CO1	Evaluation of Probability distribution of Discrete and Continuous random variables and their moments.
	CO2	Apply the concept of correlation and regression to find covariance and Sampling distribution
	CO3	Evaluate the given data for appropriate test of hypothesis for Large samples.
	CO4	Evaluate the given data for appropriate test of hypothesis for small samples and one way ANOVA
	CO5	Recognize if a given stochastic system with finite number of states is a Markov chain or not and also identify classes of states in Markov chains and characterize the states.
A6CS28 Digital Electronics and Computer Organization	CO1	Apply minimization techniques to simplify Boolean expressions.
	CO2	Apply the principles of Digital electronics to design combinational and sequential logic circuits.
	CO3	Understand the basics of instruction set and their impact on processor design
	CO4	Illustrate register transfer operations
	CO5	Analyze memory hierarchy and I/O Communication.
A6CS05 Data Structures	CO1	Ability to select the data structures that efficiently model the information in a problem.
	CO2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
	CO3	Implement and know the application of algorithms for sorting and pattern matching.


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	CO4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
A6IT02 Object Oriented Programming using JAVA	CO1	Use object-oriented programming concepts to solve real world problems.
	CO2	Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
	CO3	Use multithreading concepts to develop inter process communication.
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
	CO5	Build the internet-based dynamic applications using the concept of applets
A6CS07 Software Engineering	CO1	Ability to translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
	CO2	Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
	CO3	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report
A6CS06 Data Structures Lab	CO1	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
	CO2	Ability to Implement searching and sorting algorithms
A6IT03 Object Oriented Programming using JAVA Lab	CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
	CO2	Understand the use of different exception handling mechanisms and concept of multithreading for robust and efficient application development.
	CO3	Understand and implement concepts on file streams and operations in java programming for a given application programs.
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
A6CS52 Skill Development (Data Visualization using R)	CO1	Understand How to import data into Tableau.
	CO2	Understand Tableau concepts of Dimensions and Measures.
	CO3	Develop Programs and understand how to map Visual Layouts and Graphical Properties.
	CO4	Create a Dashboard that links multiple visualizations.
	CO5	Use graphical user interfaces to create Frames for providing solutions to real world problems
A6HS05 Gender Sensitization	CO1	Students will have developed a better understanding of important issues related to gender in contemporary India.
	CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
	CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	Students will acquire insight into the gendered division of labour and its relation


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		to politics and economics.
	CO5	Men and women students and professionals will be better equipped to work and live together as equals.
	CO6	Students will develop a sense of appreciation of women in all walks of life. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence
A6CS08 Discrete Mathematics	CO1	Analyze and examine the validity of argument by using propositional and predicate calculus.
	CO2	Apply basic counting techniques to solve the combinatorial problems
	CO3	Apply sets relations and digraphs to solve applied problems
	CO4	Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation.
	CO5	Use the basic concepts of graph theory and some related theoretical problems
A6HS08 Business Economics and Financial Analysis	CO1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.
	CO2	Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis.
	CO3	Develop an understanding of cost analysis
	CO4	Analyze how capital budgeting decisions are carried out.
	CO5	Understanding the framework for both manual and computerized accounting process.
	CO6	Know how to analyze and interpret the financial statements through ratio analysis.
A6CS09 Database Management Systems	CO1	Gain knowledge of fundamentals of DBMS, database design and normal forms
	CO2	Master the basics of SQL for retrieval and management of data.
	CO3	Be acquainted with the basics of transaction processing and concurrency control.
	CO4	Familiarity with database storage structures and access techniques
A6CS11 Operating System	CO1	Analyze the different structures and services of operating system.
	CO2	Analyze various algorithms used for OS services with respect to defined/chosen criteria.
	CO3	Solve the resource allocation and sharing problems.
	CO4	Assess different methods to solve OS problems.
	CO5	Analyze the memory management approaches of operating system
A6CS13 Software Testing Fundamentals	CO1	Understand software testing methods
	CO2	apply various software testing techniques
	CO3	Design and conduct a software test process for a software testing project
	CO4	Designing solutions for various software testing problems by selecting appropriate software test model
	CO5	Implement various practice- oriented software testing projects
A6CS10 Database Management	CO1	Apply the basic concepts of Database Systems and Applications.
	CO2	Develop an ER model for a given database.
	CO3	Use the basics of SQL and construct queries using SQL in database creation and


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Department of Computer Science and Engineering

Regulation: MLR22 (M.Tech-CSE)

Course Code & me	CO Number	Course Outcomes
B55801 Mathematical Foundations of Computer Science	CO1	Ability to understand and construct precise mathematical proofs..
	CO2	Ability to use logic and set theory to formulate precise statements.
	CO3	Ability to analyze and solve counting problems on finite and discrete structures.
	CO4	Ability to describe and manipulate sequences.
	CO5	Ability to apply graph theory in solving computing problems.
B55802 Advanced Data Structures	CO1	Ability to select the data structures that efficiently model the information in a problem
	CO2	Ability to understand how the choice of data structures impact the performance of programs
	CO3	Design programs using a variety of data structures, including hash tables, search structures and digital search structures
A55806 Deep Learning	CO1	Implement deep learning algorithms, understand neural networks and traverse the layers of data
	CO2	Learn topics such as convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
	CO3	Understand applications of Deep Learning to Computer Vision
	CO4	Understand and analyze Applications of Deep Learning to NLP.
B55812 Mining Massive Datasets	CO1	Handle massive data using Map-Reduce. .
	CO2	Develop and implement algorithms for massive data sets and methodologies in the context of data mining.
	CO3	Understand the algorithms for extracting models and information from large datasets
	CO4	Develop recommendation systems
	CO5	Gain experience in matching various algorithms for particular classes of problems..
B55803 Advanced Data Structures Lab	CO1	Ability to select the data structures that efficiently model the information in a problem.
	CO2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.

	CO3	Implement and know the application of algorithms for sorting and pattern matching.
	CO4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and B-trees.
B55807 Deep Learning Lab	CO1	Learn The Fundamental Principles Of Deep Learning.
	CO2	Identify The Deep Learning Algorithms For Various Types of Learning Tasks in various domains
	CO3	Implement Deep Learning Algorithms And Solve Real-world problems.
B55813 Research Methodology and IPR	CO1	Understand research problem formulation. .
	CO2	Analyze research related information
	CO3	Follow research ethics
	CO4	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
	CO5	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
	CO6	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.
B55813 Advanced Algorithms	CO1	Analyze the complexity/performance of different algorithms.
	CO2	Determine the appropriate data structure for solving a particular set of problems.
	CO3	Categorize the different problems in various classes according to their complexity.
A55815 Advanced Computer Architecture	CO1	Computational models and Computer Architectures.
	CO2	Concepts of parallel computer models. s
	CO3	Scalable Architectures, Pipelining, Superscalar processors
B55819 Advanced Computer Networks	CO1	Understanding of holistic approach to computer networking
	CO2	Ability to understand the computer network protocols and their applications
	CO3	Ability to design simulation concepts related to packet forwarding in networks.
B55825 Robotic Process Automation	CO1	Describe RPA, where it can be applied and how it's implemented.
	CO2	Identify and understand Web Control Room and Client Introduction
	CO3	Understand how to handle various devices and the workload
	CO4	Understand Bot creators, Web recorders and task editors
B55816 Advanced Algorithms Lab	CO1	Able to analyze the performance of algorithm
B55820 Advanced Computer	CO1	The practical exposure to existing protocols


