



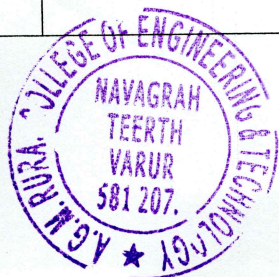
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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**  
**CO STATEMENT FOR THE SCHEME 2018 (BATCH 2018-2022)**

| SL.NO        | SUB NAME                    | COs       | CO Statement  |
|--------------|-----------------------------|-----------|---|
| <b>I SEM</b> |                             |           |   |
| 1            | Calculus and Linear Algebra | 18MAT11.1 | Apply the knowledge of calculus to problems related to polar curves and its applications in determining the bentness of the curve   |
|              |                             | 18MAT11.2 | Learn the notion of partial differentiation to calculate rates of change of multivariate function and solve problems related to composite functions and jacobians   |
|              |                             | 18MAT11.3 | Apply the concept of change of order of integration and variables to evaluate multiple integrals and their usage in computing the area and volumes  |
|              |                             | 18MAT11.4 | Solve first order linear/nonlinear differential equations analytically using standard methods   |
|              |                             | 18MAT11.5 | Make use of matrix theory for solving system of linear equations and compute Eigenvalues and Eigenvectors required for matrix diagonalization process   |
| 2            | Engineering Physics         | 18PHY12.1 | Learn and understand various types of oscillations and their implications. Recognize the significance of shock waves and its application in various fields  |
|              |                             | 18PHY12.2 | To get acquainted with elastic properties of materials by understanding the definition of elasticity, stress, strain, modulus of rigidity, young's modulus, bulk modulus and elastic limits   |
|              |                             | 18PHY12.3 | To realize the inter relation between time varying electric field and magnetic field, Properties of EM waves, Maxwell's Equation and their role in Optical fiber communication  |
|              |                             | 18PHY12.4 | Gain Knowledge of the intricacies of matter and energy, which is essential to explore the role of subatomic particles in understanding the matter at macro, micro and Nano level using the principles of quantum mechanics and understand the |



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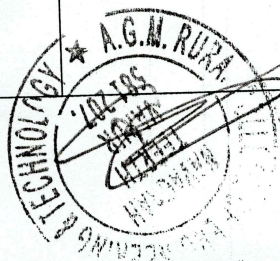
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|   |   |            |   |
|---|---|------------|---|
|   |   |            | physics of lasers, various types of lasers and to appreciate their role in modern technology.   |
|   |   | 18PHY12.5  | Learn the niceties of technologically important materials such as conductor, semiconductor and dielectrics, their potential properties in understanding their use in engineering applications |
| 3 | Basic Electrical Engineering                | 18ELE13.1  | Students will be able to comprehend the basic concept of AC and DC circuits   |
|   |   | 18ELE13.2  | Explain the working principle of AC and DC circuits   |
|   |   | 18ELE13.3  | Explain the working principle of construction of Transformer  |
|   |   | 18ELE13.4  | Understand the basic concepts of wiring, earthing, Domestic protection device and electric shock  |
| 4 | Elements of Civil Engineering and Mechanics | 18CIV14.1  | Mention the applications of various fields of Civil Engineering   |
|   |   | 18CIV14.2  | Compute the resultant of given force system subjected to various loads  |
|   |   | 18CIV14.3  | Comprehend the action of forces, moments and other loads on the system of rigid bodies and compute the reactive forces that develop as a result of external bodies                            |
|   |   | 18CIV14.4  | Locate the centroid and compute the moment of Inertia of regular and buildup section  |
|   |   | 18CIV14.5  | Express the relationship between motion of bodies and analyze the bodies in motion  |
| 5 | Engineering Graphics                        | 18EGDL15.1 | Prepare Engineering drawing as per BIS conventions mentioned in the relevant codes.   |
|   |   | 18EGDL15.2 | Produce computer generated drawings using CAED software   |
|   |   | 18EGDL15.3 | Use the knowledge of orthographic projections to represent engineering concepts and present the same in the form of drawings.   |



