1.1.1: Curricula developed and implemented have relevance to the local, regional, national, and global developmental needs, which is reflected in the Programme outcomes (POs) and Course Outcomes(COs) of the Programmes offered by the institution

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PEOs, PSOs & COs

GRMT 17 M.Tech (Civil Engineering)

Course outcomes (CO's) of all courses of all programs offered by the institution

Department Vision: To be the best Civil Engineering department in the region by means of good teaching, research and consultancy that serves the society.

Department Mission:

- Arranging field visits, guest lectures and interactive sessions with subject experts
- Creating a strong bond between industrial needs and academic research outcomes
- Undertaking collaborative projects which offer opportunities for long-term interaction between academia and industry
- Promoting the career of the faculty members by encouraging their research work
- Adopting best teaching practices, imparting employability skills and empowering to become entrepreneurs in the trade.

Program Educational Objectives (PEOs):

PEO1	Learning new technologies and/or undertaking higher education.
PEO2	Leading a team of engineers in executing projects.
PEO3	An entrepreneur in civil engineering community and/or a leadership role exhibiting systematic approach to resolve societal problems with ethical values.

Program Educational Objectives (PSOs):

PSO1:	Get proficiency in management and communication skills to become an entrepreneur.
PSO2:	Ability to use earth sciences in execution of civil engineering projects.

Program Outcomes (POs): Engineering Graduates will be able to:

- PO-1. Apply knowledge of computing, mathematics, science and engineering basics related to Civil Engineering.
- PO-2. Identify the problems and analyse the solutions by simulating, conducting experiments and interpreting Data.
- PO-3 Design civil engineering structures to meet industrial needs.
- PO-4 Explore and investigate contemporary engineering problems and proposed solutions.
- PO-5 Use latest techniques, skills and modern machinery for engineering practices.
- PO-6 Propose civil engineering solutions to solve societal problems.
- PO-7 Design sustainable systems in congruence with social and environmental issues.
- PO-8 Practice professional ethics with legal awareness and societal responsibilities.
- PO-9 Work as an individual or in a team to achieve targets.
- PO-10 Articulate thoughts and ideas effectively at different levels.
- PO-11 Manage financial and human resources for better execution of project.
- PO-12 Participate in lifelong learning process.

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Course outcomes for First Year First Semester Course	
Course Code: 17211102	
Course Title: Theory of Elasticity	
CO1:	Know the definition of stress and deformation and how to determine the components of the stress and strain tensors.
CO2:	Apply the conditions of compatibility and equations of equilibrium.
CO3:	Understand how to express the mechanical characteristics of materials, constitutive equations and generalized Hook law.
CO4:	Use the equilibrium equations stated by the displacements and compatibility conditions stated by stresses
CO5:	Understand index notation of equations, tensor and matrix notation and define state of plane stress, state of plane strain
CO6:	Be able to analyse real problem and to formulate the conditions of theory of elasticity Applications
CO7:	Determine the boundary restrictions in calculations. Solve the basic problems of the theory of elasticity by using Airy function expressed as bi- harmonic function
Course Code: 17211103	
Course Title: Matrix Analysis of Structures	
CO1:	Perform the structural analysis of determinate and indeterminate structures using classical compatibility methods, such as method of consistent displacements, force and equilibrium Methods
CO2:	Perform structural analysis using the stiffness method.
CO3:	Solve multiple degree of freedom two- and three-dimensional problems involving trusses, beams, frames and plane stress
CO4:	Understand basic finite element analysis
Course Code:17211104	
Course Title: Structural Dynamics	
CO1:	Understand the response of structural systems to dynamic loads
CO2:	Realize the behaviour and response of linear and nonlinear SDOF and MDOF structures with various dynamic loading
CO3:	Understand the behaviour and response of MDOF structures with various dynamic Loading.
CO4:	Possess the ability to find out suitable solution for continuous system
CO5:	Understand the behaviour of structures subjected to dynamic loads under free vibration
CO6:	Understand the behaviour of structures subjected to dynamic loads Harmonic excitation and earthquake load
Course Code:17211161a	
Course Title: Experimental Stress Analysis	
CO1:	Explain the measurement of strain under static and dynamic loads.
CO2:	Describe the Mechanical, optical, pneumatic and electrical Strain gauges for strain measurement
CO3:	Create awareness about the fixing of gauges and temperature Effects in bonded gauges and measure of stress in stress Gauges.
CO4:	Analysis of measuring circuits and strains of different strain Gauge rosettes.
CO5:	Describe the measurements by using transducers and exciters