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Networks Lab		
B55827 Digital Forensics	CO1	Understand relevant legislation and codes of ethics.
	CO2	Computer forensics and digital detective and various processes, policies and procedures.
	CO3	E-discovery, guidelines and standards, E-evidence, tools and environment.
	CO4	Email and web forensics and network forensics.
B55831 Fault Tolerant Systems	CO1	Become familiar with general and state of the art techniques used in design and analysis of fault tolerant digital systems.
	CO2	Be familiar with making system fault tolerant, modeling and testing, and bench marking to evaluate and compare systems
	CO2	Ability to Implement searching and sorting algorithms
	CO2	Apply basic counting techniques to solve the combinatorial problems
	CO3	Apply sets relations and digraphs to solve applied problems
	CO4	Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation.
	CO5	Use the basic concepts of graph theory and some related theoretical problems
	CO5	Implement various practice- oriented software testing projects



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Course Code&Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for secure information Technology
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.
	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.
A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6CS03 Programming for Problem Solving	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors

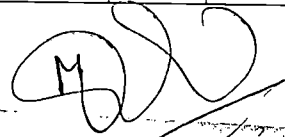

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Lab		encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.
	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6ME04 Engineering Work Shop	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.
	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6IT01 Basics of Information Technology	CO1	Know the working principles of functional units of a basic Computer
	CO2	Understand program development, the use of data structures and algorithms in problem solving.
	CO3	Know the need and types of operating system, database systems.
	CO4	Understand the significance of networks, internet, WWW and cyber security.
	CO5	Understand Autonomous systems, the application of artificial intelligence.
I YEAR II SEMESTER		
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace transforms of functions

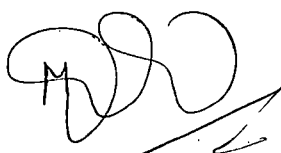


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	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6HS01 English for skill Enhancement	CO1	Develop language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/compose clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
	CO5	Develop language components to communicate effectively in informal and informal situations
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6EE60 Basic Electrical Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources.
	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6EC03 Electronic Devices and Applications	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Know the applications of various devices.
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
A6HS02 English Language and Communication skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.
A6CS04 Python Programming Lab	CO1	Write, test, and debug simple Python programs.
	CO2	Implement Python programs with conditionals and loops.
	CO3	Develop Python programs step-wise by defining functions and calling them.
	CO4	Use Python lists, tuples, dictionaries for representing compound data.
	CO5	Read and write data from/to files in Python
A6EC04 Introduction To	CO1	Able to demonstrate various sensor interfacing using Visual Programming Language.



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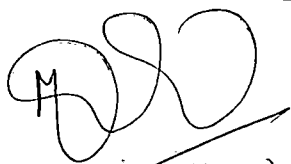
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Internet Of Things	CO2	Able to analyze various Physical Components.
	CO3	Able to demonstrate Wireless Control of Remote Devices.
	CO4	Able to design and develop Mobile Application which can interact with Sensors
A6BS11 Environmental Science	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life.
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection.
	CO3	Study the impact of conservation of biodiversity.
	CO4	Analyze the reasons for environmental pollution.
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future.

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Course Code & Name	CO Number	Course Outcomes
A6CS08 DISCRETE MATHEMATICS	CO1	Analyze and examine the validity of argument by using propositional and predicate calculus
	CO2	Apply basic counting techniques to solve the combinatorial problems
	CO3	Apply sets relations and digraphs to solve applied problems
	CO4	Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation.
	CO5	Use the basic concepts of graph theory and some related theoretical problems
A6CS18 Computer Network	CO1	Identify computer networks and its components.
	CO2	Identify the different types of network topologies and protocols.
	CO3	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
	CO4	Select and use various sub netting and routing mechanisms.
	CO5	Design a network diagram for a given scenario
A6CS09 DATABASE MANAGEMENT SYSTEMS	CO1	Gain knowledge of fundamentals of DBMS, database design and normal forms
	CO2	Master the basics of SQL for retrieval and management of data.
	CO3	Be acquainted with the basics of transaction processing and concurrency control.



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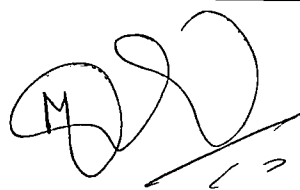
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	CO4	Familiarity with database storage structures and access techniques
A6CS15 DESIGN AND ANALYSIS OF ALGORITHMS	CO1	Identify various Time and Space complexities of various algorithms
	CO2	Understand Tree Traversal method and Greedy Algorithms
	CO3	Apply Dynamic Programming concept to solve various problems
	CO4	Apply Backtracking, Branch and Bound concept to solve various problems
	CO5	Implement different performance analysis methods for non deterministic algorithms
A6HS13	CO1	Demonstrate how to install and configure RStudio
SKILL DEVELOPMENT(R PROGRAMMING LAB)	CO2	Perform basic operations using R Studio.
	CO3	Import, review, manipulate and summarize data-sets in R
	CO4	Make use of R studio to analyze data by working on datasets.
	CO5	Apply various concepts to write programs in R.
A6IT02 OBJECT ORIENTED PROGRAMMING USING JAVA	CO1	Use object oriented programming concepts to solve real world problems.
	CO2	Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
	CO3	Use multithreading concepts to develop inter process communication
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
	CO5	Build the internet-based dynamic applications using the concept of applets
A6CS10 DATABASE MANAGEMENT SYSTEMS LAB	CO1	Apply the basic concepts of Database Systems and Applications.
	CO2	Develop an ER model for a given database.
	CO3	Use the basics of SQL and construct queries using SQL in database creation and interaction.
	CO4	Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
	CO5	Analyze and Select storage and recovery techniques of database system.
A6IT03 OBJECT ORIENTED PROGRAMMING USING JAVA LAB	CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
	CO2	Understand the use of different exception handling mechanisms and concept of multithreading for robust and efficient application development.
	CO3	Understand and implement concepts on file streams and operations in java programming for a a given application programs.
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
A6HS06 CONSTITUTION OF INDIA	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution.
	CO2	List fundamental rights and fundamental duties of Indian citizens.



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CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels
CO5	Explain the functions and responsibilities of election commission of india and union public service commission.



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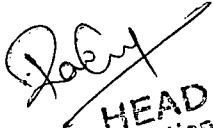
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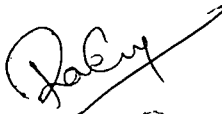
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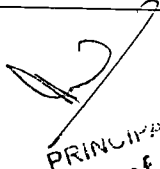
I YEAR I SEMESTER		
Course Code&Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for secure information Technology
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.


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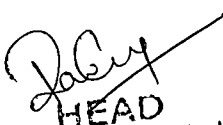

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	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.
A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6CS03 Programming for Problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.
	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment


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	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6ME04 Engineering Work Shop	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.
	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6IT01 Basics of Information Technology	CO1	Know the working principles of functional units of a basic Computer
	CO2	Understand program development, the use of data structures and algorithms in problem solving.
	CO3	Know the need and types of operating system, database systems.
	CO4	Understand the significance of networks, internet, WWW and cyber security.
	CO5	Understand Autonomous systems, the application of artificial intelligence.
I YEAR II SEMESTER		
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace transforms of functions
	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6HS01 English for skill Enhancement	CO1	Develop language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/compose clearly and creatively, and adjust writing style appropriately



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		to the content, the context, and nature of the subject.
	CO5	Develop language components to communicate effectively informal and informal situations
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6EE60 Basic Electrical Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources.
	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6EC03 Electronic Devices and Applications	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Know the applications of various devices.
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
A6HS02 English Language and Communication skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.