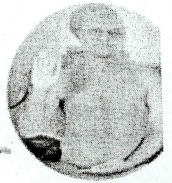
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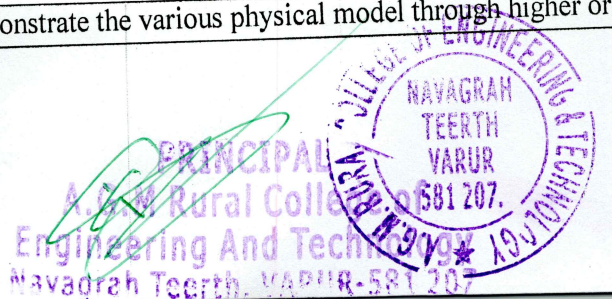
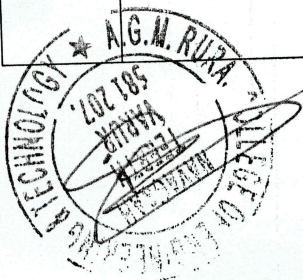
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|               |   |            |  |
|---------------|---|------------|--|
|               |   |            | drawings.  |
|               |   | 18EGDL15.4 | Develop isometric drawings of simple objects reading the orthographic projections of those objects.  |
|               |   | 18EGDL15.5 | Convert pictorial and isometric views of objects to orthographic views.  |
| 6             | Engineering Physics laboratory          | 18PHYL16.1 | To recognize the light by exploring its interactions with matter and in realizing its characteristic properties  |
|               |   | 18PHYL16.2 | Understanding the mechanical properties of the material by application of stress   |
|               |   | 18PHYL16.3 | Appreciating the significance of elementary electric circuits in the functioning of various electric/ electronic devices and gaining understanding of physics of the materials       |
|               |   | 18PHYL16.4 | Design and implementation of electronic circuits to gain better understanding of physics in semiconductor devices  |
|               |   | 18PHYL16.5 | Appreciating the role of quantum mechanics in exploring the electrical properties of the materials   |
| 7             | Basic Electrical Engineering Laboratory | 18ELE17.1  | Determine the current, power drawn and comparing the power factor of different lamps   |
|               |   | 18ELE17.2  | Determine impedance of an electrical circuit and power consumed in 3phase load   |
|               |   | 18ELE17.3  | Determine the earth resistance and understand the 2way and 3 way control of lamp   |
|               |   | 18ELE17.4  | Understand the basic functioning of domestic appliances of like fuse, MCB, UPS   |
| <b>II SEM</b> |   |            |  |
| 8             | Advanced Calculus and Numerical Methods | 18MAT21.1  | Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the interdependence of line surface and volume integrals |
|               |   | 18MAT21.2  | Emonstrate the various physical model through higher order   |





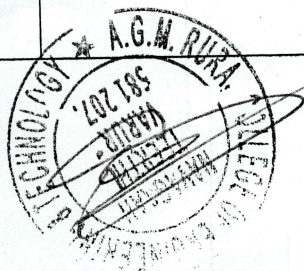
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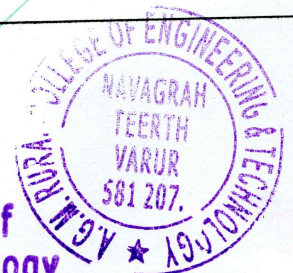


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|    |                                   |           | differential equations and solve such higher order differential equations  |
|    |                                   | 18MAT21.3 | Construct a variety of partial differential equations and solve the linear differential equations  |
|    |                                   | 18MAT21.4 | Explain the applications of differential equations and solution of ordinary differential equations   |
|    |                                   | 18MAT21.5 | Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena   |
| 9  | Engineering Chemistry             | 18CHE22.1 | Use of free energy in equilibria, rationalize bulk properties and processes using the thermodynamic consideration, electrochemical energy systems  |
|    |                                   | 18CHE22.2 | Causes and effect of corrosion of metals and control of corrosions. Modification of surface properties of metals to develop resistance to corrosion wear, tear impact et... by electro plating and electroless plating                                       |
|    |                                   | 18CHE22.3 | Production and consumption of energy for industrialization of country and living standard of people. Electrochemical and concentration of cells. Classical modern batteries and fuel cells. Utilization of solar energy for different useful forms of energy |
|    |                                   | 18CHE22.4 | Environmental pollution, waste management and water chemistry.   |
|    |                                   | 18CHE22.5 | Different techniques of instrumental methods of analysis. Fundamental principles of Nan materials.   |
| 10 | C-Programming for problem Solving | 18CPS23.1 | Illustrate simple algorithms from the different domains such as mathematic, physics etc.   |
|    |                                   | 18CPS23.2 | Construct a programming solutions to the given problems using C  |
|    |                                   | 18CPS23.3 | Identify and Correct the syntax and logical errors in C programming  |



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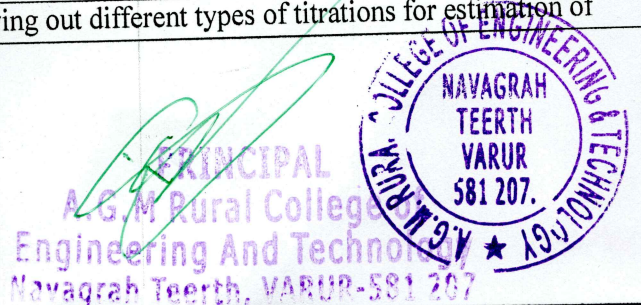
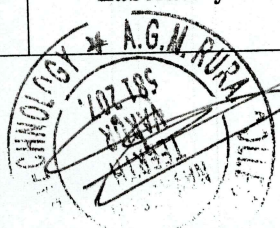
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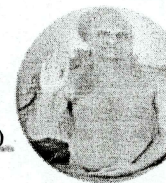
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|          |  | 18CPS23.4  | Modularize the given problems using functions and structures   |
| 11       | Basic Electronics  | 18ELN24.1  | Describe the operations of diodes, BJT, FET and Operational Amplifiers.  |
|          |  | 18ELN24.2  | Design and explain the constructions of rectifiers, regulators, amplifiers and oscillators.  |
|          |  | 18ELN24.3  | Describe general operating principles of SCR and its applications  |
|          |  | 18ELN24.4  | Explain the working and design of Fixed voltage IC regulators using 7805 and astable oscillator using timer IC 555                           |
|          |  | 18ELN24.5  | Explain different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-Flops.     |
|          |  | 18ELN24.6  | Describe the basic principles of operation of communication system and mobile phones   |
|          |  | 12         | Elements of Mechanical Engineering   |
| 18ME25.2 | Explain the working principles of Hydraulic turbines, pumps, IC engines and refrigerators                |            |  |
| 18ME25.3 | Recognize various metal joining process and power transmission elements                                  |            |  |
| 18ME25.4 | Understand the properties of common engineering materials and their applications in engineering industry |            |  |
| 18ME25.5 | Discuss the working of conventional machine tools, machining process and accessories.                    |            |  |
| 18ME25.6 | Describe the advanced manufacturing systems  |            |  |
| 13       | Engineering Chemistry Laboratory   | 18CHEL26.1 | Handling different types of instruments for analysis of materials using small quantities of materials involved in quick and accurate results |
|          |  | 18CHEL26.2 | Carrying out different types of titrations for estimation of   |





