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# ELECTRICAL & ELECTRONICS ENGINEERING
# I & II Sem Course Outcomes

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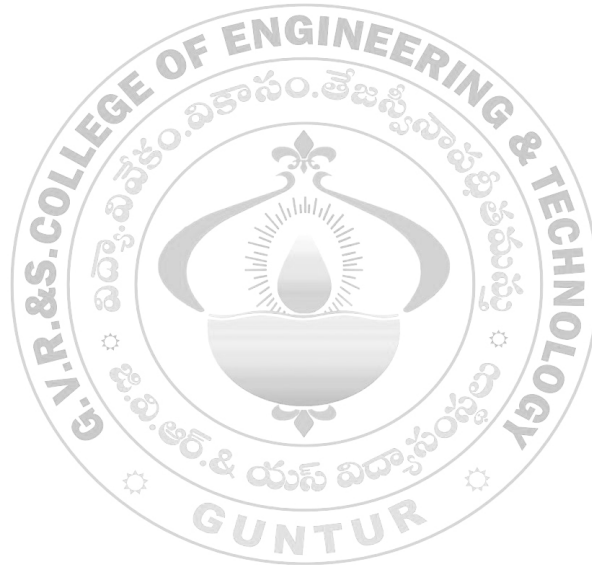**GVR & S College of Engg. & Tech.**
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# GVR&S COLLEGE OF ENGINEERING AND TECHNOLOGY

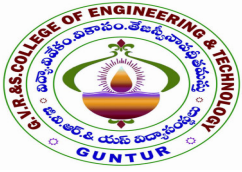*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | ELECTRICAL &ELECTRONICS ENGINEERING | |
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| | | **I&II Sem Course Outcomes for the Academic Year 2023-2024** | |
| **S.No.** | **Year/Sem** | **Course Name** | **Course Outcomes** |
| 1 | I/I | **ENGLISH COMMUNICATIVE ENGLISH** | **CO1**: Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers |
| | | | **CO2:** Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials |
| | | | **CO3:** Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations |
| | | | **CO4:** Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information |
| | | | **CO5:** Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing |
| 2 | I/I | **MATHEMATICS-I** | **CO1:** utilize mean value theorems to real life problems (L3) |
| | | | **CO2:** solve the differential equations related to various engineering fields (L3) |
| | | | **CO: 3**familiarize with functions of several variables which is useful in optimization (L3) |
| | | | **CO: 4**Apply double integration techniques in evaluating areas bounded by region (L3) |
| | | | **CO:5** students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5 ) |
| 3 | I/I | **MATHEMATICS-II** | **CO:1** develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) |
| | | | **CO:2** solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) |

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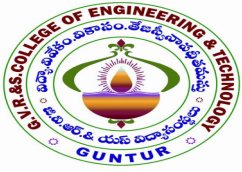*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | |
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| | | | **CO:3** evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) |
| | | | **CO:4** apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) |
| | | | **CO:5** apply numerical integral techniques to different Engineering problems (L3) |
| 4 | I/I | **PROGRAMMING FOR PROBLEM SOLVING USING C** | **CO:1** To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program |
| | | | **CO:2** To gain knowledge of the operators, selection, control statements and repetition in C |
| | | | **CO:3** To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage. |
| | | | **CO:4** To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. |
| | | | **CO:5** To assimilate about File I/O and significance of functions |
| 5 | I/I | **ENGINEERING DRAWING & DESIGN** | **CO1:**To introduce the students to use drawing instruments and to draw polygons, Engg. Curves. |
| | | | **CO2:**Constructing regular polygons by general methods, inscribing and describing polygons on circles. . |
| | | | **CO3:**Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normals for the curves |
| | | | **CO4:**Plain scales, diagonal scales and vernier scales |
| | | | **CO5:**The objective is to represent the object in 3D view through isometric views. |
| 6 | I/I | **ENGLISH COMMUNICATION SKILLS LABORATORY** | CO1:Vowels, Consonants, Pronunciation, Phonetic Transcription |
| | | | CO2:Past tense markers, word stress-di-syllabic words, Poly-Syllabic words |
| | | | CO3:Rhythm & Intonation |

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|  |  |  | CO4:Contrastive Stress (Homographs) |
|---|---|---|---|
|  |  |  | CO5:Word Stress: Weak and Strong forms<br>Stress in compound words |
| 7 | I/I | ELECTRICAL ENGINEERING WORKSHOP | CO1:To demonstrate the usage of measuring equipment |
|  |  |  | CO2: To train the students in setting up simple wiring circuits |
|  |  |  | CO3: To impart methods in electrical machine wiring |
| 8 | I/I | PROGRAMMING FOR PROBLEM SOLVING USING C LAB | CO:1Apply the principles of C language in problem solving |
|  |  |  | CO:2 To design flowcharts, algorithms and knowing how to debug programs. |
|  |  |  | CO:3 To design & develop of C programs using arrays, strings pointers & functions. |
|  |  |  | CO:4 To review the file operations, preprocessor commands. |
| 9 | I/I | ENVIRONMENTAL SCIENCE | CO:1 Overall understanding of the natural resources. |
|  |  |  | CO:2  Basic understanding of the ecosystem and its diversity. |
|  |  |  | CO:3  Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. |
|  |  |  | CO:4  An understanding of the environmental impact of developmental activities. |
|  |  |  | CO:5  Awareness on the social issues, environmental legislation and global treaties. |
| 10 | I/II | MATHEMATICS-III | CO:1  interpret the physical meaning of different operators such as gradient, curl and divergence (L5) |
|  |  |  | CO:2   estimate the work done against a field, circulation and flux using vector calculus (L5) |

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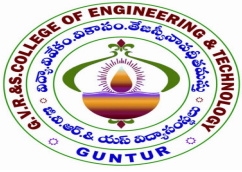*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | | CO:3 apply the Laplace transform for solving differential equations (L3) |
| | | | CO:4 find or compute the Fourier series of periodic signals (L3) |
| | | | CO:5 know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) |
| 11 | I/II | APPLIED PHYSICS | CO1 **Explain** the need of coherent sources and the conditions for sustained interference (L2) |
| | | | CO:2 **Identify** engineering applications of interference (L3 |
| | | | CO:3 **Analyze** the differences between interference and diffraction with applications (L4) |
| | | | CO:4 **Illustrate** the concept of polarization of light and its applications (L2) |
| | | | CO:5 **Classify** ordinary polarized light and extraordinary polarized light (L2) |
| 12 | I/II | DATA STRUCTURES THROUGH C | CO:1 Operations on linear data structures and their applications |
| | | | CO:2 The various operations on linked lists |
| | | | CO:3 The basic concepts of Trees, Traversal methods and operations. |
| | | | CO:4 Concepts of implementing graphs and its relevant algorithms |
| | | | CO:5 Sorting and searching algorithms |
| 13 | I/II | ELECTRICAL CIRCUIT ANALYSIS - I | CO:1 To study the concepts of passive elements, types of sources and various network reduction techniques. |
| | | | CO:2 To understand the applications of network topology to electrical circuits. |
| | | | CO:3 To study the concept of magnetic coupled circuit. |
| | | | CO:4 Get the knowledge on different hydraulic machinery devices and its principles that will be utilized in hydropower development and for other practical usages |
| | | | CO:5 To understand the behavior of RLC networks for sinusoidal excitations |