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A6CS04 Python Programming Lab	CO1	Write, test, and debug simple Python programs.
	CO2	Implement Python programs with conditionals and loops.
	CO3	Develop Python programs step-wise by defining functions and calling them.
	CO4	Use Python lists, tuples, dictionaries for representing compound data.
	CO5	Read and write data from/to files in Python
A6EC04 Introduction To Internet Of Things	CO1	Able to demonstrate various sensor interfacing using Visual Programming Language.
	CO2	Able to analyze various Physical Components.
	CO3	Able to demonstrate Wireless Control of Remote Devices.
	CO4	Able to design and develop Mobile Application which can interact with Sensors
A6BS11 Environmental Science	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life.
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection.
	CO3	Study the impact of conservation of biodiversity.
	CO4	Analyze the reasons for environmental pollution.
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future.
II YEAR I SEMESTER		
A6BS03 Computer Oriented Statistical Methods	CO1	Evaluation of Probability distribution of Discrete and Continuous random variables and their moments.
	CO2	Apply the concept of correlation and regression to find covariance and Sampling distribution
	CO3	Evaluate the given data for appropriate test of hypothesis for Large samples.
	CO4	Evaluate the given data for appropriate test of hypothesis for small samples and one way ANOVA


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	CO5	Recognize if a given stochastic system with finite number of states is a Markov chain or not and also identify classes of states in Markov chains and Characterize the states.
A6CS08 Discrete Mathematics	CO1	Analyze and examine the validity of argument by using propositional and predicate calculus
	CO2	Apply basic counting techniques to solve the combinatorial problems
	CO3	Apply sets relations and digraphs to solve applied problems
	CO4	Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation.
	CO5	Use the basic concepts of graph theory and some related theoretical problems
A6IT02 Object Oriented Programming Through Java	CO1	Use object oriented programming concepts to solve real world problems.
	CO2	Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally).
	CO3	Use multithreading concepts to develop inter process communication.
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
	CO5	Solve real world problems using Collections
A6CS09 Database Management Systems	CO1	Recognize the basic concepts and the applications of database systems.
	CO2	Design ER-models to represent simple database application scenarios and convert ER-Model to Relational Model.
	CO3	Demonstrate SQL queries and apply Normalization techniques.
	CO4	Be acquainted with the basics of transaction processing and concurrency control.
	CO5	Familiarity with database storage structures and access techniques
A6HS08 Business Economics And Financial Analysis	CO1	Understand the market dynamics namely, demand and supply, demand forecasting, elasticity of demand and supply, pricing methods and pricing in different market structures.
	CO2	Gain an insight into how production function is carried out to achieve least


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		cost combination of inputs and cost analysis.
	CO3	Analyze how capital budgeting decisions are carried out.
	CO4	Understanding the framework for both manual and computerized accounting process
	CO5	Know how to analyze and interpret the financial statements through ratio analysis.
A6IT03 Object Oriented Programming Through Java Lab	CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.
	CO2	Understand the use of different exception handling mechanisms and concept of multithreading for robust and efficient application development.
	CO3	Understand and implement concepts on file streams and operations in java programming for aa given application programs.
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver).
A6CS10 Database Management Systems Lab	CO1	Apply the basic concepts of Database Systems and Applications.
	CO2	Develop an ER model for a given database.
	CO3	Use the basics of SQL and construct queries using SQL in database creation and interaction.
	CO4	Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
	CO5	Analyze and Select storage and recovery techniques of database system.
	CO6	Develop Procedures, Cursors, and Triggers in database system.
A6IT04 Skill Development Course	CO1	To familiarize with the syntax and semantics of HTML
	CO2	To learn the usage of CSS for styling web pages.
	CO3	To use Javascript for creating dynamic and interactive web content like applications and browsers.
	CO4	To use bootstrap for enabling responsive development of mobile-first



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		websites
	CO5	To develop a complete website by using HTML, CSS, JavaScript and bootstrap with some case studies
A6HS05 Gender sensitization	CO1	Students will have developed a better understanding of important issues related to gender in contemporary India.
	CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
	CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
	CO5	Men and women students and professionals will be better equipped to work and live together as equals.
	CO6	Students will develop a sense of appreciation of women in all walks of life. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
II B.TECH II SEMESTER		
A6CS28 Digital Electronics And Computer Organization	CO1	Able to perform the conversion among different number systems.
	CO2	Able to design combinational and sequential logic circuits
	CO3	Able to understand different computer instructions
	CO4	Identify basic components and design of the CPU
	CO5	Compare various types of IO mapping and memory mapping techniques
A6CS11 Operating Systems	CO1	Analyze the different structures and services of operating system.
	CO2	Analyze various algorithms used for OS services with respect to defined/chosen criteria.
	CO3	Solve the resource allocation and sharing problems.
	CO4	Assess different methods to solve OS problems.
	CO5	Analyze the memory management approaches of operating systems.
A6IT05	CO1	Choose appropriate process model depending on the user requirements


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Software Engineering And Design	CO2	Demonstrate the principles and requirements at various phases of software development
	CO3	Model structural UML Diagrams.
	CO4	Model behavioural UML Diagrams.
	CO5	Distinguish different testing strategies
A6CS15 Design Analysis Algorithms And Of	CO1	Identify various Time and Space complexities of various algorithms
	CO2	Understand Tree Traversal method and Greedy Algorithms
	CO3	Apply Dynamic Programming concept to solve various problems
	CO4	Apply Backtracking, Branch and Bound concept to solve various problems
	CO5	Implement different performance analysis methods for non deterministic algorithms
A6IT06 Data Structures Through Java	CO1	Write the algorithms for various operations on list using arrays and linked list and analyze the time complexity of its operations.
	CO2	Apply linear data structures like stack and queue in problem solving and also learn the construction of heaps.
	CO3	Demonstrate various searching and sorting techniques and compare their computational complexities in terms of space and time and also learn the concepts of hashing techniques.
	CO4	Construct and analyze different search trees.
	CO5	design graphs and their traversals and also learn text processing algorithms
A6IT07 Data Structures Through Java Lab	CO1	Ability to select the data structures that efficiently model the information in a problem.
	CO2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
	CO3	Implement and know the application of algorithms for sorting and pattern matching.
	CO4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and B-trees.
	CO5	Design and analysis of text processing algorithms
A6IT08	CO1	To write the problem statement for the given system.



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Software Engineering And Design Lab	CO2	To capture the requirements specification for an intended software system using DFD & use case Modeling.
	CO3	To draw the structural UML diagrams for the given specification
	CO4	To draw the behavioral UML diagrams for the given specification
	CO5	To perform Different testing Methodologies on the given specification.
A6HS06 Constitution Of India	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution.
	CO2	List fundamental rights and fundamental duties of Indian citizens.
	CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
	CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels.
	CO5	Explain the functions and responsibilities of election commission of India and union public service commission



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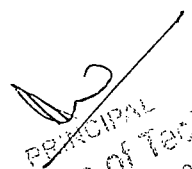
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Course Code & Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6CS02 Programming for problem solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems
	CO4	Use Strings and structures to formulate algorithms and programs
	CO5	Use FILE to perform read and write operations
A6HS01 English for Skill Enhancement	CO1	Will be able to acquire language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech
	CO4	Write/ compose clearly and creatively, and adjust writing style appropriately