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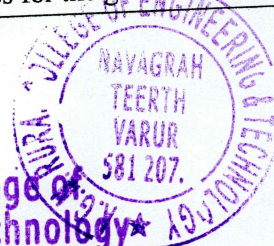


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|                |   |           | concerned in materials using comparatively more quantity of materials involved for good results  |
| 14             | C-Programming Laboratory                                    | 18CPL27.1 | Write algorithms ,flowcharts and program for simple problems   |
|                |   | 18CPL27.2 | Correct the syntax and logical errors to execute program   |
|                |   | 18CPL27.3 | Write iterative and wherever possible recursive programs   |
|                |   | 18CPL27.4 | Demonstrate use of functions, arrays, strings, strictures and pointers in problem solving.   |
| <b>III SEM</b> |   |           |  |
| 15             | Transform Calculus, Fourier Series and Numerical Techniques | 18MAT31.1 | Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.   |
|                |   | 18MAT31.2 | Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.  |
|                |   | 18MAT31.3 | Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.  |
|                |   | 18MAT31.4 | Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.  |
|                |   | 18MAT31.5 | Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis   |
| 16             | NETWORK THEORY  | 18EC32.1  | Determine currents and voltages using source transformation/ source shifting/ mesh/ nodal analysis and reduce given network using star-delta transformation/source transformation/ source shifting..                           |
|                |   | 18EC32.2  | Solve network problems by applying Superposition/ Reciprocity/ Thevenin's/ Norton's/ Maximum Power Transfer/ Millman's Network Theorems and electrical laws to reduce circuit complexities and to arrive at feasible solutions |
|                |   | 18EC32.3  | Calculate current and voltages for the given circuit under   |



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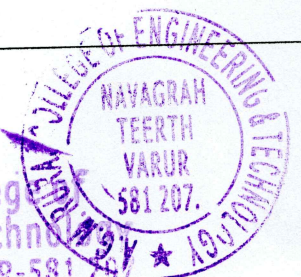


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|    |  |          | transient conditions  |
|    |  | 18EC32.4 | Apply Laplace transform to solve the given network.   |
|    |  | 18EC32.5 | Solve the given network using specified two port network parameter like Z or Y or T or h. Understand the concept of resonance |
| 17 | Electronic Devices                     | 18EC33.1 | Understand the principles of semiconductor Physics s  |
|    |  | 18EC33.2 | Understand the principles and characteristics of different types of semiconductor devices                                     |
|    |  | 18EC33.3 | Understand the fabrication process of semiconductor device  |
|    |  | 18EC33.4 | Utilize the mathematical models of semiconductor junctions and MOS transistors for circuits and systems.                      |
|    |  |          |   |
| 18 | Digital System Design                  | 18EC34.1 | Explain the concept of combinational and sequential logic circuits.   |
|    |  | 18EC34.2 | Design the combinational logic circuits.  |
|    |  | 18EC34.3 | Design the sequential circuits using SR, JK, D, T flip-flops and Mealy & Moore machines                                       |
|    |  | 18EC34.4 | Design applications of Combinational & Sequential Circuits.   |
|    |  |          |   |
| 19 | Computer Organization and Architecture | 18EC35.1 | Explain the basic organization of a computer system.  |
|    |  | 18EC35.2 | Explain different ways of accessing an input / output device including interrupts.  |
|    |  | 18EC35.3 | Illustrate the organization of different types of semiconductor and other secondary storage memories.                         |
|    |  | 18EC35.4 | Illustrate simple processor organization based on hardwired control and micro programmed control.                             |



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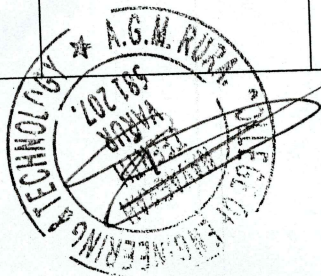
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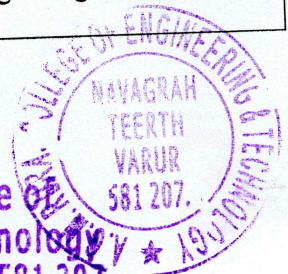