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| 14 | I/II | BASIC CIVIL AND MECHANICAL ENGINEERING | CO:1 To impart basic principles of stress, strain, shear force and bending moment |
| | | | CO:2 To teach principles of strain measurement using electrical strain gauges. |
| | | | CO:3 To impart basic characteristics of building materials |
| | | | CO:4 To familiarize the sources of energy, power plant economics and environmental aspects |
| | | | CO:5 To make the students to understand the basics concept of Boilers & I.C. engines. |
| 15 | I/II | BASIC CIVIL AND MECHANICAL ENGINEERING LAB | CO:1 To make the student learn about the constructional features and operational details of various types of internal combustion engines |
| | | | CO:2 To make the student learn about the constructional features, operational details of various types of hydraulic turbines |
| | | | CO:3 To practice the student about the fundamental of fluid dynamic equations and its applications fluid jets |
| 16 | I/II | APPLIED PHYSIC LAB | CO:1 Determination of wavelength of a source-Diffraction Grating-Normal incidence. |
| | | | CO:2 Newton's rings – Radius of Curvature of Plano - Convex Lens. |
| | | | CO:3 Determination of thickness of a spacer using wedge film and parallel interference fringes |
| 17 | I/II | DATA STRUCTURES THROUGH C LAB | CO:1 To develop skills to design and analyze simple linear and non linear data structures. |
| | | | CO:2 To strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem |
| | | | CO:3 To gain knowledge in practical applications of data structures |
| 18 | I /II | CONSTITUTION OF INDIA | CO:1 To Enable the student to understand the importance of constitution |
| | | | CO:2 To understand the structure of executive, legislature and judiciary |
| | | | CO:3 To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and election commission of India |
| | | | CO:4 To understand the central and state relation financial and administrative. |

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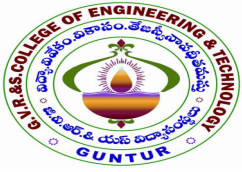*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| 19 | II/I | **ELECTRICAL CIRCUIT ANALYSIS-II** | CO:1  To study the concepts of balanced and unbalanced three-phase circuits. |
| | | | CO:2  To study the transient behavior of electrical networks with DC, pulse and AC excitations. |
| | | | CO:3  To study the performance of a network based on input and output excitation/response |
| | | | CO:4  To understand the realization of electrical network function into electrical equivalent passive elements. |
| | | | CO:5  To understand the application of fourier series and fourier transforms for analysis of electrical circuits. |
| 20 | II/I | **DC MACHINES AND TRANSFORMERS** | CO:1   To Understand the construction, principle of operation and performance of DC machines |
| | | | CO:2   To Learn the characteristics, performance, methods of speed control and testing methods of DC motors |
| | | | CO:3   To predetermine the performance of single phase transformers with equivalent circuit models |
| | | | CO:4 To Understand the methods of testing of single-phase transformer |
| | | | CO:5   To Analyze the three phase transformers and achieve three phase to two phase conversion |
| 21 | II/I | **ELECTRONIC DEVICES AND CIRCUITS** | CO:1 The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed . |
| | | | CO:2  Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes |
| | | | CO:3  The principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained. |
| | | | CO:4  The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained |

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| | | | CO:5 Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained. |
| 22 | II/I | ELECTROMAGNETIC FIELDS | CO:1 To study the production of electric field and potentials due to different configurations of static charges. . |
| | | | CO:2 To study the properties of conductors and dielectrics, calculate the capacitance of different configurations. Understand the concept of conduction and convection current densities. |
| | | | CO:3 To study the magnetic fields produced by currents in different configurations, application of Ampere's law and the Maxwell's second and third equations. |
| | | | CO:4 To study the magnetic force and torque through Lorentz force equation in magnetic field environment like conductors and other current loops. |
| | | | CO:5 To develop the concept of self and mutual inductances and the energy stored. |
| 23 | II/I | MATHEMATICS-IV | CO:1 To familiarize the complex variables. |
| | | | CO:2 To familiarize the students with the foundations of probability and statistical methods. |
| | | | CO:3 To equip the students to solve application problems in their disciplines. |
| 24 | II/I | DC MACHINES AND TRANSFORMERS LAB | CO:1 To plot the magnetizing characteristics of DC shunt generator and understand the mechanism of self-excitation. |
| | | | CO:2 To control the speed of DC motors. |
| | | | CO:3 To determine and predetermine the performance of DC machines. |
| 25 | II/I | ELECTRONIC DEVICES AND CIRCUITS LAB | CO:2 To study the characteristics of electronic components and measuring instruments |
| | | | CO:2 To understand the characteristics of PN, Zener diode, design rectifiers with and without filters |
| | | | CO:3 To understand the biasing of transistors |

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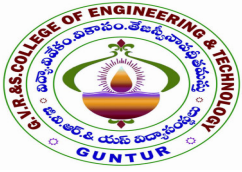*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| 26 | II/I | **ELECTRICAL CIRCUITS LAB** | CO:1 To verify and demonstrate various theorems and resonance. |
| | | | CO:2 To draw the locus diagram of series circuits |
| | | | CO:3 To determine the various parameters of a two port networks |
| | | | CO:4 To determine self and mutual inductance of a magnetic circuit, parameters of a given coil |
| | | | CO:5 To measure the power of three phase unbalanced circuit |
| 27 | II/I | **SKILL ORIENTED COURSE DESIGN OF ELECTRICAL CIRCUITS USING ENGINEERING SOFTWARE TOOLS** | CO:1 To Learn the fundamentals of MATLAB Tools |
| | | | CO:2 To generate various waveform signals and sequences |
| | | | CO:3 To verify and simulate various electrical circuits using Mesh and Nodal Analysis |
| | | | CO:4 To verify and simulate various theorems |
| | | | CO:5 To verify and simulate RLC series and parallel resonance |
| 28 | II/I | **PROFESSIONAL ETHICS & HUMAN VALUES** | CO:1 To create an awareness on Engineering Ethics and Human Values |
| | | | CO: 2 To instill Moral and Social Values and Loyalty |
| | | | CO:3 To appreciate the rights of others |
| | | | CO:4 To create awareness on assessment of safety and risk |
| | | | CO:5 To study the principle of operation and working of DVMS, Power analyser and applications of CRO. |
| 29 | II/II | **PYTHON PROGRAMMING** | CO:1 To learn about Python programming language syntax, semantics, and the runtime environment |
| | | | CO:2 To be familiarized with universal computer programming concepts like data types, containers |
| | | | CO:3 To be familiarized with general computer programming concepts like conditional execution, loops & functions |
| | | | CO:4 To be familiarized with general coding techniques and object-oriented programming . |

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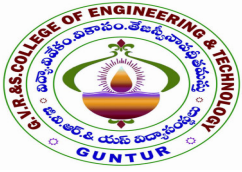
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| | | | CO:5 To Introduction to Programming Concepts with Scratch. |
| 30 | II/II | DIGITAL ELECTRONICS | CO:1 To solve a typical number base conversion and analyze new error coding techniques. |
| | | | CO:2 Theorems and functions of Boolean algebra and behavior of logic gates. |
| | | | CO:3 To optimize logic gates for digital circuits using various techniques. |
| | | | CO:4 To understand concepts of combinational circuits. |
| | | | CO:5 To develop advanced sequential circuits. |
| 31 | II/II | INDUCTION AND SYNCHRONOUS MACHINES | CO:1 Understand the principle of operation and performance of 3-phase induction motor. |
| | | | CO:2 Quantify the performance of induction motor and induction generator in terms of torque and slip. |
| | | | CO:3 To understand the torque producing mechanism of a single phase induction motor |
| | | | CO:4 To study parallel operation and control of real and reactive powers for synchronous generators. |
| | | | CO:5 To understand the operation, performance and starting methods of synchronous motors. |
| 32 | II/II | POWER SYSTEMS-I | CO:1 To study the principle of operation of different components of a thermal power stations. |
| | | | CO:2 To study the principle of operation of different components of a Nuclear power stations |
| | | | CO:3 To study the constructional and operation of different components of an Air and Gas Insulated substations |
| | | | CO:4 To study the constructional details of different types of cables. |
| | | | CO:5 To study different types of load curves and tariffs applicable to consumers. |
| 33 | II/II | MANAGERIAL | CO:1 The Learning objectives of this paper are to understand the |