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		to the content, the context, and nature of the subject
	CO5	Use language components to communicate effectively in formal and informal situations
A6BS11 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials
	CO4	Predict potential applications of chemistry and practical utility in order to become good engineers and Entrepreneurs
A6CS03 Programming for problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs
	CO3	Implement real time applications using the concept of array, pointers, functions and structures
	CO4	Solve real world problems using matrices, searching and sorting
A6SH02 English Language and Communication Skill Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm
	CO3	Obtain the consistent accent and intelligibility in pronunciation
	CO4	Neutralize the impact of dialects
	CO5	Apply language appropriately public speaking, group discussions and interviews
A6EC04 Introduction to Internet of Things	CO1	Able to demonstrate various sensor interfacing using Visual Programming Language
	CO2	Able to analyze various Physical Components
	CO3	Able to demonstrate Wireless Control of Remote Devices


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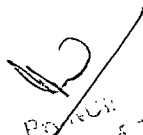

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	CO4	Able to design and develop Mobile Application which can interact with Sensors
A6IT01 Basics of Information Technology	CO1	Know the working principles of functional units of a basic Computer
	CO2	Understand program development, the use of data structures and algorithms in problem solving
	CO3	Know the need and types of operating system, database systems
	CO4	Understand the significance of networks, internet, WWW and cyber security
	CO5	Understand Autonomous systems, the application of artificial intelligence
A6BS06 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics forengineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energygeneration
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communicationtechnology
	CO5	Comprehend the knowledge of quantum physics in quantum computation for secure information technology
A6EE60 Basic Electrical and Electronics Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources
	CO2	Explain the working of DC machines and solve the numerical problems
	CO3	Explain the working of AC electrical machines and solve the numerical problems
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers
	CO5	Analyze the different configurations of Transistors and obtain its characteristics
A6ME02	CO1	Understand various commands and create drawing in AutoCAD
	CO2	Construct various engineering curves and know their importance


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Engineering Drawing	CO3	Prepare orthographic projections of objects by visualizing them in different positions
	CO4	Solve the problem of projections of planes and solids in different positions
	CO5	Construct the isometric view into orthographic views and vice versa
A6EC03 Electronic Devices and Applications	CO1	Acquire the knowledge of various electronic devices and the its use on real life
	CO2	Know the applications of various devices
	CO3	Acquire the knowledge about the role of special purpose devices and their applications
A6BS07 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor
	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensionalpendulum
A6CS04 Python Programming Lab	CO1	Write, test, and debug simple Python programs
	CO2	Implement Python programs with conditions and loops
	CO3	Develop Python programs step-wise by defining functions and calling them
	CO4	Use Python lists, tuples, dictionaries for representing compound data
	CO5	Read and write data from/to files in Python
A6ME04	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes


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Engineering Work Shop	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands
	CO4	Apply basic electrical engineering knowledge for house wiring practice
	CO5	Learn the safety precautions for various operations in basic trades
A6BS13 Environmental Sciences	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection
	CO3	Study the impact of conservation of biodiversity
	CO4	Analyze the reasons for environmental pollution
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future
A6BS03 Computer Oriented Statistical Methods	CO1	Evaluation of Probability distribution of Discrete and Continuous random variables and their moments
	CO2	The concept of correlation and regression, covariance and sampling distribution
	CO3	Evaluation of the given data for appropriate test of hypothesis for large samples
	CO4	Evaluation of the given data for appropriate test of hypothesis for small samples and one way ANOVA
	CO5	To learn the concept of Markov chain, transition probabilities in discrete & continuous time and Stochastic simulation techniques
A6CS08 Discrete	CO1	Analyze and examine the validity of argument by using propositional and predicate calculus
	CO2	Apply basic counting techniques to solve the combinatorial problems
	CO3	Apply sets relations and digraphs to solve applied problems
	CO4	Solve the given recurrence relation using different methods such as substitution, Generating function and characteristics roots equation

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Mathematics	CO5	Use the basic concepts of graph theory and some related theoretical problems
A6CS05 Data Structures	CO1	Use arrays, pointers and structures to formulate algorithms and programs.
	CO2	Design and implement applications of Linked List.
	CO3	Design and implement Stack ADT using Array and Linked List.
	CO4	Design and implement Queue ADT using Array and Linked List.
	CO5	Solve problems involving graphs and trees.
	CO6	Analyze searching and sorting techniques based on time and space complexity.
A6CS09 Database Management Systems	CO1	Recognize the basic concepts and the applications of database systems
	CO2	Design ER-models to represent simple database application scenarios and convert ER-Model to Relational Model
	CO3	Demonstrate SQL queries and apply Normalization techniques
	CO4	Summarize the usage of different concurrency control protocols
	CO5	Demonstrate the role of DBA using DCL commands and Apply PL/SQL to interact with database. Also, to summarize the usage of tree-based indexing
A6HS08 Business Economics and Financial Analysis	CO1	Gain the conceptual knowledge on Business Economics and practical applications of Demand and Supply viz. Laws, Types, Elasticity, and Forecasting and Equilibrium
	CO2	Familiarize the concepts and applications related to Production and Cost of a firm
	CO3	Assess the features of different Market Structures and forms of Business Organizations existing in the modern business
	CO4	Analyze how Capital Budgeting decisions are carried out
	CO5	Elaborate the concepts and principles of Financial Accounting & interpret financial statements through ratio analysis
A6CS06 Data Structures Lab	CO1	Use appropriate data structure for given problem
	CO2	Use compilers include library functions, debuggers and trouble shooting
	CO3	Execute write programs in C to implement various types Linked Lists


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	CO4	Execute programs using data structures such as arrays, linked lists to implement stacks
A6CS10 Database Management Systems Lab	CO1	Apply the basic concepts of Database Systems and Applications
	CO2	Develop an ER model for a given database
	CO3	Use the basics of SQL and construct queries using SQL in database creation and interaction
	CO4	Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system
	CO5	Analyze and Select storage and recovery techniques of database system
	CO6	Develop Procedures, Cursors, and Triggers in database system
A6IT04 Skill Develop Course	CO1	Apply basic HTML for creating websites
	CO2	Apply CSS for styling web pages
	CO3	Demonstrate the usage of JavaScript for creating dynamic and interactive web content
	CO4	Use Bootstrap for front-end development of creating websites and web apps
	CO5	Develop an interactive website using, HTML, CSS, JavaScript and bootstrap
A6HS05 Gender Sensitization	CO1	Develop a better understanding of important issues related to gender in contemporary India
	CO2	Sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender
	CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it
	CO4	Men and Women students and professionals will be better equipped to work and live together as equals
	CO5	Create a sense of appreciation of women in all walks of life
A6CS28 Digital Logic	CO1	Able to perform the conversion among different number systems
	CO2	Able to design combinational and sequential logic circuits
	CO3	Able to understand different computer instructions


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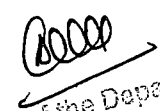
Design and Computer Organization	CO4	Identify basic components and design of the CPU
	CO5	Compare various types of IO mapping and memory mapping techniques
A6CS15 Design and Analysis of Algorithms	CO1	Identify various Time and Space complexities of various algorithms
	CO2	Understand Tree Traversal method and Greedy Algorithms
	CO3	Apply Dynamic Programming concept to solve various problems
	CO4	Apply Backtracking, Branch and Bound concept to solve various problems
	CO5	Implement different performance analysis methods for non-deterministic algorithms
A6IT02 Object Oriented Programming Through Java	CO1	Use object oriented programming concepts to solve real world problems
	CO2	Demonstrate the user defined exceptions by exception handling keywords (try, catch, throw, throws and finally)
	CO3	Use multithreading concepts to develop inter process communication
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver)
	CO5	Build the internet-based dynamic applications using the concept of applets
A6CS13 Software Engineering	CO1	Understand software development life cycle and select appropriate model suited for diverse software application
	CO2	Analyze the customer's requirements for a project to be developed and formulate the software requirements document
	CO3	Conceptualize the system through design with emphases on architectural modeling and user
	CO4	Classify software testing strategies and recommend testing techniques during the construction of software
	CO5	Examine the application of metrics and software tools during software development
A6CS11	CO1	Analyze the different structures and services of operating system
	CO2	Analyze various algorithms used for OS services with respect to defined/chosen criteria
	CO3	Solve the resource allocation and sharing problems