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|---------------|---|-----------|---|
| 20            | Power Electronics and Instrumentation             | 18EC36.1  | Build and test circuits using power electronic devices.   |
|               |   | 18EC36.2  | Analyze and design controlled rectifier, DC to DC converters, DC to AC inverters and SMPS.  |
|               |   | 18EC36.3  | Define instrument errors.   |
|               |   | 18EC36.4  | Develop circuits for multirange Ammeters, Voltmeters and Bridges to measure passive component values and frequency.               |
|               |   | 18EC36.5  | Describe the principle of operation of Digital instruments and PLCs.  |
|               |   | 18EC36.6  | Use Instrumentation amplifier for measuring physical parameters.  |
| 21            | Electronic Devices and Instrumentation Laboratory | 18ECL37.1 | Understand the characteristics of various electronic devices and measurement of parameters.                                       |
|               |   | 18ECL37.2 | Design and test simple electronic circuits.   |
|               |   | 18ECL37.3 | Use of circuit simulation software for the implementation and characterization of electronic circuits and devices.                |
| 22            | Digital System Design Laboratory                  | 18ECL38.1 | Demonstrate the truth table of various expressions and combinational circuits using logic gates.                                  |
|               |   | 18ECL38.2 | Design various combinational circuits such as adders, subtractors,  |
|               |   | 18ECL38.3 | Construct flips-flops, counters and shift registers.  |
|               |   | 18ECL38.4 | Simulate Serial adder and Binary Multiplier.  |
| <b>IV SEM</b> |   |           |   |
| 23            | Engineering Mathematics-IV                        | 18MAT41.1 | Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.       |
|               |   | 18MAT41.2 | Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing. |
|               |   | 18MAT41.3 | Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.         |



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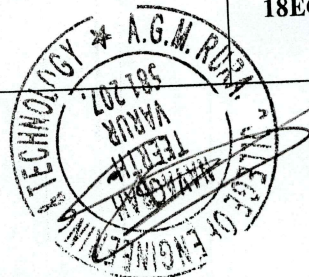
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|    |   | 18MAT41.4 | Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.                         |
|    |   | 18MAT41.5 | Construct joint probability distributions and demonstrate the validity of testing the hypothesis.  |
| 24 | Analog Circuits                           | 18EC42.1  | Understand the characteristics of BJTs and FETs.   |
|    |   | 18EC42.2  | Design and analyze BJT and FET amplifier circuits.   |
|    |   | 18EC42.3  | Design sinusoidal and non-sinusoidal oscillators.  |
|    |   | 18EC42.4  | Understand the functioning of linear ICs.  |
|    |   | 18EC42.5  | Design of Linear IC based circuits.  |
| 25 | Control System                            | 18EC43.1  | Develop the mathematical model of mechanical and electrical systems.   |
|    |   | 18EC43.2  | Develop transfer function for a given control system using block diagram reduction techniques and signal flow graph method.                |
|    |   | 18EC43.3  | Determine the time domain specifications for first and second order systems.   |
|    |   | 18EC43.4  | Determine the stability of a system in the time domain using Routh-Hurwitz criterion and Root-locus technique.                             |
|    |   | 18EC43.5  | Determine the stability of a system in the frequency domain using Nyquist and bode plots.  |
| 26 | Engineering Statistics and Linear algebra | 18EC44.1  | Identify and associate Random Variables and Random Processes in Communication events.  |
|    |   | 18EC44.2  | Analyze and model the Random events in typical communication events to extract quantitative statistical parameters.                        |
|    |   | 18EC44.3  | Analyze and model typical signal sets in terms of a basis function set of Amplitude, phase and frequency.                                  |
|    |   | 18EC44.4  | Demonstrate by way of simulation or emulation the ease of analysis employing basis functions, statistical representation and Eigen values. |





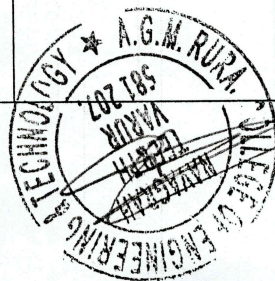
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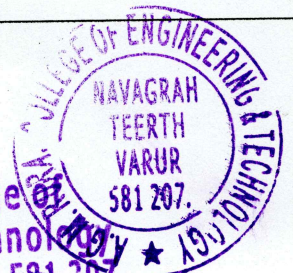


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|    |                     |           |  |
|----|---------------------|-----------|--|
| 27 | Signals and Systems | 18EC45.1  | Analyze the different types of signals and systems.  |
|    |                     | 18EC45.2  | Determine the linearity, causality, time-invariance and stability properties of continuous and discrete time systems.  |
|    |                     | 18EC45.3  | Represent continuous and discrete systems in time and frequency domain using different transforms Test whether the system is stable.   |
|    |                     | 18EC45.4  | Apply Z-transforms for analysis of continuous time and discrete time signals and systems   |
| 28 | Microcontroller     | 18EC46.1  | Explain the difference between Microprocessors & Microcontrollers, Architecture of 8051 Microcontroller, Interfacing of 8051 to external memory and Instruction set of 8051.                         |
|    |                     | 18EC46.2  | Write 8051 Assembly level programs using 8051 instruction set.   |
|    |                     | 18EC46.3  | Explain the Interrupt system, operation of Timers/Counters and Serial port of 8051.  |
|    |                     | 18EC46.4  | Write 8051 Assembly language program to generate timings and waveforms using 8051 timers, to send & receive serial data using 8051 serial port and to generate an external interrupt using a switch. |
|    |                     | 18EC46.5  | Write 8051 Assembly language programs to generate square wave on 8051 I/O port pin using interrupt and C Programme to send & receive serial data using 8051 serial port.                             |
|    |                     | 18EC46.6  | Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051 using 8051 I/O ports.  |
| 29 | Microcontroller Lab | 18ECL47.1 | Write Assembly language programs in 8051 for solving simple problems that manipulate input data using different instructions of 8051.  |
|    |                     | 18ECL47.2 | Interface different input and output devices to 8051 and control them using Assembly language program.   |
|    |                     | 18ECL47.3 | Interface the serial devices to 8051 and do the serial transfer using C programming.   |