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| | | **ECONOMICS & FINANCIAL ANALYSIS** | concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting.☐ |
| | | | CO:2  To familiarize about the Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.☐ |
| | | | CO:3  To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.☐ |
| | | | CO:4  To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation |
| | | | CO:5  Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals. |
| 34 | II/II | **PYTHON PROGRAMMING LAB** | CO:1  To acquire programming skills in core Python |
| | | | CO:2  To acquire Object Oriented Skills in Python . |
| | | | CO:3  To develop the skill of designing Graphical user Interfaces in Python |
| | | | CO:4  To develop the ability to write database applications in Python |
| 35 | II/II | **INDUCTION AND SYNCHRONOUS MACHINES LAB** | CO:1  Speed control methods of three-phase induction motors |
| | | | CO:2  Performance characteristics of three-phase and single-phase induction motors |
| | | | CO:3  Principles of power factor improvement of single-phase induction motor.☐ |
| | | | CO:4  Voltage regulation calculations of three–phase alternator by various methods, |
| | | | CO:5  Performance curves of three-phase synchronous motor.☐ |
| 36 | II/II | **DIGITAL ELECTRONICS LAB** | CO:1  To know the concept of Boolean laws for simplifying the digital circuits |
| | | | CO:2  To understand the concepts of flipflops.☐ |
| | | | CO:3  To understand the concepts of counters. |
| | | | CO:4  To analyze and design various circuits.☐ |
| | | | CO:5 Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects |
| 37 | II/II | **SKILL ORIENTED COURSE IOT APPLICATIONS OF** | CO: To understand fundamentals of various technologies of Internet of Things |

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| | | ELECTRICAL ENGINEERING | |
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| | | | CO:2 To know various communication technologies of Things<br>CO:3 To know the connectivity of devices using web and internet in the IoT environment. |
| | | | CO:4 To understand the implementation of IoT by studying case studies like Smart Home, Smart city, etc. |
| 38 | III/I | POWER SYSTEMS–II | CO:1 To compute inductance/capacitance of transmission lines and to understand the concepts of GMD/GMR |
| | | | CO:2 To study the short and medium length transmission lines, their models and performance |
| | | | CO:3 To study the effect of travelling waves on transmission lines. |
| | | | CO:4 To study the factors affecting the performance of transmission lines and power factor improvement methods. |
| | | | CO:5 To discuss sag and tension computation of transmission lines as well as to study the performance of overhead insulators. |
| 39 | III/I | POWER ELECTRONICS | CO:1 To study the characteristics of various power semiconductor devices and to design firing circuits for SCR |
| | | | CO:2 To understand the operation of single phase full–wave converters and analyze harmonics in the input current |
| | | | CO:3 To study the operation of three phase full–wave converters. |
| | | | CO:4 To understand the operation of inverters and application of PWM techniques for voltage control and harmonic mitigation |
| | | | CO: 5 To analyze the operation of AC-AC regulators. |
| 40 | III/I | CONTROL SYSTEMS | CO:1 To learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function |

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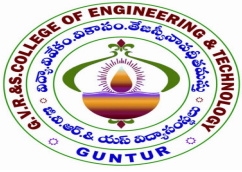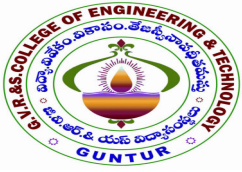*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | CO:2 To analyze the time response of first and second order systems and improvement of performance using PI, PD, PID controllers. To investigate the stability of closed loop systems using Routh's stability criterion and root locus method. |
| | | | CO:3 To understand basic aspects of design and compensation of LTI systems using Bode diagrams |
| | | | CO:4 To learn Frequency Response approaches for the analysis of LTI systems using Bode plots, polar plots and Nyquist stability criterion. |
| | | | CO:5 To learn state space approach for analysis of LTI systems and understand the concepts of controllability and observability |
| 41 | III/I | **UTILIZATION OF ELECTRICAL ENERGY** | CO 1 To study the basic principles of illumination and its measurements and to design the different types lighting systems |
| | | | CO 2 To acquaint with the different types of heating and welding techniques |
| | | | CO 3 To understand the operating principles and characteristics of various motors with respect to speed, temperature and loading conditions. |
| | | | CO 4 To understand the basic principles of electric traction including speed–time curves of different traction services and calculation of braking, acceleration and other related parameters |
| | | | CO 5 To Introduce the concepts of various types of energy storage systems. |
| 42 | III/I | **Principles of Communications** | CO:1 Analyze the performance of analog modulation schemes in time and frequency domains. |
| | | | CO:2 Analyze the performance of angle modulated signals. |
| | | | CO:3 Characterize analog signals in time domain as random processes and noise |
| | | | CO:4 Characterize the influence of channel on analog modulated signals |
| | | | CO:5 Determine the performance of analog communication systems in terms of SNR |
| 43 | III/I | **POWER ELECTRONICS LABORATORY** | CO:1 To learn the characteristics of various power electronic devices and analyze firing circuits and commutation circuits of SCR. |
| | | | CO:2 To analyze the performance of single–phase and three–phase full–wave bridge converters with both resistive and inductive loads. |
| | | | CO:3 To understand the operation of AC voltage regulator with resistive and inductive loads. |

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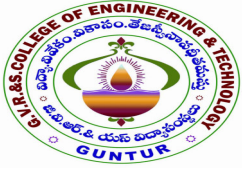*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | |
|---|---|---|---|
| | | | CO:4  To understand the working of Buck converter and Boost converter. |
| | | | CO:5  To understand the working of single-phase & three-phase inverters. |
| 44 | III/I | **CONTROL SYSTEMS LABORATORY** | CO:1  To impart hands on experience to understand the performance of basic control system components such as magnetic amplifiers  : |
| | | | CO:2  D.C. servo motors, A.C. Servo motors and Synchros. |
| | | | CO:3  To understand time and frequency responses of control system with and without controllers and compensators |
| 45 | III/I | **SOFT SKILL COURSE EMPLOYABILITY SKILLS** | CO:1  To enhance the Numerical ability skills such as addition, subtraction, multiplication, division, calculation of percentages, average etc. |
| | | | CO:2  To develop the problem solving skills on time, distance and speed calculations, to improve the basic mathematical skills on arithmetic ability. |
| | | | CO:3  To analyze a candidate's ability to relate a certain given group of items and illustrate it diagrammatically |
| | | | CO:4  To develop interpersonal skills and adopt good leadership behavior for empowerment of self and others.by managing stress and time effectively |
| | | | CO:5 To prepare good resume, prepare for interviews and group discussions, and to explore desired career opportunities |
| 46 | III/I | **ENVIRONMENTAL SCIENCE** | CO:1  Overall understanding of the natural resources. |
| | | | CO:2  Basic understanding of the ecosystem and its diversity. |
| | | | CO:3 Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities. |
| | | | CO:4  An understanding of the environmental impact of developmental activities |
| | | | CO:5  Awareness on the social issues, environmental legislation and global treaties |
| 47 | III/II | ELECTRIC DRIVES | CO:1 To learn the fundamentals of electric drive and different electric braking methods |
| | | | CO:2 To analyze the operation of three phase converter controlled dc motors and four quadrant operation of dc motors using dual |