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Course Code: 17211162a	
Course Title: Repair and Rehabilitation of Structures	
CO1:	Recognize the mechanisms of degradation of concrete structures and to design durable concrete structures.
CO2:	Conduct field monitoring and non- destructive evaluation of concrete structures.
CO3:	Design and suggest repair strategies for deteriorated concrete structures including repairing with composites.
CO4:	Understand the methods of strengthening methods for concrete structures
CO5:	Assessment of the serviceability and residual life span of concrete structures by Visual inspection and in situ tests
CO6:	Evaluation of causes and mechanism of damage
CO7:	Evaluation of actual capacity of the concrete structure Maintenance strategies
Course Code: 17211111	
Course Title: Advanced Structural Engineering Laboratory	
CO1:	conduct various laboratory tests on Cement, Aggregates
CO2:	Know strain measurement
CO3:	Non- destructive testing
CO4:	Chemical analysis on concrete and Aggregate and Sand
Course outcomes for First Year Second Semester Course	
Course Code:17211201	
Course Title: Finite Element Method	
CO1:	Develop finite element formulations of 1 degree of freedom problems and solve them
CO2:	Understand any Finite Element software to perform stress, thermal and modal analysis
CO3:	Compute the stiffness matrices of different elements and system
CO4:	Interpret displacements, strains and stress resultants
Course Code: 17211202	
Course Title: Earthquake Resistant Design	
CO1:	To learn the fundamentals of seismology and basic earthquake mechanisms, tectonics types ofground motion, and propagation of ground motion.
CO2:	Understand qualitative and quantitative representations of earthquake magnitude
CO3:	Determine the natural frequency of a single degree of freedom dynamic system for given mass, stiffness and damping properties.
CO4:	Determine the maximum dynamic response of an elastic vibrating structure to a given forcing function
CO5:	Learn the fundamentals of building code based structural design
CO6:	Determine the static design base shear based on the type of structural system, irregularity, location and occupancy.

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CO7:	Distribute the static base shear to the structure based on vertical distribution of mass horizontal distribution of mass, and centres of rigidity.
CO8:	Recognize special conditions such as irregular buildings, building separation, P- delta
Course Code:17211203	
Course Title: Stability of Structures	
CO1:	Analyse different types of structural instabilities
CO2:	Execute and work out the inelastic buckling using various methodologies.
CO3:	Examine the behaviour of beam columns and frames with and without side sway using classical and stiffness methods
CO4:	To be well versed in the lateral buckling, tensional buckling, Flexural tensional buckling of various beams and non- circular sections.
Course Code:17211204	
Course Title: Theory of Plates & Shells	
CO1:	Have a knowledge about various plate theories due to bending
CO2:	Gain the knowledge of Navier"s solution, Levy"s solution and solve for the rectangular and square plates
CO3:	Analyse circular plates with various boundary conditions
CO4:	Focus on the finite difference method of solving plate problems.
CO5:	Ability to realize the potential energy principle and find the solution of rectangular plates for various loadings
CO6:	Understand the behaviour of folded plates and shells.
Course Code: 17211263a	
Course Title: Advanced Pre-Stressed Concrete	
CO1:	Understand the basic concepts about pressurised concrete
CO2:	Analyse pre-stressed concrete structures
CO3:	Calculate deflections of pre-stressed members
CO4:	Gain the knowledge about composite structural members
Course Code: 17211264c	
Course Title: Earth Retaining Structures	
CO1:	Quantify the lateral earth pressures associated with different earth systems
CO2:	Evaluate the mechanical properties of geosynthetics used for soil reinforcement
CO3:	Identify the merits and demerits of different earth retaining systems.
CO4:	Select the most technically appropriate type of retaining wall for the application from a thorough knowledge of available systems
CO5:	Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods
CO6:	Aware of current guidelines regarding the design of earth retaining structures.
CO7:	Design retaining structures considering both external and internal stability aspects

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Course Code: 17211211	
Course Title: CAD Laboratory	
CO1:	Develop Computer Programs for Analysis and Design of various Structural Elements
CO2:	Use different Structural Engineering software's to solve various civil Engineering programs

M.TECH POWER SYSTEMS (Electrical & Electronics Engineering)

Department Vision

To be a pioneering department in preparing students to compete globally in their profession and making significant contribution to the society.