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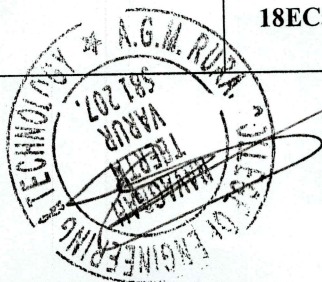
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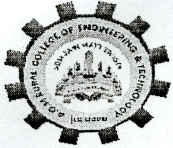
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|              |                                    |           |   |
|--------------|------------------------------------|-----------|---|
| 30           | Analog Circuits Laboratory         | 18ECL48.1 | Design analog circuits using BJT/FETs and evaluate their performance characteristics.   |
|              |                                    | 18ECL48.2 | Design analog circuits using OPAMPs for different applications  |
|              |                                    | 18ECL48.3 | Simulate and analyze analog circuits that uses ICs for different electronic applications  |
| <b>V SEM</b> |                                    |           |   |
| 31           | Management                         | 18EC51.1  | Understand the fundamental concepts of Management and Entrepreneurship and opportunities in order to setup a business.                        |
|              |                                    | 18EC51.2  | Describe the functions of Managers, Entrepreneurs and their social responsibilities.  |
|              |                                    | 18EC51.3  | Understand the components in developing a business plan.  |
|              |                                    | 18EC51.4  | Awareness about various sources of funding and institutions supporting entrepreneurs.   |
| 32           | Digital Signal Processing          | 18EC52.1  | Determine response of LTI systems using time domain and DFT techniques.   |
|              |                                    | 18EC52.2  | Compute DFT of real and complex discrete time signals.  |
|              |                                    | 18EC52.3  | Computation of DFT using FFT algorithms and linear filtering approach.  |
|              |                                    | 18EC52.4  | Design and realize FIR and IIR digital filters  |
|              |                                    | 18EC52.5  | Understand the DSP processor architecture.  |
| 33           | Principles of Communication System | 18EC53.1  | Analyze and compute performance of AM and FM modulation in the presence of noise at the receiver.   |
|              |                                    | 18EC53.2  | Analyze and compute performance of digital formatting processes with quantization noise.  |
|              |                                    | 18EC53.3  | Multiplex digitally formatted signals at Transmitter and demultiplex the signals and reconstruct digitally formatted signals at the receiver. |
|              |                                    | 18EC53.4  | Design/Demonstrate the use of digital formatting in Multiplexers, Vocoders and Video transmission.  |



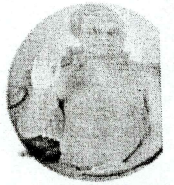
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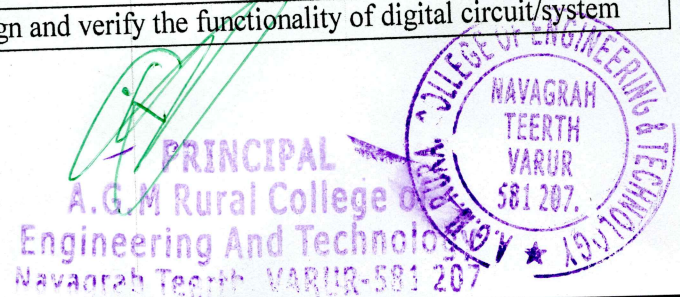
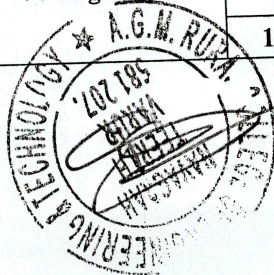
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|----|-------------------------------|----------|---|
| 34 | INFORMATION THEORY AND CODING | 18EC54.1 | Explain concept of Dependent & Independent Source, measure of information, Entropy, Rate of Information and Order of a source   |
|    |                               | 18EC54.2 | Represent the information using Shannon Encoding, Shannon Fano, Prefix and Huffman Encoding Algorithms  |
|    |                               | 18EC54.3 | Model the continuous and discrete communication channels using input, output and joint probabilities  |
|    |                               | 18EC54.4 | Determine a codeword comprising of the check bits computed using Linear Block codes, cyclic codes & convolutional codes   |
|    |                               | 18EC54.5 | Design the encoding and decoding circuits for Linear Block codes, cyclic codes, convolutional codes, BCH and Golay codes  |
| 35 | Electromagnetic Waves         | 18EC55.1 | Evaluate problems on electrostatic force, electric field due to point, linear, volume charges by applying conventional methods and charge in a volume.  |
|    |                               | 18EC55.2 | Apply Gauss law to evaluate Electric fields due to different charge distributions and Volume Charge distribution by using Divergence Theorem.   |
|    |                               | 18EC55.3 | Determine potential and energy with respect to point charge and capacitance using Laplace equation and Apply Biot-Savart's and Ampere's laws for evaluating Magnetic field for different current configurations |
|    |                               | 18EC55.4 | Calculate magnetic force, potential energy and Magnetization with respect to magnetic materials and voltage induced in electric circuits.   |
|    |                               | 18EC55.5 | Apply Maxwell's equations for time varying fields, EM waves in free space and conductors and Evaluate power associated with EM waves using Poynting theorem   |
| 36 | Verilog HDL                   | 18EC56.1 | Write Verilog programs in gate, dataflow (RTL), behavioral and switch modeling levels of Abstraction.   |
|    |                               | 18EC56.2 | Design and verify the functionality of digital circuit/system   |