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|  |  |  | converters. |
|---|---|---|---|
|  |  |  | CO:3 To discuss the converter control of dc motors in various quadrants. |
|  |  |  | CO:4 To understand the concept of speed control of induction motor by using AC voltage controllers and voltage source inverters |
|  |  |  | CO:5 To understand the speed control mechanism of synchronous motors |
| 48 | III/II | **POWER SYSTEM ANALYSIS** | CO:1  To development the impedance diagram (p.u) and formation of $Y_{bus}$ |
|  |  |  | CO:2  To study the different load flow methods |
|  |  |  | CO:3  To study the concept of the $Z_{bus}$building algorithm. |
|  |  |  | CO:4  To study short circuit calculation for symmetrical faults |
|  |  |  | CO:5  To study the effect of unsymmetrical faults and their effects. |
| 49 | III/II | **MICROPROCESSORS AND MICROCONTROLLERS** | CO:1  To understand the organization and architecture of Microprocessor |
|  |  |  | CO:2   To understand addressing modes to access memory |
|  |  |  | CO:3  To understand 8051 micro controller architecture |
|  |  |  | CO:4   To understand the programming principles for 8086 and 8051 |
|  |  |  | CO:5   To understand the interfacing of Microprocessor with I/O as well as other devices |
| 50 | III/II | **ELECTRICAL MEASUREMENTS AND INSTRUMENTATION** | CO:1   To understand and analyze the factors that effect the various measuring units. |
|  |  |  | CO:2   To choose the appropriate meters for measuring of voltage, current, power, power factor and energy qualities & understand the concept of standardization |
|  |  |  | CO:3   Describe the operating principle of AC & DC bridges for measurement of resistance, inductance and capacitance |
|  |  |  | CO:4   To understand the concept of the transducer and their effectiveness in converting from one form to the other form for the ease of calculating and measuring purposes. |

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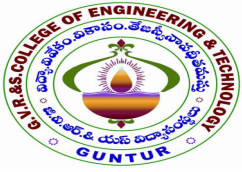*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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|  |  |  | CO:5   To understand the operating principles of basic building blocks of digital systems, record and display units. |
|---|---|---|---|
| 51 | III/II | **Basic electronics** | CO:1  Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation. |
|  |  |  | CO:2  Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons |
|  |  |  | CO:3  Understand the construction, principle of operation of transistors, |
|  |  |  | CO:4  To Characteristics and Parameters |
| 52 | III/II | **ELECTRICAL MEASUREMENTS AND INSRUMENTATION LABORATORY** | CO:1   To understand students how different types of meters work and their construction. |
|  |  |  | CO:2   To make the students understand how to measure resistance, inductance and capacitance by AC & DC bridges |
|  |  |  | CO:3  To understand the testing of CT and PT. |
|  |  |  | CO:4  To study the procedure for standardization and calibration of various methods |
| 53 | III/II | **POWER SYSTEMS AND SIMULATION LAB** | CO:1  Estimate the sequence impedances of 3-phase Transformer and Alternators |
|  |  |  | CO:2   Evaluate the performance of transmission lines |
|  |  |  | CO:3  Analyse and simulate power flow methods in power systems |
|  |  |  | CO:4   Analyse and simulate the performance of PI controller for load frequency control. |
|  |  |  | CO:5  Analyse and simulate stability studies of power systems |
| 54 | III/II | **MICRO PROCESSORS AND MICRO CONTROLLERS LAB** | CO:1  To study programming based on 8086 microprocessor and 8051 microcontroller |
|  |  |  | CO:2  To study 8086 microprocessor based ALP using arithmetic, logical and shift operations. |
|  |  |  | CO:3  To study to interface 8086 with I/O and other devices. |
|  |  |  | CO:4  To study parallel and serial communication using 8051& PIC 18 micro controllers. |

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**Electrical & Electronics Engineering I & II Sem Course outcomes for the Academic year 2020- 2021**

| S.NO. | YEAR/ SEM | COURSE NAME | Course Outcomes |
|---|---|---|---|
| 55 | III/II | SKILL ADVANCED COURSE MACHINE LEARNING WITH PYTHON | **CO1:** patterns and concepts from data without being explicitly programmed in various IOT nodes. |
| | | | **CO2:** to design and analyze various machine learning algorithms and techniques with a modern outlook focusing on recent advances. |
| | | | **CO3:** to explore supervised and unsupervised learning paradigms of machine earning, Deep learning technique and various feature extraction strategie |
| 56 | III/II | RESEARCH METHODOLOGY | **CO1:** To understand the objectives and characteristics of a research problem |
| | | | **CO2:** To analyze research related information and to follow research ethics |
| | | | **CO3:** To understand the types of intellectual property rights. |
| | | | **CO4:** To learn about the scope of patent rights. |
| | | | **CO5:** To understand the new developments in IPR |

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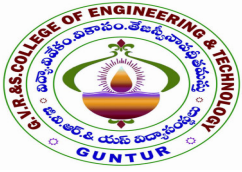*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | | |
|---|---|---|---|
| 57 | IV/I | **FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEMS THROUGH JAVA** | **CO1:** To learn the basics of power flow control in transmission lines using FACTS controllers |
| | | | **CO2:** To explain operation and control of voltage source converter. |
| | | | **CO3:** To learn the method of shunt compensation using static VAR compensators |
| | | | **CO4:** To learn the methods of compensation using series compensators |
| | | | **CO5:** To explain operation of Unified Power Flow Controller (UPFC) and Interline Power flow Controller (IPFC). |
| 58 | IV/I | **HIGH VOLTAGE ENGINEERING** | **CO1**: To understand HV breakdown phenomena in gases. |
| | | | **CO2**: To understand the breakdown phenomenon of liquids and solid dielectrics. |
| | | | **CO3:**. To acquaint with the generating principle of operation and design of HVDC, AC voltages. |
| | | | **CO4**: To understand the generating principles of Impulse voltages & currents |
| | | | **CO5:** To understand various techniques for AC, DC and Impulse measurements of high voltages and currents |
| 59 | IV/I | **POWER SYSTEM OPERATION AND CONTROL** | **CO1:** To understand optimal dispatch of generation with and without losses. |
| | | | **CO2:** To understand the optimal scheduling of hydro thermal systems |
| | | | **CO3**: To understand the optimal unit commitment problem. |
| | | | **CO4**: To understand the load frequency control for single area system with and without controllers |
| | | | **CO5:** To understand the load frequency control for two area system with and without controllers |
| 60 | IV/I | **HIGH VOLTAGE ENGINEERING** | **CO1:** To understand HV breakdown phenomena in gases, liquids and solids dielectrics. |
| | | | **CO2:** To acquaint with the generating principle of operation and design of HVDC, AC and Impulse voltages and currents. |
| | | | **CO3:** To understand various techniques for AC, DC and Impulse measurement of high voltages and currents. . |
| | | | **CO4:** To understand the insulating characteristics of dielectric materials. |