Department Mission

- Establishing centres of excellence with focus on advanced technology
- By preparing the students for successful careers based on a strong normal ethicalfoundation
- Delivering world class teaching, mentoring, intellectual stimulation, industry collaborations and state of the art research
- By training and educating students as global citizens to become entrepreneurs in their chosen field

Program Educational Objectives (PEOs):

PEO1	Engage in ongoing learning and professional development through self- study, continuing education in Electrical and Electronics Engineering and also in other allied fields
PEO2	Apply their engineering skills, exhibiting critical thinking and problem solving skills in professional engineering practices or tackle social, technical and business challenges
PEO3	Improve professional competence through lifelong learning including higher education and research

Program Specific Outcomes (PSO's):

PSO1	Apply knowledge of power system configuration, electrical equipment and protection practices to the design and specifications of electrical generation, transmission, distribution and utilization systems
PSO2	To design. Analyze, test and evaluate the performance of the electrical machines and transformers
PSO3	To develop the expertise in the technology associated with efficient conversion andcontrol of electrical power by static means from available forms to the required form
PSO4	Graduates will able to work as research fellow and implement their knowledge in all electrical and electronics research organization of defense, renewable energy, mines, chemical and power plants

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Program Outcomes (POs): Engineering Graduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3	**Design/development of solutions:** Design solutions for complex engineering problemsanddesignsystemcomponentsorprocessesthatmeetthespecifiedneedswithappropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems: Use** research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of theinformation to provide valid conclusions.
5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustain able development.
8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Course outcomes (Cos) of all courses of all programs offered by EEE Department

Course Outcomes for First Year First Semester Course	
Course Code: 17221101	
Course Title: Generation and Measurement of High Voltages	
CO-1	Understand numerical computation of electrostatic problems
CO-2	Understand the techniques of generation of high AC, DC and transient voltages
CO-3	Measure high AC, DC and transient voltages
CO-4	Measure high AC, DC and transient currents
Course Code: 17221102	
Course Title: Dielectrics and Insulation Engineering	
CO-1	Learn Properties of insulating materials
CO-2	Know Electrical breakdown in gas and vacuum insulation
CO-3	Know Electrical breakdown in liquid and solid insulation
CO-4	Know Insulation design in electrical power apparatus
Course Code: 17221103	
Course Title: High Voltage Direct Current Transmission	
CO-1	Understand the basic HVDC transmission equipment
CO-2	Understand the control of HVDC systems
CO-3	Understand the interaction between HVAC and HVDC system and the variousprotection schemes of HVDC engineering
CO-4	Understand the various protection schemes of HVDC engineering.
Course Code: 17221161a	
Course Title: Break down Phenomenon in Electrical Insulation (Gases, Liquids, Solids and Vacuum	
CO-1	Understand the fundamental process of conduction in gases
CO-2	Understand ionization and breakdown phenomena in gases
CO-3	Understand breakdown phenomena in liquid and solid dielectrics
CO-4	Understand breakdown phenomena in vacuum
Course Code: 17221161b	
Course Title: Smart Grid	
CO-1	Understand smart grids and analyze the smart grid policies and developments in smart grids
CO-2	Develop concepts of smart grid technologies in hybrid electrical vehicles etc
CO-3	Understand smart substations, feeder automation, GIS etc

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CO-4	Analyze micro grids and distributed generation systems
CO-5	Analyze the effect of power quality in smart grid and to understand latest developments in ICT for smart grid

Course Code: 17221104	
Course Title: Power system operation and control	
CO-1	Determine the unit commitment problem for economic load dispatch
CO-2	Get the knowledge of load frequency control of single area and two area systems
CO-3	Know the effect of generation with limited energy supply.
CO-4	Determine the interchange evaluation in interconnected power systems
Course Code: 17221161c	
Course Title: Advance digital processing	
CO-1	Understand neural networks and, analyze different types of neural networks.
CO-2	Design training algorithms for neural networks
CO-3	Develop algorithms using genetic algorithm for optimization.
CO-4	Analyze and, design fuzzy logic systems.
CO-5	Apply AI Techniques in electrical engineering
Course Code: 17221161d	
Course Title: Artificial Intelligence Techniques	
CO-1	Understand neural networks and, analyze different types of neural networks.
CO-2	Design training algorithms for neural networks
CO-3	Develop algorithms using genetic algorithm for optimization.
Course Code: 17221162c	
Course Title: Advanced Electro Magnetic Fields	
CO-1	know about analysis of electrostatic fields and properties of potential gradients
CO-2	know about the dielectric boundary conditions and electric stress control and optimization and time varying fields
Course Code: 17221162a	
Course Title: High Voltage Power Apparatus and Diagnostics	
CO-1	Team power transformer, types of insulation material
CO-2	Measure tan delta and capacitance of transformer oil.
CO-3	To Know the concept of moisture in transformer oil and paper and partial discharges
CO-4	To know degree of polymerization