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Operating Systems	CO4	Assess different methods to solve OS problems
	CO5	Analyze the memory management approaches of operating systems
A6IT03 Object Oriented Programming Through Java Lab	CO1	Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity
	CO2	Understand the use of different exception handling mechanisms and concept of multithreading for robust and efficient application development
	CO3	Understand and implement concepts on file streams and operations in java programming for a given application programs
	CO4	Develop java application to interact with database by using relevant software component (JDBC Driver)
A6CS12 Operating Systems Lab	CO1	Write and use the Shell Scripts in managing Linux Environment
	CO2	Construct C Scripts to handle the File system in Linux
	CO3	Simulate and implement operating system concepts such as scheduling, deadlock management
	CO4	Implement operating system concepts such as file management and memory management
	CO5	Able to implement C programs using Unix system calls
A6HS06 Constitution of India	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution
	CO2	List fundamental rights and fundamental duties of Indian citizens
	CO3	Identify the division of legislative, executive and financial powers between the union and state governments
	CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels
	CO5	Explain the functions and responsibilities of election commission of India and union public service commission


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Department of Electrical and Electronics Engineering

Regulation: MLR22 (B.Tech)

Course Code & Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6HS01 English for skill Enhancement	CO1	Develop language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/compose clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
	CO5	Develop language components to communicate effectively in informal and formal situations
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6EE62 Basic Electrical	CO1	Evaluate current and voltage values in resistive circuits with independent sources.

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Engineering	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6HS02 English Language and Communication skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.
A6BS14 Engineering Chemistry Lab	CO1	Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
	CO2	Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
	CO3	Students are able to prepare polymers like bakelite and nylon-6,6.
	CO4	Estimations saponification value, surface tension and viscosity of lubricant oils.
A6EE63 Basic Electrical Engineering Lab	CO1	Analyze the circuit using Kirchhoff's law and Resonance of series and parallel network simplification theorems.
	CO2	Evaluate the efficiency of single-phase alternating quantities.
	CO3	Evaluate the efficiency and critical speed and critical field resistance of DC Machine
	CO4	Evaluate the Torque-Slip characteristics of 3 phase Induction Motor
A6ME04 Engineering Work	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.

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Shop	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6BS11 Environmental Science	CO1	Identify the consequences of human actions on the web of life, global economy and quality of human life.
	CO2	Evaluate the strategies for scientific, social, economic and legal environmental protection.
	CO3	Study the impact of conservation of biodiversity.
	CO4	Analyze the reasons for environmental pollution.
	CO5	Assess the environmental impact of air, water, biological and socio-economical aspects and risk assessment towards sustainable future.
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace transforms of functions
	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for



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		secure information Technology
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.
	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.
A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6EC01 Electronic Devices and Circuits	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Understand the importance of application of diodes.
	CO3	Know the applications of Bipolar Junction Transistor.
	CO4	Analyze the concept on Junction Field Effect Transistor.
	CO5	Acquire the knowledge about the role of special purpose devices and their applications.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.



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	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6CS03 Programming for Problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
A6EC02 Electronic Devices and Circuits Lab	CO1	Acquire the knowledge of various semiconductor devices and their use in real life.
	CO2	Design aspects of biasing and keep them in active region of the device for functional circuits
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
Electrical Circuits – II (A6EE04)	CO1	Analyze the star and delta connected circuits
	CO2	Understand the response of network theorems with DC & AC excitations
	CO3	Discuss the concept of network functions and calculate network parameters.
	CO4	Understand the design of various types of network topologies
	CO5	Analyze the three phase circuits
	CO1	Understand the operation and characteristics of various electronic devices.

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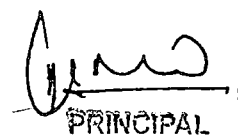
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Electronic Devices And Circuits(A6EC01)	CO2	Analyze few applications of electronic devices.
	CO3	Understand the importance of biasing and stabilization of transistors.
	CO4	Design and Analyze the small signal model for BJT and FET amplifiers.
	CO5	Study operation and characteristics of Rectifiers with filters.
Electrical Machines – I (A6EE05)	CO1	Estimate various types of losses, efficiency and performance of DC Machines.
	CO2	Estimate the behavior of generator using parallel operation for power generation.
	CO3	Find losses and efficiency by various testing technique of DC machines.
	CO4	Estimate various types of losses, efficiency and performance of single phase transformers
	CO5	Analyze the operation of various three phase transformers
Electromagnetic Fields (A6EE06)	CO1	Analyze concept of electrostatic field intensity and electric potential.
	CO2	Apply polarization of dielectrics and the behavior of conductors and dielectrics in electric field.
	CO3	Analyze the concept of magnetic field intensity and flux density in various media
	CO4	Evaluate forces in magnetic fields according to laws of electromagnetic induction.
	CO5	Analyze concept of electrostatic field intensity and electric potential.
Electrical Measurement And Instruments (A6EE11)	CO1	Understand the basic definition of electrical instruments.
	CO2	Calculate the value of error in an instrument and measure the accuracy.
	CO3	Find the value of unknown resistance by using bridge circuits.
	CO4	Measure the power in a three-phase circuit.
	CO5	Understand the working of energy meter and calculate the energy consumed
Electronic Devices And Circuits Lab (A6EC02)	CO1	Calculate various parameters of semi conductor devices from their characteristics.
	CO2	Know the role of semi conductor devices in real time applications.
	CO3	Calculate h-parameters of BJT under various configurations.
	CO4	Compute frequency response of various amplifiers.
Electrical Machines Lab – I (A6EE07)	CO1	Estimate various types of losses, efficiency and performance of DC Machines.
	CO2	Estimate the behavior of generator using parallel operation for power generation.
	CO3	Find losses and efficiency by various testing technique of DC machines.
	CO4	Analyze the speed control of DC Machines.
Electrical Simulation	CO1	Analyze the electrical circuits using network theorems.



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tools Laboratory (A6EE08)	CO2	Evaluate the resonance of series and parallel RLC circuits
	CO3	Evaluate the Self and mutual inductance of magnetically coupled coils
	CO4	Evaluate the Active and Reactive power of three phase system
Gender Sensitization (A6HS05)	CO1	Develop a better understanding of important issues related to gender in contemporary India.
	CO2	Sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender
	CO3	Attain a finer grasp of how gender discrimination works in our society and how to counter it
	CO4	Men and Women students and professionals will be better equipped to work and live together as equals
	CO5	Create a sense of appreciation of women in all walks of life
Digital System Design (A6EC12)	CO1	Understand the basic building blocks of logic design
	CO2	Realize switching circuits i.e. digital circuits using basic building blocks of logic design
	CO3	Apply the concepts of basic building blocks of logic design to building blocks of logic design
	CO4	Analyze the behaviour of digital circuits designed for real time applications
	CO5	Evaluate the behaviour of digital circuits described for real time applications.
Electrical Machines – II (A6EE09)	CO1	Estimate various types of losses, efficiency and performance of AC Machines.
	CO2	Estimate the behavior of AC machines using no load and blocked rotor tests
	CO3	Find losses and efficiency by various testing technique of AC machines.
	CO4	Estimate various types of losses, efficiency and performance of single phase AC Machines.
	CO5	Analyze the operation and characteristics of various synchronous motors
Power Systems – I (A6EE10)	CO1	Analyze the concept of various methods of electrical energy production
	CO2	Application of various power plants based on classification and use them from economic and operational point of view
	CO3	Evaluate the RLC parameters of a transmission line
	CO4	Evaluate the regulation and efficiency of short, medium, long transmission lines
	CO5	Analyze the concept of sag and tension in OH lines
Digital Logic Design Lab(A6EC16)	CO1	Understand the basic building blocks of logic design
	CO2	Realize switching circuits i.e. digital circuits using basic building blocks of logic design
	CO3	Apply the concepts of basic building blocks of logic design
	CO4	Analyze the behaviour of digital circuits designed for real time applications