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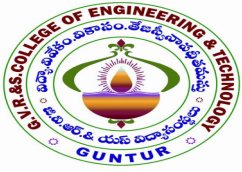*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | |
|---|---|---|---|
| | | | **CO5:** To understand the various testing techniques of HV equipments. |
| **61** | IV/I | **UNIVERSAL HUMAN VALUES-2: UNDERSTANDING HARMONY** | **CO1:** To Need, Basic Guidelines, Content and Process for Value Education |
| | | | **CO2:** To Understanding Harmony in the Human Being - Harmony in Myself! |
| | | | **CO3** To Understanding Harmony in the Family and Society- Harmony in Human Relationship. |
| | | | **CO4:** To Understanding Harmony in the Nature and Existence - Whole existence as Coexistence |
| | | | **CO5:** To Implications of the above Holistic Understanding of Harmony on Professional Ethics |
| **62** | IV/I | **SKILL ADVANCED COURSE MACHINE LEARNING WITH PYTHON LAB** | **CO1:** To Requirements: Develop the following program using Anaconda/ Jupiter/ Spider and evaluate MLmodels |
| | | | **CO2:** Implement procedures for the machine learning algorithms. |
| | | | **CO3:** Design and Develop Python programs for various Learning algorithms |
| | | | **CO4:** Apply appropriate data sets to the Machine Learning algorithms |
| | | | **CO5:** Develop Machine Learning algorithms to solve real world problems |
| **63** | IV/I | **INDUSTRIAL ELECTRONICS** | **CO1:** Understand the concept of DC amplifiers |
| | | | **CO2:** Analyze and design different voltage regulators for real time applications |
| | | | **CO3:** Describe the basis of SCR and Thyristor |
| | | | **CO4:** Determine the performance of DIAC and TRIAC |
| | | | **CO5:** Develop real time application using electronics |
| **64** | IV/I | **Digital Logic design** | **CO1:** Classify different number systems and apply togenerate various codes |
| | | | **CO2:** Use the concept of Boolean algebra in minimization of switching functions |
| | | | **CO3:** Design different types of combination allogic circuits |
| | | | **CO4:** Apply knowledge offlip-flops in designing of Registers and counters |
| | | | **CO5:** The operation and design methodology for synchronous sequential circuits and algorithmic state machines |

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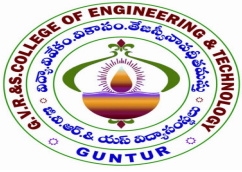*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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# Computer Science and Engineering Course Outcomes
## for the Academic Year 2023-2024

| Computer Science and Engineering I&II Sem Course Outcomes for the Academic Year | | | |
|---|---|---|---|
| S.No. | Year/Sem | Course Name | Course Outcomes |
| 1 | I/I | **Communicative English** | **CO1**: understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information |
| | | | **CO2:** ask and answer general questions on familiar topics and introduce oneself/others |
| | | | **CO3:** employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information |
| | | | **CO4:** recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs |
| | | | **CO5:** form sentences using proper grammatical structures and correct word forms |
| 2 | I/I | **Mathematics -I** | **CO1:** utilize mean value theorems to real life problems (L3) |
| | | | **CO2:** solve the differential equations related to various engineering fields (L3) |
| | | | **CO3:** familiarize with functions of several variables which is useful in optimization (L3) |
| | | | **CO4:** apply double integration techniques in evaluating areas bounded by region (L3) |
| | | | **CO5:** students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5 ) |
| 3 | I/I | **Applied Physics** | **CO:1** Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2) . |
| | | | **CO:2** Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and |

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| | | | other fields (L2). Apply the fiber optic concepts in various fields (L3). |
|---|---|---|---|
| | | | **CO:3** Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in onedimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2) |
| | | | **CO:4** Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3) |
| | | | **CO:5** Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2). |
| 4 | I/I | **Programming for Problem Solving using C** | **CO:1** To write algorithms and to draw flowcharts for solving problems |
| | | | **CO:2** To convert flowcharts/algorithms to C Programs, compile and debug programs |
| | | | **CO:3** To use different operators, data types and write programs that use two-way/ multi-way selection |
| | | | **CO:4** To select the best loop construct for a given problem |
| | | | **CO:5** To design and implement programs to analyze the different pointer applications |
| | | | **CO:6** To decompose a problem into functions and to develop modular reusable code |
| | | | **CO:7** To apply File I/O operations |
| 5 | I/I | **Computer Engineering** | **CO1:** Assemble and disassemble components of a PC |

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| | | | |
|---|---|---|---|
| | | **Workshop** | **CO2:** Construct a fully functional virtual machine, Summarize various Linux operating system Commands |
| | | | **CO3:** Recognize characters & extract text from scanned images, Create audio files and podcasts. |
| 6 | I/I | **English Communication Skills Laboratory** | **CO1:** Better pronunciation and accent |
| | | | **CO2:** Ability to use functional English |
| | | | **CO3**: Competency in analytical skills and problem solving skills |
| 7 | I/I | **Applied Physics Lab** | **CO1:** Demonstrate the concepts of physics experimentally with physical equipment. |
| | | | **CO2:** Summarize the required data to perform experiments related to engineering physics. |
| | | | **CO3:** Calculate the physical values with targeted accuracy by explaining the basic knowledge, principles, and concepts of physics using required instruments. |
| 6 | I/I | **Programming for Problem Solving using C Lab** | **CO1:** Gains Knowledge on various concepts of a C language. |
| | | | **CO2:** Able to draw flowcharts and write algorithms. |
| | | | **CO3:** Able design and development of C problem solving skills. |
| | | | **CO4:** Able to design and develop modular programming skills. |
| | | | **CO5:** Able to trace and debug a program |
| 7 | I/II | **Mathematics – II** | **CO1:** develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) |
| | | | **CO2:** solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) |
| | | | **CO3:** evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) |
| | | | **CO4:** apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) |
| | | | **CO5:** apply numerical integral techniques to different Engineering problems (L3) |
| | | | **CO6:** apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3) |

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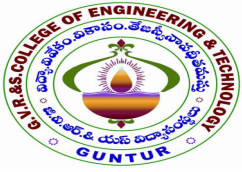*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| 8 | I/II | **Applied Chemistry** | **CO1:** Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. |
| | | | **CO2:** Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion. |
| | | | **CO3:** Synthesize nanomaterials for modern advances of engineering technology. |
| | | | **CO4:** Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors. |
| | | | **CO5:** Analyze the principles of different analytical instruments and their applications. |
| | | | **CO6:** Design models for energy by different natural sources. |
| | | | **CO7:** Obtain the knowledge of computational chemistry and molecular machines |
| 9 | I/II | **Computer Organization** | **CO1:** Demonstrate and understanding of the design of the functional units of a digital computer system. |
| | | | **CO2:** Relate Postulates of Boolean algebra and minimize combinational functions |
| | | | **CO3:** Recognize and manipulate representations of numbers stored in digital computers |
| | | | **CO4:** Build the logic families and realization of logic gates. |
| | | | **CO5:** Design and analyze combinational and sequential circuits |
| | | | **CO6:** Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components |
| | | | **CO7:** Solve elementary problems by assembly language programming |
| 10 | I/II | **Python Programming** | **CO1:** Develop essential programming skills in computer programming concepts like data |