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CO-5	To know concept of Fourier Transformer and frequency response analysis of transformer winding

Course Code: 17221162b	
Course Title: Collision Phenomena in plasma Science	
CO-1	Understand the collision phenomena in different materials
CO-2	Know Transition from Streamer to Townsend mechanisms of breakdown
CO-3	Understand Electric glow discharge and plasma glow discharge.
Course Code: 17221111	
Course Title: High Voltage Laboratory	
CO-1	Design the various testing procedures of various insulators
CO-2	Design the procedure for calibration of tong tester
CO-3	Compute the breakdown strength of dielectric coil
CO-4	Determine the leakage current of various insulators

Course Outcomes for First Year Second Semester Course	
Course Code: 17221201	
Course Title: High Voltage Testing Techniques	
CO-1	Understand different testing procedures on electrical Insulating materials, Insulation Systems
CO-2	Learn the different testing techniques adopted on electrical power apparatus
Course Code: 17221203	
Course Title: Surge Phenomenon and Insulation Co-ordination	
CO-1	Understand line concepts of travelling waves and their behavior in transmission systems
CO-2	Understand lighting phenomena and over voltages in power systems
CO-3	Understand the behavior of the transformer when surge voltages are induced in
CO-4	Understand the insulation coordination between different protecting and protective devicesin the power system
Course Code: 17221263a	
Course Title: Partial Discharges in High Voltage Equipment	
CO-1	Know Types of partial discharge that occurs in the insulation systems
CO-2	Understand Detection of discharges using different detection circuits.
CO-3	Understand Location of partial discharge in electrical apparatus and systems
Course Code: 17221204	
Course Title: Advanced Power System protection	
CO-1	Know the classifications and applications of static relays.
CO-2	Understand the application of comparators.

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CO-3	Understand the static version of different types of relays
CO-4	Understand the numerical protection techniques
Course Code: 17221263c	
Course Title: Pulse Power Engineering	
CO-1	Know Various energy storage devices, repetitive generators and cumulative pulse lines
CO-2	Know Pulse forming networks and their applications
CO-3	Know Pulse power generators
Course Code: 17221202	
Course Title: High voltage Alternating Current Transmission	
CO-1	Calculate the transmission line parameters
CO-2	Calculate the field effects on EHV and UHV AC lines.
CO-3	Determine the corona, RI and audible noise in EHV and UHV lines
CO-4	Analyze voltage control and compensation problems in EHV and UHV transmission systems

Course Code: 17221263b	
Course Title: High voltage systems using Electromagnetic Transients Program Analysis	
CO-1	Understand the severity of over voltages due to faults on a given power system
CO-2	To limit the effects of lightning over voltages in power systems
CO-3	Understand the various transient over voltages and their effects on power system
Course Code: 17221264a	
Course Title: Reactive power compensation and Management	
CO-1	Leam various load compensations.
CO-2	Obtain the mathematical model of reactive power compensating devices
CO-3	Get application of reactive power compensation in electrical traction & arc fumaces.
Course Code: 17221264b	
Course Title: Power system deregulation	
CO-1	Understand of operation of deregulated electricity market systems
CO-2	Know Typical issues in electricity markets
CO-3	Analyze various types of electricity market operational and control issues
Course Code: 17221264c	
Course Title: Flexible ac transmission Systems	
CO-1	Know the performance improvement of transmission system with facts
CO-2	Get the knowledge of effect of static shunt and series compensation Know the effect of UPFC

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CO-3	Know the effect UPFC
CO-4	Determine an appropriate facts device for different types of applications
Course Code: 17221211	
Course Title: Simulation Laboratory	
CO-1	Describe structure of digital filters
CO-2	Design digital filters different techniques
CO-3	Understand the implementation aspects of signal processing algorithms
CO-4	Know the effect of finite word length in signal processing.
CO-5	Analyze different power spectrum estimation techniques