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Electrical Machines Lab – II (A6EE12)	CO1	Estimate various types of losses, efficiency and performance of AC Machines.
	CO2	Estimate the behavior of AC machines using no load and blocked rotor tests
	CO3	Find losses and efficiency by various testing technique of AC machines.
	CO4	Estimate various types of losses, efficiency and performance of single phase AC Machines.
Electrical Measurements And Instrumentation Lab (A6EE13)	CO1	Able to know the basic electrical instruments.
	CO2	Calculate the value of error in an instrument and measure the accuracy.
	CO3	Find the value of unknown resistance by using bridge circuits.
	CO4	Measure the power in a three phase circuit.



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Department Of Mechanical Engineering

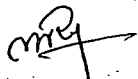
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Course Code & Name	CO Number	Course Outcomes
A6ME03 Engineering Workshop Practices	CO1	Assemble different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes
	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, House wiring, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice
	CO5	Learn the safety precautions for various operations in basic trade operations
A6ME01 Engineering Graphics	CO1	Explain various commands and create drawing in AutoCAD
	CO2	Sketch the various curves used in engineering applications
	CO3	Prepare orthographic projections of lines, planes by visualizing them in different positions
	CO4	Solve the problem of projections of solids and development of surfaces for industrial needs.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6ME05 Engineering Mechanics	CO1	Evaluate different system of forces acting on rigid body under static equilibrium.
	CO2	Analyze the frictional forces existing at different contact surfaces of the rigid body under static equilibrium
	CO3	Determine the centre of gravity and moment of inertia of simple and composite bodies.
	CO4	Analyze linear and rotary motion of particle or rigid bodies using Kinematic & Kinetic Equations.
	CO5	Evaluate solutions for mechanics problems by using virtual work method and also able to distinguish basics of mechanical vibrations
A6ME06 Elements Of Mechanical Engineering Design	CO1	Understand the working, usage and applications of different measuring instruments
	CO2	Select suitable material fit for the purpose
	CO3	Identify design principles from an engineering perspective
	CO4	Devise visual design using conceptualization techniques
	CO5	Choose an appropriate reverse engineering technique for the component design
A6EE62 Basic Electrical	CO1	Evaluate current and voltage values in resistive circuits with independent sources.


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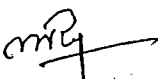

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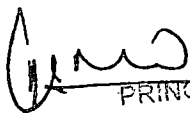
Engineering	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6BS05 Probability, Statistics and Complex Analysis	CO1	Evaluation of Probability distribution of Discrete and Continuous random
	CO2	Evaluation of the given data for appropriate test of hypothesis for large samples.
	CO3	Evaluation of the given data for appropriate test of hypothesis for small samples
	CO4	Evaluation of Limit, continuity, differentiability, analyticity and finding harmonic function
	CO5	Evaluation of the line integrals along piece wise smooth paths & Express the given complex function as a power series using Taylor's series, Maclaurin's series, Residues and improper integrals
A6ME09 Strength of Materials	CO1	Analyze various stresses, strains and deformations induced in the body due to application of various loads
	CO2	Evaluate and sketch the variation of shear force and bending moment along the length of different types beams with various support conditions.
	CO3	Evaluate the resistance of various beam sections under bending and shear loads
	CO4	Analyze the resultant effect of principal stresses induced in the body and can determine slope and deflection for various beams under different loading and boundary conditions
	CO5	Analyze the stresses developed and deformation of thin and thick cylinder due to internal Pressure.
A6ME10 Material Science and Metallurgy	CO1	Explain basic concepts of crystal structures and their imperfections and also draw crystal points, directions and planes in cubic unit cells.
	CO2	Interpret various phases present in the binary phase diagrams of alloys and also calculate mass fraction of phases
	CO3	Recommend heat treatment processes for the desired changes in properties of steels
	CO4	Differentiate ferrous and non-ferrous alloys in terms of their properties and applications. Classify and explain polymers, ceramics and composites in terms of their properties and applications
A6ME12 Manufacturing Processes	CO1	Explain casting, casting methods, preparation of patterns and castings
	CO2	Enumerate various welding & cutting techniques.
	CO3	Explain hot working, cold working, extrusion, rolling and forging processes.
	CO4	Select equipment for various deformation processes
	CO5	Demonstrate various methods used for producing plastic shapes.
A6ME14	CO1	Apply the first law of thermodynamics for simple open and closed systems


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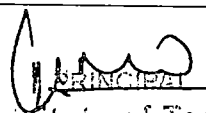
Thermodynamics		under steady and unsteady conditions
	CO2	Analyze the second law of thermodynamics to open and closed systems and calculate entropy.
	CO3	Summarize the thermodynamic properties of gases and steam and apply it to related system analysis
	CO4	Calculate the properties of gas mixtures and apply it to related system analysis.
	CO5	Evaluate the properties of moist air and its use in psychometric processes.
A6ME13 Manufacturing Processes Lab	CO1	Design and manufacture different patterns
	CO2	Prepare various castings.
	CO3	Operate arc welding, gas welding and resistance welding equipment.
	CO4	Perform operations such as blanking, piercing, deep drawing, extrusion, bending and other operations.
	CO5	Use injection moulding and blow moulding equipment to produce plastic products such as water bootle, water bottle caps etc.
A6ME11 Strength of Materials and Material Science and Metallurgy Lab	CO1	Analyze mechanical behaviour of test sample under tensile, compressive, torsion and impact load conditions
	CO2	Find deflection of simply supported and cantilever beams with different cross sections/materials
	CO3	Calculate stiffness and modulus of rigidity of helical coil spring
	CO4	Identify the various phases depicted in the microstructure of pure metals, ferrous and nonferrous alloys.
	CO5	Analyze the significance of cooling rate in the formation of fine grains using Jominy end quench test.
A6ME15 Python Lab for Mechanical Applications	CO1	Apply conditional statement, loops condition and functions in python program
	CO2	Solve mathematical and mechanical problems using python program
	CO3	Plot various type of chart using python program.
	CO4	Analyze the mechanical problem using python program
	CO5	Illustrate programs on various python libraries such as numpy, pandas and matplotlib.
A6HS05 Gender Sensitization	CO1	Students will have developed a better understanding of important issues related to gender in contemporary India.
	CO2	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film
	CO3	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
	CO4	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
	CO5	Men and women students and professionals will be better equipped to work and live together as equals.
	CO6	Students will develop a sense of appreciation of women in all walks of life.