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| | | | |
|---|---|---|---|
| | | | types, containers |
| | | | **CO2:** Apply the basics of programming in the Python language |
| | | | **CO3:** Solve coding tasks related conditional execution, loops |
| | | | **CO4:** Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming |
| 11 | I/II | **Data Structures** | **CO1:** Summarize the properties, interfaces, and behaviors of basic abstract data types |
| | | | **CO2:** Discuss the computational efficiency of the principal algorithms for sorting & searching |
| | | | **CO3:** Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs |
| | | | **CO4:** Demonstrate different methods for traversing trees |
| 12 | I/II | **Applied Chemistry Lab** | **CO1:** Student will know structure property relationship and corrosion. |
| | | | **CO2:** Student will know the use of water as an engineering material, its properties and applications. |
| | | | **CO3:** Student will generate usefulness and apply the various instrumental techniques for identification and characterization of materials |
| | | | **CO4:** Student will understand the various types of fuels and combustion. |
| | | | **CO5:** Student will know the types, properties and applications of polymers and nanomaterials. |
| 13 | I/II | **Python Programming Lab** | **CO1:** Develop essential programming skills in computer programming concepts like data types, containers |
| | | | **CO2:** Apply the basics of programming in the Python language |
| | | | **CO3:** Solve coding tasks related conditional execution, loops |
| | | | **CO4:** Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming |
| 14 | I/II | **Data Structures Lab** | **CO1:** Use basic data structures such as arrays and linked list. |
| | | | **CO2:** Programs to demonstrate fundamental algorithmic problems including Tree. Traversals, Graph traversals, and shortest paths. |

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| | | | CO3: Use various searching and sorting algorithms. |
|---|---|---|---|

| S.NO. | YEAR/SEM | COURSE NAME | Course Outcomes |
|---|---|---|---|
| 15 | II/I | OBJECT ORIENTED PROGRAMMING THROUGH C++ | CO1:. Classify object oriented programming and procedural programming |
| | | | CO2:. Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling |
| | | | CO3:. Build C++ classes using appropriate encapsulation and design principles |
| | | | CO4: Apply object oriented or non-object oriented techniques to solve bigger computing problems |
| 16 | II/I | OPERATING SYSTEMS | CO1: Describe various generations of Operating System and functions of Operating System |
| | | | CO2: Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance |
| | | | CO3: . Solve Inter Process Communication problems using Mathematical Equations by various methods |
| | | | CO4: . Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques |
| | | | CO5: . Outline File Systems in Operating System like UNIX/Linux and Windows |
| 17 | II/I | SOFTWARE ENGINEERING | CO1: Ability to transform an Object-Oriented Design into high quality, executable code |
| | | | CO2: Skills to design, implement, and execute test cases at the Unit and Integration level |
| | | | CO3: Compare conventional and agile software methods |
| | | MATHEMATICAL FOUNDA | CO1: Comprehend mathematical principles and logic |
| | | | CO2: Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software |

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| 18 | II/I | TIONS OF COMPUTER SCIENCE | CO3:. Manipulate and analyze data numerically and/or graphically using appropriate Software |
|---|---|---|---|
| 19 | II/I | MATHEMATICS - III | CO1: Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) |
| | | | CO2: Estimate the work done against a field, circulation and flux using vector calculus (L5) |
| | | | CO3: Apply the Laplace transform for solving differential equations (L3) |
| | | | CO4: Find or compute the Fourier series of periodic signals (L3) |
| | | | CO5: Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) |
| | | | CO6: . Identify solution methods for partial differential equations that model physical processes (L3) |
| 20 | II/I | CONSTITUTION OF INDIA | Co1: Understand historical background of the constitution making and its importance for building a democratic India.. |
| | | | CO2: Understand the functioning of three wings of the government ie., executive, legislative and judiciary. |
| | | | CO3: Understand the value of the fundamental rights and duties for becoming good citizen of India. |
| | | | CO4: Analyze the decentralization of power between central, state and local self- government |
| | | | CO5: Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy. |
| 21 | II/I | OBJECT ORIENTED PROGRAMMING THROUG | CO1: Apply the various OOPs concepts with the help of programs |

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| | | | |
|---|---|---|---|
| | | **H C++ LAB** | |
| 22 | II/I | **OPERATING SYSTEM LAB** | **CO1:** To use the Unix file system and file access control |
| | | | **CO2:** To use of an operating system to develop software |
| | | | **CO3:** Students will be able to use Linux environment efficiently |
| | | | **CO4:** Solve problems using bash for shell scripting . |
| 23 | II/I | **SOFTWARE ENGINEERING LAB** | **CO1:** By the end of this lab the student is able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project |
| | | | **CO2:** . prepare SRS document, design document, test cases and software configuration management and risk management related document |
| | | | **CO3:** develop function oriented and object oriented software design using tools like rational rose. |
| | | | **CO4:**use modern engineering tools necessary for software project management, estimations, time management and software reuse |
| | | | **CO5:** generate test cases for software testing |
| 24 | II/I | **WEB APPLICATION DEVELOPMENT USING FULL STACK** Frontend Development – Module -I | **CO1**: Analyze a web page and identify its elements and attributes. |
| | | | **CO2**: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet |
| | | | **CO3**: Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone |
| | | | **CO4**. Create web pages using HTML and Cascading Style Sheets |

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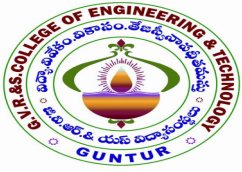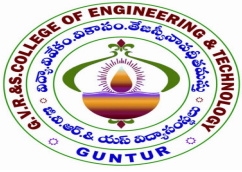
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| 25 | II/II | PROBABILITY AND STATISTICS | **CO1:** Classify the concepts of data science and its importance (L4) or (L2) |
|---|---|---|---|
| | | | **CO2** Interpret the association of characteristics and through correlation and regression tools (L4) |
| | | | **CO3** Make use of the concepts of probability and their applications (L3) |
| | | | **CO4:** Apply discrete and continuous probability distributions (L3) and event handling |
| | | | **CO5:** Design the components of a classical hypothesis test (L6) |
| | | | **CO6:** Infer the statistical inferential methods based on small and large sampling tests (L4) |
| 26 | II/II | DATABASE MANAGEMENT SYSTEMS | **CO1:** Describe a relational database and object-oriented database |
| | | | **CO2:** . Create, maintain and manipulate a relational database using SQL |
| | | | **CO3:** Describe ER model and normalization for database design |
| | | | **CO4:** Examine issues in data storage and query processing and can formulate appropriate solutions . |
| | | | **CO5:** Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage |
| 27 | II/II | FORMAL LANGUAGES AND AUTOMATA THEORY | **CO1:** Classify machines by their power to recognize languages |
| | | | **CO2:** Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy |
| | | | **CO3:** Employ finite state machines to solve problems in computing |
| | | | **CO4:** Illustrate deterministic and non-deterministic machines |
| | | | **CO5:** Quote the hierarchy of problems arising in the computer science |
| 28 | II/II | JAVA | **CO1:** . Able to realize the concept of Object Oriented |