Course Outcomes for Second Year First Semester Course	
Course Code: 17221311	
Course Title: Comprehensive viva voce	
CO-1	Identify a current problem through literature/field/ case studies and define the background objectives and methodology for solving the same.
CO-2	Analyze, design and develop a technology/process.
CO-3	Implement and evaluate the technology at the laboratory level.
Course Code: 17221312	
Course Title: Seminar-I	
CO-1	Identify a current problem through literature/field/ case studies and define the background Objectives and methodology for solving the same.
CO-2	Analyze, design and develop a technology/process.
CO-3	Implement and evaluate the technology at the laboratory level.
CO-4	Write report and present it effectively.
Course Code: 17221313	
Course Title: Project work-I	
CO-1	Identify a current problem through literature/field/ case studies and define the background objectives and methodology for solving the same.
CO-2	Analyze, design and develop a technology/process.
CO-3	Implement and evaluate the technology at the laboratory level.
Course Outcomes for Second Year Second Semester Course	
Course Code: 17221411	
Course Title: Seminar-II	
CO-1	Identify a current problem through literature/field/ case studies and define the background objectives and methodology for solving the same.

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CO-2	Analyze, design and develop a technology/process.
CO-3	Implement and evaluate the technology at the laboratory level.
CO-4	Write report and present it effectively.
Course Code: 17221412	
Course Title: Project work-II	
CO-1	Identify a current problem through literature/field/ case studies and define the background objectives and methodology for solving the same.
CO-2	Analyze, design and develop a technology/process.
CO-3	Implement and evaluate the technology at the laboratory level.
CO-4	Write report and present it effectively.

GRMT 17 M.Tech VLSI (Electronics Communication Engineering)

Department Vision:

Create an educational environment to mound the students to meet the challenges of modern Electronics & Communication industry through state of the art Technical knowledge and Innovative experimental Approaches.

Department Mission:

1. To create learning, development and testing environment to meet ever challenging needs of the Electronic industry
2. To create entrepreneurial environment and industry Interaction for Mutual benefit
3. To become a global partner in training human resources in the fields of chip design, instrumentation and networking
4. To associate with internationally reputed Institutions for Academic excellence and collaborative Research

Program Educational Objectives (PEOs) :

PEO1	To prepare students with excellent comprehension of basic Sciences, mathematics and engineering subjects facilitating them to gain employment or pursue postgraduate studies with an appreciation for lifelong learning.
PEO2	To train students with problem solving capabilities such as analysis and design with adequate practical skills wherein they demonstrate creativity and innovation that would enable them to develop state of the art equipment and technologies of multidisciplinary nature for societal development.

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Program Specific Outcomes (PSO's):

PSO1	Analyze and design analog and digital circuits or systems for a given specification and function.
PSO2	Implement functional blocks of hardware-software co-designs for signal processing and communication applications.

Program Outcomes (POs): Engineering Graduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustain able development.
8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.
12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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Course Outcomes for First Year First Semester Course	
Course Code: 17242101	
Course Title: DIGITAL SYSTEM DESIGN	
CO-1	To understand the various techniques and algorithms used for the minimization of switching functions.
CO-2	To get knowledge on PLD's and to understand the designing ,configuring and minimization techniques of PLA's.
CO-3	To realize, design and implement various large scale digital system according o modern requirements.
CO-4	To identify and locate various faults present in combinational and sequential circuits and correct them.
CO-5	To study fault detection and location in sequential circuits.
Course Code: 17242102	
Course Title: VLSI TECHNOLOGU AND DESIGN	
CO-1	Use the electric CAD tools to build schematic entry, Layout.
CO-2	Able to do circuit design and simulate the circuits using anyone of the SPICE.
CO-3	Implement the logic circuits using MOS and CMOS technology.
CO-4	Analyse various circuit configurations and their applications.
CO-5	Analyze the merits of circuits according to the technology and applications change.
Course code:17242103	
Course Title: CM0S ANALOG IC DESIGN	
CO-1	Understand fabrication structure of MOS and CMOS and its functioning.
CO-2	Understand concepts of delay calculations and concerned parameters.
CO-3	Understand designing concepts of amplifiers.
CO-4	Understanding designing concepts of OPAMP amplifiers and its associated circuits.
CO-5	Understanding designing concepts of comparators.
Course Code: 17242104	
Course Title: HARDWARE SOFTWARE C0-DESIGN	
CO-1	Understand the basics of hardware software co-design.
CO-2	How to select a target architecture and how to prototype is built and how emulation of a prototype is done.
CO-3	Acquire knowledge about compilation technologies and compile development environment.
CO-4	Formulate design specifications and perform design verifications
CO-5	Understand the importance of system level specifications languages and multi-language co-simulation.