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|               |                                      |           | using test benches.   |
|               |                                      | 18EC56.3  | Identify the suitable Abstraction level for a particular digital design.  |
|               |                                      | 18EC56.4  | Write the programs more effectively using Verilog tasks, functions and directives.  |
|               |                                      | 18EC56.5  | Perform timing and delay Simulation   |
| 37            | Digital Signal Processing Laboratory | 18ECL57.1 | Understand the concepts of analog to digital conversion of signals and frequency domain sampling of signals.  |
|               |                                      | 18ECL57.2 | Modeling of discrete time signals and systems and verification of its properties and results.   |
|               |                                      | 18ECL57.3 | Implementation of discrete computations using DSP processor and verify the results.   |
|               |                                      | 18ECL57.4 | Realize the digital filters using a simulation tool and analyze the response of the filter for an audio signal.                                     |
| 38            | Verilog HDL Laboratory               | 18ECL58.1 | Write the Verilog/VHDL programs to simulate Combinational circuits in Dataflow, Behavioral and Gate level Abstractions.                             |
|               |                                      | 18ECL58.2 | Describe sequential circuits like flip flops and counters in Behavioral description and obtain simulation waveforms                                 |
|               |                                      | 18ECL58.3 | Synthesize Combinational and Sequential circuits on programmable ICs and test the hardware.   |
|               |                                      | 18ECL58.4 | Interface the hardware to the programmable chips and obtain the required output   |
| <b>VI SEM</b> |                                      |           |   |
| 39            | DIGITAL COMMUNICATION                | 18EC61.1  | Associate and apply the concepts of Bandpass sampling to well specified signals and channels.   |
|               |                                      | 18EC61.2  | Analyze and compute performance parameters and transfer rates for low pass and bandpass symbol under ideal and corrupted non band limited channels. |



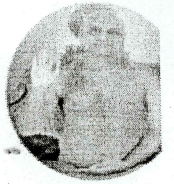
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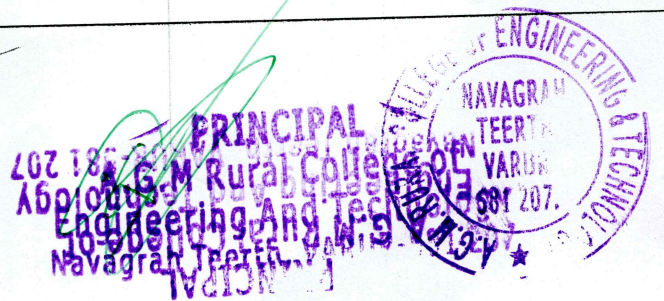
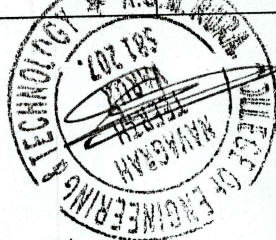
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|    |   |           |   |
|----|---|-----------|---|
|    |   |           | channels.   |
|    |   | 18EC61.3  | Test and validate symbol processing and performance parameters at the receiver under ideal and corrupted bandlimited channels.  |
|    |   | 18EC61.4  | Demonstrate that bandpass signals subjected to corruption and distortion in a bandlimited channel can be processed at the receiver to meet specified performance criteria |
| 40 | EMBEDDED SYSTEMS                              | 18EC62.1  | Describe the architectural features and instructions of 32 bit microcontroller ARM Cortex M3.   |
|    |   | 18EC62.2  | Apply the knowledge gained for Programming ARM Cortex M3 for different applications.  |
|    |   | 18EC62.3  | Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.                                    |
|    |   | 18EC62.4  | Develop the hardware software co-design and firmware design approaches.   |
|    |   | 18EC62.5  | Explain the need of real time operating system for embedded system applications.  |
| 41 | MICROWAVE AND ANTENNA                         | 18EC63.1  | Describe the use and advantages of microwave transmission   |
|    |   | 18EC63.2  | Analyze various parameters related to microwave transmission lines and waveguides   |
|    |   | 18EC63.3  | Identify microwave devices for several applications   |
|    |   | 18EC63.4  | Analyze various antenna parameters necessary for building a RF system   |
|    |   | 18EC63.5  | Recommend various antenna configurations according to the applications.   |
| 42 | Professional Elective-1<br>Operational System | 18EC641.1 | Explain the goals, structure, operation and types of operating systems.   |
|    |   | 18EC641.2 | Apply scheduling techniques to find performance factors.  |