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| | | | |
|---|---|---|---|
| | | **PROGRAMMING** | Programming & Java Programming       Constructs |
| | | | **CO2**: Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords |
| | | | **CO3**: Apply the concept of exception handling and Input/ Output operations |
| | | | **CO4**: Able to design the applications of Java & Java applet |
| | | | **CO5**: Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit |
| **29** | **II/II** | **MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY** | **CO1**: The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product |
| | | | **CO2:** The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs |
| | | | **CO3:** . The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units . |
| | | | **CO4:** The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis |
| | | | **CO5:** The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making |
| **30** | **II/II** | **DATABASE MANAGEMENT SYSTEMS LAB** | **CO1:** . Utilize SQL to execute queries for creating database and performing data manipulation operations. |
| | | | **CO2:** Examine integrity constraints to build efficient databases. |
| | | | **CO3:** . Apply Queries using Advanced Concepts of SQL |
| | | | **CO4:** Build PL/SQL programs including stored procedures, functions, cursors and triggers |
| **31** | **II/II** | **R PROGRAMMING LAB** | **CO1:** Access online resources for R and import new function packages into the R workspace |
| | | | **CO2**: Import, review, manipulate and summarize data-sets in R |
| | | | **CO3:** Explore data-sets to create testable hypotheses and identify appropriate statistical tests. |
| | | | **CO4:** . Perform appropriate statistical tests using R |

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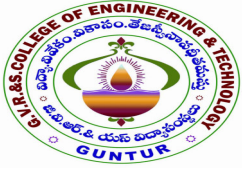*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | |
|---|---|---|---|
| | | | CO5: Create and edit visualizations with R |
| 32 | II/II | JAVA PROGRAMMING LAB | CO1 Evaluate default value of all primitive data type, Operations, Expressions, Control- flow, Strings |
| | | | CO2: Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism |
| | | | CO3: Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism |
| | | | CO4: Construct Threads, Event Handling, implement packages, developing applets |
| 33 | II/II | WEB APPLICATION DEVELOPMENT USING FULL STACK Frontend Development – Module -II | CO1: develop of the major Web application tier- Client side development |
| | | | CO2: participate in the active development of cross-browser applications through JavaScript |
| | | | CO3: Develop JavaScript applications that transition between states |
| 34 | III/I | COMPUTER NETWORKS | CO1: Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards |
| | | | CO2: Discuss different transmission media and different switching networks |
| | | | CO3. Analyze data link layer services, functions and protocols like HDLC and PPP |
| | | | CO4: Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols |
| | | | CO5: Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc. |

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| 35 | III/I | DESIGN AND ANALYSIS OF ALGORITHMS | **CO1:** Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms |
|---|---|---|---|
| | | | **CO2:** List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method |
| | | | **CO3**. Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations |
| | | | **CO4:** Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches |
| | | | **CO5:** Demonstrate NP- Completeness theory ,lower bound theory and String Matching |
| 36 | III/I | DATA WAREHOUSING AND DATA MINING | **CO1:** Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications. |
| | | | **CO2**. Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms |
| | | | **CO3**. Choose appropriate classification technique to perform classification, model building and evaluation. |
| | | | **CO4** Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent itemsets generation. |
| | | | **CO5**. Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result. |
| 37 | III/I | SOFTWARE PROJECT MANAGEMENT | **CO1:** Apply the process to be followed in the software development life-cycle models |
| | | | **CO2**. Apply the concepts of project management & planning |

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| | | (Professional Elective –I) | **CO3**. . Implement the project plans through managing people, communications and change |
| | | | **CO4** .Conduct activities necessary to successfully complete and close the Software projects |
| | | | **CO5**. .Implement communication, modeling, and construction & deployment practices in software development |

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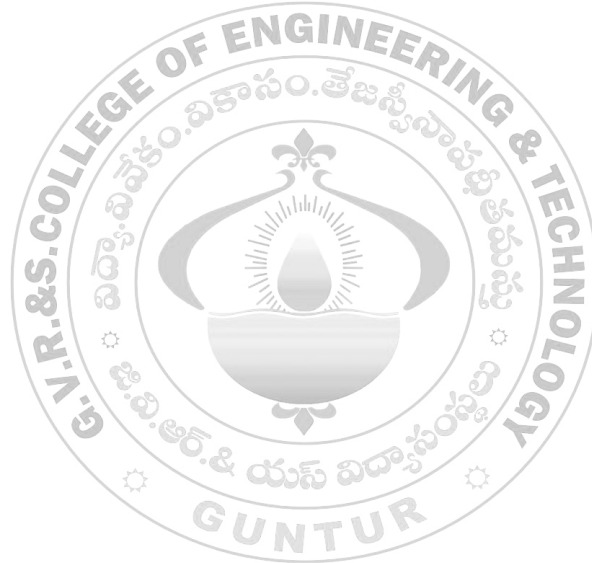**GUNTUR - 522017**

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| 38 | III/I | EMPLOY ABILITY SKILLS-I | CO1: . Understand the corporate etiquette.. |
| | | | CO2. Make presentations effectively with appropriate body language |
| | | | CO3. Be composed with positive attitude |
| | | | CO4 . Understand the core competencies to succeed in professional and personal life |
| 39 | III/I | DATA WAREHO USING AND DATA MINING LAB | CO1: Design a data mart or data warehouse for any organization |
| | | | CO2. Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques |
| | | | CO3. . Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data |
| | | | CO4 . . Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results |

| 40 | III/I | COMPUTER NETWORKS LAB | CO1 how reliable data communication is achieved through data link layer. |
| | | | CO2. Suggest appropriate routing algorithm for the network |
| | | | CO3:. Provide internet connection to the system and its installation |
| | | | CO4: . Work on various network management tools |

| 41 | III/I | CONTINUOUS | CO1:. Understand  the why,What and how of devops adoption |
| | | | CO2 Attain literacy on Devops |
| | | | CO3:. Align Capabilities  Required in the team |

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| | | INTEGRATION AND CONTINUOUS DELIVERY USING DevOps (Skill Oriented Course) | **CO4:** Create an automated CICD Pipeline using a stack of tools. |
| 42 | III/II | MACHINE LEARNING | **CO1:**. Explain the fundamental usage of the concept Machine Learning system |
| | | | **CO2:** Demonstrate on various regression Technique |
| | | | **CO3:**. Analyze the Ensemble Learning Methods |
| | | | **CO4:** Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning. |
| | | | **CO5:** Discuss the Neural Network Models and Fundamentals concepts of Deep Learning |
| 43 | III/II | COMPILER DESIGN | **CO1:**. Demonstrate Phases in the design of compiler |
| | | | **CO2:** Organize Syntax Analysis, Top Down and LL(1) grammars. |
| | | | **CO3:**. . Analyze synthesized, inherited attributes and syntax directed translation schemes |
| | | | **CO4** Determine algorithms to generate code for a target machine |
| 44 | III/II | CRYPTOGRAPHY AND NETWORK SECURITY | **CO1:**. Explain different security threats and countermeasures and foundation course of cryptography mathematics |
| | | | **CO2**. Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography |
| | | | **CO3** Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more |
| | | | **CO4:** Design applications of hash algorithms, digital signatures and key management techniques |

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| | | | CO5: Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec . |
| 45 | III/II | OBJECT ORIENTED ANALYSIS AND DESIGN | CO1:. Analyze and nature of Complex system and its solutions |
| | | | CO2: Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships |
| | | | CO3:. Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications. |
| | | | CO4 Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams. |
| | | | CO5 Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems. |
| 46 | III/II | DATA COMMUNI CATIONS | CO1 Know the Categories and functions of various Data communication Networks |
| | | | CO2: Design and analyze various error detection techniques.. |
| | | | CO3:. . Demonstrate the mechanism of routing the data in network layer |
| | | | CO4 . Know the significance of various Flow control and Congestion control Mechanisms |
| 47 | III/II | EMPLOY ABILITY SKILLS-II | CO1: Solve Various Basic Mathematics Problems by following different Methods |
| | | | CO2: Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems |