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Course code:17242111	
Course Title: VLSI LAB	
CO-1	Students are required to design logic circuits to perform experiments.
CO-2	To verify and perform the logical and functional operations.
CO-3	To perform the analysis with appropriate synthesizer and then verify the implemented logic.
CO-4	Students are required to acquire knowledge in both ilex and mentor graphics.
FIRST YEAR SECOND SEMESTER	
Course code:17242202	
Course Title: CMOS MIXED SIGNAL DESIGN CIRCUIT	
CO-1	Understand the theory of discrete-time signal processing and its implementation using analog techniques.
CO-2	Understand the operation of phase locked loops and frequency synthesizers.
CO-3	Understand the principle of analog to digital conversion techniques.
CO-4	Understand the principle of digital to analog conversion techniques.
CO-5	Understand mixed signal design and capable of carrying out a project by using the above mixed signal circuits.
Course code:17242203	
Course Title: EMBEDDED REAL TIME OPERATING SYSTEM	
CO-1	Understand OS concepts and RTOS concepts.
CO-2	Understand programming concepts of some of the most widely used RTOS.
CO-3	Understand use of real-time operating systems in embedded software.
CO-4	Understand how to create program image for the target embedded systems.
CO-5	Understand programming in RT Linux.
Course code:17242204	
Course Title: DESIGN FOR TESTABILITY	
CO-1	Create understanding of the fundamental concepts of testing in VLSI design.
CO-2	Perceiving trends affecting testing.
CO-3	An ability to know design verification and test evaluation.
CO-4	Employ the simulation algorithms for verification and validations.
CO-5	An ability to know the high level testability measures and scan methods.

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Course code:17242261(a)	
Course Title: DIGITAL SIGNAL PROCESSING	
CO-1	Comprehends the knowledge and concepts of digital signal processing technologies.
CO-2	Acquire knowledge of DSP computational building blocks and knows how to achieve speed in DSP architecture or processor.
CO-3	Acquire knowledge about various addressing modes of DSP TMS320C54XX and are able to program DSP processor.
CO-4	Acquire knowledge of Analog devices family of DSP devices.
CO-5	Discuss about interfacing of serial and parallel communication devices.
Course code:17242211	
Course Title: EMBEDDED SYSTEM LAB	
CO-1	Students are required to write the program using C-language according to the experiment requirements.
CO-2	The experiments are required to develop the algorithms, flow diagrams, source code and perform the compilation.
CO-3	The programs that are developed for the implementation should be the level at embedded system design.
CO-4	Experiment requirements are RTOS library functions and macros ARM-926 develper kits and ARM-cortex

GRMT 17 M.Tech DECS (Electronics Communication Engineering)

Department Vision :

Create an educational environment to mound the students to meet the challenges of modern Electronics & Communication industry through state of the art Technical knowledge and Innovative experimental Approaches.

Department Mission:

1. To create learning, development and testing environment to meet ever challenging needs of the Electronic industry
2. To create entrepreneurial environment and industry Interaction for Mutual benefit
3. To become a global partner in training human resources in the fields of chip design, instrumentation and networking
4. To associate with internationally reputed Institutions for Academic excellence and collaborative Research

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Program Educational Objectives (PEOs):

PEO1	To prepare students with excellent comprehension of basic Sciences, mathematics and engineering subjects facilitating them to gain employment or pursue postgraduate studies with an appreciation for lifelong learning.
PEO2	To train students with problem solving capabilities such as analysis and design with adequate practical skills wherein they demonstrate creativity and innovation that would enable them to develop state of the art equipment and technologies of multidisciplinary nature for societal development.

Program Specific Outcomes (PSO's):

PSO1	Analyze and design analog and digital circuits or systems for a given specification and function.
PSO2	Implement functional blocks of hardware-software co-designs for signal processing and communication applications.