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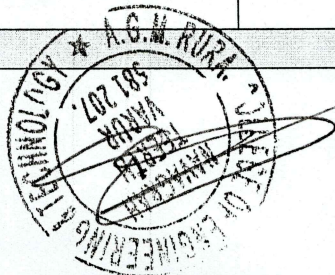
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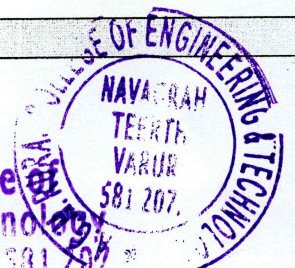
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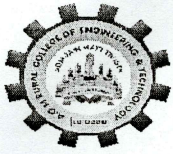
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|    |                            | 18EC641.3  | Explain organization of file systems and IOCS.   |
|    |                            | 18EC641.4  | Apply suitable techniques for contiguous and non-contiguous memory allocation.   |
|    |                            | 18EC641.5  | Describe message passing, deadlock detection and prevention methods.   |
| 43 | Embedded System Laboratory | 18ECL66.1  | Understand the instruction set of 32 bit microcontroller ARM Cortex M3, and the software tool required for programming in Assembly and C language. |
|    |                            | 18ECL66.2  | Develop assembly language programs using ARM Cortex M3 for different applications.   |
|    |                            | 18ECL66.3  | Interface external devices and I/O with ARM Cortex M3.   |
|    |                            | 18ECL66.4  | Develop C language programs and library functions for embedded system applications.  |
| 44 | COMMUNICATION LABORATORY   | 18ECL67.1  | Determine the characteristics and response of microwave waveguide.   |
|    |                            | 18ECL67.2  | Determine the characteristics of microstrip antennas and devices and compute the parameters associated with it                                     |
|    |                            | 18ECL67.3  | Design and test the digital and analog modulation circuits and display the waveforms   |
|    |                            | 18ECL67.4  | Simulate the digital modulation systems and compare the error performance of basic digital modulation schemes.                                     |
| 45 | MINIPROJECT                | 18ECMP68.1 | Design and Implementation of system to measure the system optimally  |
|    |                            | 18ECMP68.2 | Analyzing the outcomes of experiment in hardware/software through comparison   |
|    |                            | 18ECMP68.3 | Imbibing Professional Ethics in Report Writing in systematic manner and adopting to quality presentation   |
| 46 | Internship                 | CO-1       | To understand the theory concepts and implement those in Industry environment.   |

VII SEM



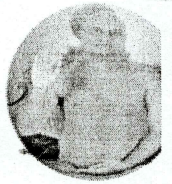
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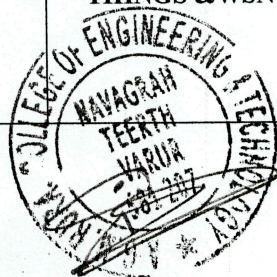
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|----|--------------------------|-----------|--|
| 47 | Computer Networks        | 18EC71.1  | Understand the concepts of networking thoroughly   |
|    |                          | 18EC71.2  | Identify the protocols and services of different layers.   |
|    |                          | 18EC71.3  | Distinguish the basic network configurations and standards associated with each network.                             |
|    |                          | 18EC71.4  | Analyze a simple network and measurement of its parameters.  |
| 48 | VLSI DESIGN              | 18EC72.1  | Demonstrate understanding of MOS transistor theory, CMOS fabrication flow and technology scaling.                    |
|    |                          | 18EC72.2  | Draw the basic gates using the stick and layout diagrams with the knowledge of physical design aspects.              |
|    |                          | 18EC72.3  | Demonstrate ability to design Combinational, sequential and dynamic logic circuits as per the requirements           |
|    |                          | 18EC72.4  | Interpret Memory elements along with timing considerations   |
|    |                          | 18EC72.5  | Interpret testing and testability issues in VLSI Design  |
| 49 | REAL TIME SYSTEMS        | 18EC731.1 | Explain the fundamentals of Real time systems and its classifications  |
|    |                          | 18EC731.2 | Understand the concepts of computer control and the suitable computer hardware requirements for realtime application |
|    |                          | 18EC731.3 | Describe the operating system concepts and techniques required for real time systems.                                |
|    |                          | 18EC731.4 | Develop the software algorithms using suitable languages to meet Real time applications.                             |
|    |                          | 18EC731.5 | Apply suitable methodologies to design and develop Real-Time Systems.  |
| 50 | INTERNET OF THINGS & WSN | 18EC741.1 | Understand choice and application of IoT & M2M communication protocols.  |
|    |                          | 18EC741.2 | Describe Cloud computing and design principles of IoT.   |
|    |                          | 18EC741.3 | Awareness of MQTT clients, MQTT server and its programming   |
|    |                          | 18EC741.4 | Develop an architecture and its communication protocols of of  |



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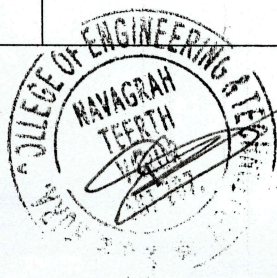
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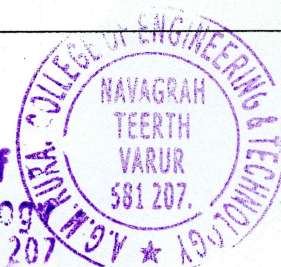