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		Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence
A6EE60 Basic Electrical and Electronics Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources.
	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6ME16 Fluid Mechanics and Hydraulic Machines	CO1	Describe the basic principles of fluid mechanics
	CO2	Identify various types of flows and formulate their governing equations.
	CO3	Analyze the losses in pipe flows with the concepts of flow through pipes.
	CO4	Evaluate hydrodynamic forces of jet striking different vanes from various angles
	CO5	Design the working proportions of hydraulic turbines and pumps.
A6ME18 Thermal Engineering - I	CO1	Demonstrate the basic Cycles and operation of IC engines
	CO2	Analyse the combustion process and also how it does affect the performance of the IC engines
	CO3	Describe procedures of testing and analyses the emission of IC engines.
	CO4	Apply the modern developments and alternate fuels on IC engines.
	CO5	Formulate and perform the maintenance and operation of Air compressors.
A6ME19 Theory of Machines - I	CO1	Outline basic concepts and principles of mechanisms for doing useful work.
	CO2	Solve velocity and acceleration in different mechanisms
	CO3	Analyze straight line and steering gear mechanisms
	CO4	Select the gears and gear trains for transmission of motion
	CO5	Design cam profile for different follower motions
A6ME20 Design of Machine Elements-I	CO1	Explain various types of design, various considerations for design and theories of failure
	CO2	Design riveted, welded and bolted joints.
	CO3	Design keys, cotter and knuckle joints
	CO4	Design shafts and shaft couplings
	CO5	Design Mechanical Springs.
A6EE61 Basic Electrical and Electronics Engineering Lab	CO1	To understand the concepts of electrical circuits and its components
	CO2	To study and understand the different types of DC/AC machines and Transformers.
	CO3	To understand the concepts of diodes & transistors.
	CO4	To impart the knowledge of various transistors configurations, characteristics and applications.
A6ME17 Fluid Mechanics	CO1	Develop procedure for standardization of experiments
	CO2	Calibrate flow discharge measuring devices used in pipes

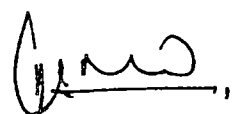

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and Hydraulic Machines Lab	CO3	Determine the major and minor losses in a given pipe.
	CO4	Prove that the total head at any point along the fluid flow is same.
	CO5	Test the performance of pumps and turbines.
A6ME21 Computer Aided Machine Drawing Lab	CO1	Understand and apply Indian and international standards while drawing machine components.
	CO2	Illustrate various machine elements and simple parts in drawings.
	CO3	Construct the drawing of riveted joints, couplings and bearings.
	CO4	Discover the engine part drawings for apt assembled views
	CO5	Select the elements of machine parts for appropriate assembled views. .
A6HS06 Constitution of India	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution
	CO2	List fundamental rights and fundamental duties of Indian citizens.
	CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
	CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels.
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Department Of Mechanical Engineering

Regulation: MLR22(M.Tech-TE)

Course Code & Name	Course Outcomes
B52101 ADVANCED THERMODYNAMICS	<ol style="list-style-type: none"> 1. Explain basic thermodynamic concepts and laws 2. Describe the concepts entropy and exergy and their use in analyses of thermal energy systems 3. Analyze power plants, refrigeration plants and thermal/chemical installations 4. Evaluate means for minimizing exergy losses in selected processes 5. Use advanced thermodynamics on a research case
B52103ADVANCED FLUID MECHANICS	<ol style="list-style-type: none"> 1. Understanding the concept of fluid and the models of fluids. 2 2. Understanding the basic physical meaning of general equations. 3. Understanding the concept of stream function and potential function. 4. Ability to derive the equation for viscous flow, including laminar flow and turbulent flow. 5. Ability to address such problems in engineering, and to solve the problems
RESEARCH METHODOLOGY & IPR	<ol style="list-style-type: none"> 1. Understand research problem formulation. 2. Analyze research related information 3. Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity. 4. Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
ADVANCED THERMAL ENGINEERING LAB	<ol style="list-style-type: none"> 1. Examine the performance parameters of internal combustion engines 2. Analyze the performance and working of refrigeration and air conditioning systems. 3. Analyze performance of heat pipe. 4. Analyze performance characteristics of solar energy equipment. 5. Determine dryness fraction of steam using separating and throttling calorimeter.
Advanced Fluid Mechanics Lab	<ol style="list-style-type: none"> 1 Describe the measurement techniques of fluid mechanics and its appropriate application. 2 Interpret the results obtained in the laboratory for various experiments. 3 Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and

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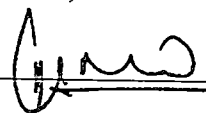
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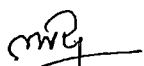
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	sustainable conclusions. 4 Write a technical laboratory
ADVANCED HEAT AND MASS TRANSFER	1. Mathematically model heat and mass transfer and fluid flow problems and to be able to apply different boundary conditions 2 Solve the simple heat and mass transfer and fluid flow problems using analytical methods and appreciate the need of numerical methods to solve complicated problems 3 Apply semi empirical formulae to determine the heat transfer parameters and use different techniques, viz., experimental, analytical and semi empirical methods to design the thermal systems.
COMPUTATIONAL FLUID DYNAMICS	1. Differentiate between different types of Partial Differential Equations and to be able to apply appropriate numerical techniques 2 Solve the simple heat transfer and fluid flow problems using different numerical techniques 3 Understand and to appreciate the need for validation of numerical solution
ADVANCED HEAT TRANSFER LAB	1. Determine the thermal property of the solids using energy balance and also using unsteady state analysis 2. Determine the heat transfer coefficient of air in free and forced convective conditions 3. Determine the performance of Recuperative Type heat exchangers 4. Determine the drag acting on different surfaces and its effects on pumping power 5. Determine performance of thermal equipment like Heat Pipe
COMPUTATIONAL METHODS LAB	1. Analyze flow in axial turbine stage, mixing tube, mixing vessel 2. Draw 2-D structured grid generation using Salome.. 3. Draw 3-D unstructured grid generation using Salome. 4. Solve the simple heat transfer and fluid flow problems 5. Understand and to appreciate the need for validation of numerical solution
PROFESSIONAL ELECTIVE – I FUELS & COMBUSTION	Understand the concepts of combustion phenomena in energy conversion devices 2. Apply the knowledge of adiabatic flame temperature in the design of combustion devices 3. Identify the phenomenon of flame stabilization in laminar and turbulent flames 4. Analyze the pollution formation mechanisms in combustion of solid, liquid and gaseous fuels
PROFESSIONAL ELECTIVE – I & ELECTRIC HYBRID VEHICLES	. Choose the appropriate source of energy for the hybrid electric vehicle based on driving cycle. 2. Analyze the power and energy need of the various hybrid electric vehicle and Measure and Estimate the energy consumption of the Hybrid Vehicles 3. Evaluate energy efficiency of the vehicle for its drive trains 4. Elaborate the types of storage systems such as battery based, fuel cell based etc. 5. Explain the types of Driving Cycles, Fuel Cell EV, Solar Powered Vehicles



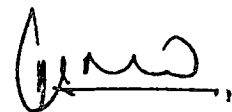

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PROFESSIONAL ELECTIVE - I EXPERIMENTAL METHODS IN THERMAL ENGINEERING	1. Understand the concepts of errors in measurements, statistical analysis of data, regression analysis, correlation and estimation of uncertainty. 2. Understand conceptual development of zero, first and second order systems. 3. Describe the working principles in the measurement of field and derived quantities. 4. Analyze sensing requirements for measurement of thermo-physical properties, radiation properties of surfaces, and vibration
PROFESSIONAL ELECTIVE - II ADVANCED I.C. ENGINES	Apply thermodynamic analysis to IC engines and describe combustion phenomena in spark ignition and compression ignition engines. 2. Describe the working of major systems used in conventional and modern engines. 3. Summarize the methods used to improve engine performance and estimate performance parameters. 4. Describe engine emission control techniques and implement viable alternate fuels. 5. Analyze the heat transfer in engines and modern trends
PROFESSIONAL ELECTIVE - II GAS TURBINES & JET PROPULSION	Apply thermodynamic analysis to IC engines and describe combustion phenomena in spark ignition and compression ignition engines. 2. Describe the working of major systems used in conventional and modern engines. 3. Summarize the methods used to improve engine performance and estimate performance parameters. 4. Describe engine emission control techniques and implement viable alternate fuels. 5. Analyze the heat transfer in engines and modern trends