Program Outcomes (POs): EngineeringGraduates will be able to:

1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilitiesrelevant to the professional engineering practice.
7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate theknowledge of, and need for sustain able development.
8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	**Individual and team work:** Function effectively as an individual, and as a member orleader in diverse teams, and in multidisciplinary settings.

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10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a Member and leader in a team, to manage projects and in multi disciplinaryenvironments.
12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Course Outcomes for First Year First Semester Course	
Course Code: 17241101	
Course Title: DIGITAL SYSTEM DESIGN	
CO-1	To understand the various techniques and algorithms used for the minimization of switching functions.
CO-2	To get knowledge on PLD's and to understand the designing configuration and minimization techniques on PLA's
CO-3	To realize, design and implement various large scale digital systems according to modern requirements.
CO-4	To identify and locate various faults present in combinational and sequential circuits and correct them.
Course Code: 17241102	
Course Title: DETECTION AND ESTIMATION OF SIGNAL	
CO-1	Learn processing of the analog signal to discrete format in depth.
CO-2	Understand Curve fitting.
CO-3	Know the process of Linear filtering.
CO-4	Understand Spectral analysis of random signals
CO-5	Know the detection and estimation of signals.
Course code:17241103	
Course Title: DIGITAL DATA COMMUNICATIONS	
CO-1	To provide knowledge about Digital data communications.
CO-2	To understand various Digital Modulation scheme
CO-3	To understand various concept on protocols and standards.
CO-4	To understand various concept on interfaces and Modems.
CO-5	To provide knowledge about error detection and error correction.
Course Code: 17241104	
Course Title: ADVANCED DIGITAL SIGNAL PROCESSING	
CO-1	Analyzing methods for frequency analysis of the signal using DFT

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CO-2	Developing algorithms for the fast Fourier and Z transform.
CO-3	Developing IIR filters using different techniques and structures.
CO-4	Designing of FIR filters using different approximation and methods.
CO-5	Understanding the Sampling rate conversion methods.

Course code:17241111	
Course Title: SYSTEMS DESIGN AND DATA COMMUNICATION LAB	
CO-1	The students require to design the logic to perform.
CO-2	Students perform the following experiments using necessary industry standard simulator.
CO-3	Perform the analysis with appropriate synthesizer and to verify the implemented logic
CO-4	Understanding the systems and design communications.
CO-5	To have a complete understanding systems and design communications in lab.
FIRST YEAR SECOND SEMESTER	
Course code:17241201	
Course Title: CODING THEORY AND APPLICATIONS	
CO-1	To understand the role of information theory for an efficient, error free and secure delivery of information using binary data segment
CO-2	To have a complete understanding of error-control coding
CO-3	To understand encoding and decoding of digital data systems
CO-4	To introduce the for the generation of these codes and their decoding
CO-5	To have a detailed knowledge of compression and decompression techniques
Course code:17241203	
Course Title: IMAGE AND VIDEO PROCESSING	
CO-1	To provide basics of image processing
CO-2	To understand the concept of how to enhance the Image and restoration of image
CO-3	To get the knowledge on image segmentation and image compression
CO-4	Underlying the concept of video processing
CO-5	To provide knowledge on different video coding techniques and estimation
Course code:17241204	
Course Title: WIRELESS COMMUNICATIONS AND NETWORKS	
CO-1	To provide knowledge about cellular system design.
CO-2	To understand the radio wave propagation.
CO-3	To get knowledge on multipath propagation and fading.

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CO-4	To understand the concept of equalizers and types.
CO-5	To provide knowledge about wireless networks.

Course code:17241261(A)	
Course Title: CMOS ANALOG AND DIGITAL IC DESIGN	
CO-1	To provide knowledge about MOS design and small signal modelling of MOS devices.
CO-2	To get knowledge on both combinational and sequential MOS device modelling circuits.
CO-3	Underlying the concept dynamic logic circuits.
CO-4	To provide knowledge about semiconductor memories.
CO-5	To understand the concept of Analog CMOS Sub- circuits.
Course code:17241211	
Course Title: ADVANCED COMMUNICATIONS LAB	
CO-1	To understand the communications.
CO-2	To get knowledge on advanced level of communications.
CO-3	Underlying the concept dynamic communications
CO-4	To provide knowledge about advanced communications.
CO-5	To understand the concept of communications in advanced levels.

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