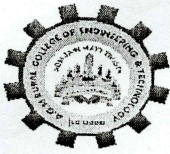
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|----|-----------------------------|-----------|--|
|    |                             |           | WSNs.  |
| 51 | Disaster Management         | 18EE753.1 | Discuss disaster management plan, cyclones, and their hazard potential   |
|    |                             | 18EE753.2 | Understand the role of IMD and cyclone prediction and cyclone warning systems in India   |
|    |                             | 18EE753.3 | Understand the role of different institutions' defense and other services in natural disaster management.  |
|    |                             | 18EE753.4 | Understand the role of the Central Water Commission in river water sharing, Draught, its assessment and draught management plan                                    |
|    |                             | 18EE753.5 | Understand occurrence of earth quake, Tsunamis and thunderstorms.  |
| 52 | COMPUTER NETWORK LABORATORY | 18ECL76.1 | Use the network simulator for learning and practice of networking algorithms.  |
|    |                             | 18ECL76.2 | Illustrate the operations of network protocols and algorithms using C programming.   |
|    |                             | 18ECL76.3 | Simulate the network with different configurations to measure the performance parameters.  |
|    |                             | 18ECL76.4 | Implement the data link and routing protocols using C programming.   |
|    |                             | 18ECL76.5 | Use the network simulator for learning and practice of networking algorithms.  |
| 53 | VLSI LABORATORY             | 18ECL77.1 | Design and simulate combinational and sequential digital circuits using Verilog HDL  |
|    |                             | 18ECL77.2 | Understand the Synthesis process of digital circuits using EDA tool.   |
|    |                             | 18ECL77.3 | Perform ASIC design flow and understand the process of synthesis, synthesis constraints and evaluating the synthesis reports to obtain optimum gate level net list |
|    |                             | 18ECL77.4 | Design and simulate basic CMOS circuits like inverter, common source amplifier and differential amplifiers.  |



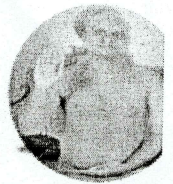
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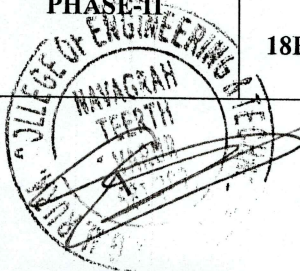
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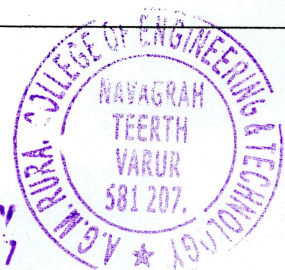


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|-----------------|--------------------------------|-----------|--|
|                 |                                | 18ECL77.5 | Perform RTL-GDSII flow and understand the stages in ASIC design.   |
| 54              | PROJECT WORK PHASE-1           | 18ECP78.1 | Design and Implementation of system to measure the system optimally  |
|                 |                                | 18ECP78.2 | Analyzing the outcomes of experiment in hardware/software through comparison                                       |
|                 |                                | 18ECP78.3 | Imbibing Professional Ethics in Report Writing in systematic manner and adopting to quality presentation           |
| 55              | INTERNSHIP                     | CO1       | To understand the theory concepts and implement those in Industry environment.                                     |
| <b>VIII SEM</b> |                                |           |  |
| 56              | Wireless and Cellular Networks | 18EC81.1  | Explain concepts of propagation mechanisms like Reflection, Diffraction, Scattering in wireless channels.          |
|                 |                                | 18EC81.2  | Develop a scheme for idle mode, call set up, call progress handling and call tear down in a GSM cellular network.  |
|                 |                                | 18EC81.3  | Develop a scheme for idle mode, call set up, call progress handling and call tear down in a CDMA cellular network. |
|                 |                                | 18EC81.4  | Understand the Basic operations of Air interface in a LTE 4G system.   |
| 57              | RADAR ENGINEERING              | 18EC823.1 | Understand the radar fundamentals and radar signals.   |
|                 |                                | 18EC823.2 | Explain the working principle of pulse Doppler radars, their applications and limitations.                         |
|                 |                                | 18EC823.3 | Describe the working of various radar transmitters and receivers.  |
|                 |                                | 18EC823.4 | Analyze the range parameters of pulse radar system which affect the system performance.                            |
| 58              | PROJECT WORK PHASE-II          | 18ECP83.1 | Design and Implementation of system to measure the system optimally  |
|                 |                                | 18ECP83.2 | Analyzing the outcomes of experiment in hardware/software through comparison                                       |



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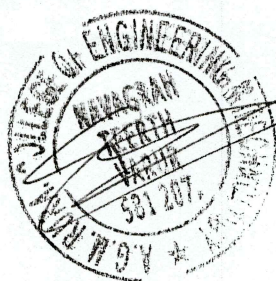
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**DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING**  
**CO STATEMENT FOR THE SCHEME 2018 (BATCH 2018-2022)**

|    |                   |           |  |
|----|-------------------|-----------|--|
|    |                   | 18ECP83.3 | Imbibing Professional Ethics in Report Writing in systematic manner and adopting to quality presentation |
| 59 | TECHNICAL SEMINAR | 18ECS84.1 | Read , Understand and realize the technical reports from reputed international journals.                 |
|    |                   | 18ECS84.2 | Prepare the essential contents from the report and express the knowledge through presentation            |
|    |                   | 18ECS84.3 | Imbibe the professional ethics while preparing the report and presentation.                              |
| 60 | Internship        | CO-1      | To understand the theory concepts and implement those in Industry environment                            |



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