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CO2	List fundamental rights and fundamental duties of Indian citizens.
CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
CO4	Understand the working of Indian democracy, its institutions and processes at the local, state and union levels
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Laxman Reddy Avenue, Dundigal, Hyderabad - 500 043, Telangana, India

Department Of Computer Science and Engineering-Data Science

Regulation: MLR22


Course Code&Name	CO Number	Course Outcomes
A6BS01 Linear Algebra and Calculus	CO1	Solve the system of linear equations using rank of the matrices.
	CO2	Find the Eigen values and Eigen vectors of a matrix
	CO3	Identify the different types of differential equations and solve them using appropriate methods.
	CO4	Evaluate the improper integrals using beta and gamma functions.
	CO5	Find the Maxima and Minima of several variable functions.
A6BS07 Applied Physics	CO1	Analyze the microscopic properties of materials using principles of quantum physics for engineering applications
	CO2	Explain the behavior of different electronic materials based on the concepts of band theory
	CO3	Apply the knowledge of Solar PV cells for choice of materials in efficient alternate energy generation
	CO4	Gain the knowledge of production of laser and usage of fibers in fiber optic communication
	CO5	Comprehend the knowledge of quantum physics in quantum computation for secure information Technology
A6CS02 Programming for Problem Solving	CO1	Apply algorithmic thinking to understand, define and solve problems
	CO2	Develop computer programs using programming constructs and control structures and to use arrays to develop C programs
	CO3	Decompose a problem into functions to develop modular reusable code and to use pointers to solve complex problems.
	CO4	Use Strings and structures to formulate algorithms and programs.
	CO5	Use FILE to perform read and write operations.

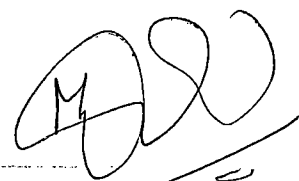
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A6ME02 Engineering Drawing	CO1	Understand various commands and create drawing in AutoCAD.
	CO2	Construct various engineering curves and know their importance.
	CO3	Prepare orthographic projections of objects by visualizing them in different positions.
	CO4	Solve the problem of projections of planes and solids in different positions.
	CO5	Construct the isometric view into orthographic views and vice versa.
A6CS03 Programming for Problem Solving Lab	CO1	Solve simple mathematical problems using Flowgorithm.
	CO2	Correct syntax errors as reported by the compilers and logical errors encountered at run time Develop programs by using decision making and looping constructs.
	CO3	Implement real time applications using the concept of array, pointers, functions and structures. Solve real world problems using matrices, searching and sorting.
A6BS08 Applied Physics Lab	CO1	Analyze the electric properties of semiconductor materials by determining energy gap of semiconductors, charge carrier concentration in Semiconductors using Hall effect and threshold voltage of LEDs, photo current in Photo diodes, solar cell, and temperature effect on resistance using thermistor.
	CO2	Identify the optical properties of light such as diffraction phenomenon using grating material for calculation of the wavelength of Laser and acceptance angle, NA of optical fiber using OFC and determine the value of Plank's constant using a light source and interference by using Newton's rings
	CO3	Analyze the electromagnetic properties of a current carrying coil by using Stewart Gee's experiment
	CO4	Analyze the least squares fitting method for data analysis using experimental data of Tensional pendulum
A6ME04 Engineering Work Shop	CO1	Assemble the different components
	CO2	Identify and apply suitable tools for different trades of Engineering processes.
	CO3	Practice on manufacturing of components using workshop trades including Soldering, Carpentry, Fitting and Tin smithy & Fabricate Components with their own hands.
	CO4	Apply basic electrical engineering knowledge for house wiring practice.
	CO5	Learn the safety precautions for various operations in basic trades.
A6IT01 Basics of Information Technology	CO1	Know the working principles of functional units of a basic Computer
	CO2	Understand program development, the use of data structures and algorithms in problem solving.
	CO3	Know the need and types of operating system, database systems.
	CO4	Understand the significance of networks, internet, WWW and cyber security.


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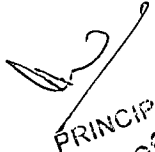

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	CO5	Understand Autonomous systems, the application of artificial intelligence.
I YEAR II SEMESTER		
A6BS02 Numerical Methods and Integral Transforms	CO1	Apply Curve fitting and Interpolation techniques.
	CO2	Apply various numerical techniques 3. Find the Fourier series of the periodic functions.
	CO3	Find the Fourier series of the periodic functions.
	CO4	Obtain the Laplace transforms of functions
	CO5	Find Fourier transforms and apply vector differentiation techniques.
A6HS01 English for skill Enhancement	CO1	Develop language proficiency with emphasis on Vocabulary, Grammar, Reading and Writing skills.
	CO2	Apply the theoretical and practical components of English syllabus to study academic subjects more effectively and critically.
	CO3	Analyze a variety of texts and interpret them to demonstrate in writing or speech.
	CO4	Write/compose clearly and creatively, and adjust writing style appropriately to the content, the context, and nature of the subject.
	CO5	Develop language components to communicate effectively in informal and informal situations
A6BS09 Engineering Chemistry	CO1	Understand the basic properties of water and its usage in domestic and industrial purpose.
	CO2	Acquire the basic knowledge of electrochemical procedures related to corrosion
	CO3	Learn the fundamentals and general properties of polymers and other engineering materials. Predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
A6EE60 Basic Electrical Engineering	CO1	Evaluate current and voltage values in resistive circuits with independent sources.
	CO2	Explain the working of DC machines and solve the numerical problems.
	CO3	Explain the working of AC electrical machines and solve the numerical problems.
	CO4	Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.
	CO5	Analyze the different configurations of Transistors and obtain its characteristics.
A6EC03 Electronic Devices and Applications	CO1	Acquire the knowledge of various electronic devices and their use on real life.
	CO2	Know the applications of various devices.
	CO3	Acquire the knowledge about the role of special purpose devices and their applications.
A6HS02 English Language and Communication skills Lab	CO1	Acquire the skill of independent language learning
	CO2	Overcome with the nuances of English speech sounds, word accent, intonation and rhythm.
	CO3	Obtain the consistent accent and intelligibility in pronunciation.
	CO4	Neutralize the impact of dialects.


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DATA STRUCTURES	CO2	Ability to assess efficiency trade-offs among different data structure implementations or combinations.
	CO3	Implement and know the application of algorithms for sorting and pattern matching.
	CO4	Design programs using a variety of data structures, including hash tables, binary and general tree structures, search trees, tries, heaps, graphs, and AVL-trees.
A6CS10 DATABASE MANAGEMENT SYSTEMS LAB	CO1	Apply the basic concepts of Database Systems and Applications.
	CO2	Develop an ER model for a given database.
	CO3	Use the basics of SQL and construct queries using SQL in database creation and interaction.
	CO4	Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system.
	CO5	Analyze and Select storage and recovery techniques of database system.
A6CS06 DATA STRUCTURES LAB	CO1	Ability to develop C programs for computing and real-life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists
	CO2	Ability to Implement searching and sorting algorithms
A6HS06 CONSTITUTION OF INDIA	CO1	Create awareness about the constitutional values and objectives written in the Indian constitution.
	CO2	List fundamental rights and fundamental duties of Indian citizens.
	CO3	Identify the division of legislative, executive and financial powers between the union and state governments.
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