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| | | | |
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| | | | **CO3:**. Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life. |
| | | | **CO4 :** Analyze, summarize and present information in quantitative forms including table, graphs and formulas |
| 48 | III/II | **MACHINE LEARNING USING PYTHON LAB** | **CO1:**. Implement Procedures for the Machine Learning algorithms |
| | | | **CO2:** Design and Develop Python programs for various Learning algorithms |
| | | | **CO3:**. Apply appropriate data sets to the Machine Learning algorithms |
| | | | **CO4 :** Develop Machine Learning algorithms to solve real world problems |
| 49 | III/II | **COMPILER DESIGN LAB** | **CO1** Design Simple Lexical Analyzers |
| | | | **CO2:** Determine predictive parsing table for a CFG |
| | | | **CO3:**. Apply Lex and Yacc tools. |
| | | | **CO4 :** Examine LR parser and generating SLR Parsing table. |
| | | | **CO5:** Relate Intermediate code generation for subset C language |
| 50 | III/II | **CRYPTO GRAPHY NETWORK SECURITY LAB** | **CO1:** Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher |
| | | | **CO2:** . Demonstrate the different algorithms like DES, BlowFish, and Rijndael, encrypt the text "Hello world" using Blowfish Algorithm. |

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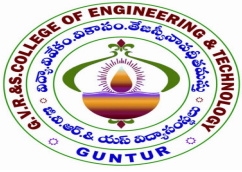*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | |
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| | | | **CO3:** . Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm |
| 51 | III/II | **MEAN STACK TECHNO LOGIES-MODULE I (HTML 5, JAVASCR IPT, EXPRESS. JS, NODE.JS AND TYPESCR IPT) (Skill Oriented Course)** | **CO1:** . .Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles |
| | | | **CO2:** . Utilize JavaScript for developing interactive HTML web pages and validate form data. . |
| | | | **CO3.** Build a basic web server using Node.js and also working with Node Package Manager (NPM). |
| | | | **CO4 :** . Build a web server using Express.js |
| | | | **CO5:** . Make use of Typescript to optimize JavaScript code by using the concept of strict type checking |
| 52 | IV/I | **CLOUD COMPUTI NG (Professio nal Elective-III)** | **CO1:.** Illustrate the key dimensions of the challenge of Cloud Computing |
| | | | **CO2:** Classify the Levels of Virtualization and mechanism of tools. . |
| | | | **CO3.** . Analyze Cloud infrastructure including Google Cloud and Amazon Cloud. |
| | | | **CO4 :** . Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud |
| | | | **CO5:** . Assess control storage systems and cloud security, the risks involved its impact and develop cloud application |
| 53 | IV/I | **COMPUT ER VISION** | **CO1:.** . Identify basic concepts, terminology, theories, models and methods in the field of computer vision |

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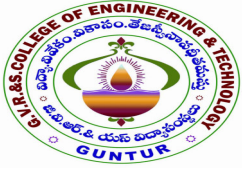
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| | | **(Professional Elective-IV)** | **CO2:** . Describe known principles of feature detection and matching,. |
| | | | **CO3**. Describe basic methods of computer vision related to image stitching, photography like high dynamic range imaging and blur removal. |
| | | | **CO4** : Suggest a design of a computer vision system for a 3D Reconstruction, Albedos, image based rendering views and depths |
| 54 | IV/I | **UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY** | **CO1:**. . . Development of a holistic perspective based on self-exploration about themselves (human being),family, society and nature/existence. |
| | | | **CO2:** . . Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence. |
| | | | **CO3** Strengthening of self-reflection. |
| | | | **CO4** : Development of commitment and courage to act. |
| 55 | IV/I | **INTERNET OF THINGS** | **CO1**. Understand internet of Things and its hardware and software components. |
| | | | **CO2:** . Interface I/O devices, sensors & communication modules |
| | | | **CO3**. Remotely monitor data and control devices. |
| | | | **CO4** : . Design real time IoT based applications |
| 56 | IV/I | **PRINCIPLES OF COMMUNICATIONS** | **CO1:**. . Analyze the performance of analog modulation schemes in time and frequency domains. |
| | | | **CO2:** . . Analyze the performance of angle modulated signals. |
| | | | **CO3**. Characterize analog signals in time domain as random processes and noise |

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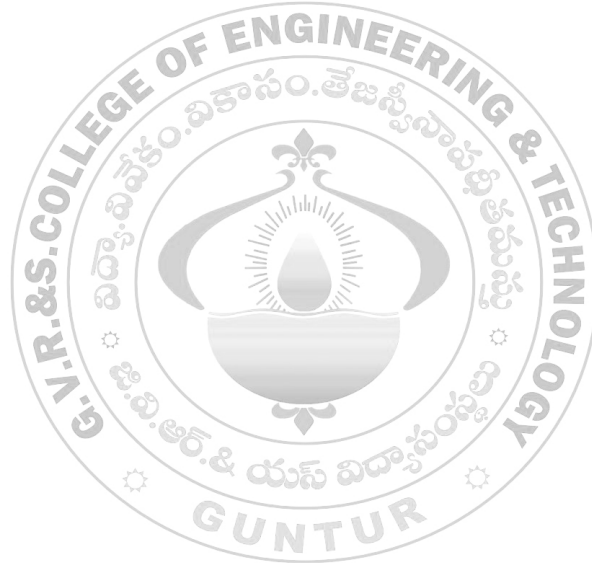| | | | |
|---|---|---|---|
| | | | **CO4** : Characterize the influence of channel on analog modulated signals |
| | | | **CO5** : Determine the performance of analog communication systems in terms of SNR |
| | | | **CO6** : Analyze pulse amplitude modulation, pulse position modulation, pulse code modulation and             TDM systems. |

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## Artificial intelligence Course Outcomes
## For theAcademicYear 2023-2024

| Artificial intelligence Course Outcomes for the Academic Year | | | |
|---|---|---|---|
| **S.No.** | **Year/Sem** | **Course Name** | **Course Outcomes** |
| 1 | I/I | **Communicative English** | **CO1**: understand social or transactional dialogues spoken by native speakers of English and identifythe context, topic, and pieces of specific information |
| | | | **CO2:** ask and answer general questions on familiar topics and introduce oneself/others |
| | | | **CO3:** employ suitable strategies for skimming and scanning to get the general idea of a text and locatespecific information |
| | | | **CO4:** recognize paragraph structure and be able to match beginnings/endings/headings withparagraphs |
| | | | **CO5:** form sentences using proper grammatical structures and correct word forms |
| 2 | I/I | **Mathematics -I** | **CO1:** utilize mean value theorems to real life problems (L3) |
| | | | **CO2:** solve the differential equations related to various engineering fields (L3) |
| | | | **CO3:** familiarize with functions of several variables which is useful in optimization (L3) |
| | | | **CO4:** apply double integration techniques in evaluating areas bounded by region (L3) |
| | | | **CO5:** students will also learn important tools of calculus in higher dimensions. Students will becomefamiliar with 2- dimensional and 3- dimensional coordinate systems(L5 ) |
| 3 | I/I | **Applied Chemistry** | **CO1:** Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers. |
| | | | **CO2:** Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion. |
| | | | **CO3:** Synthesize nanomaterials for modern advances of engineering technology. |
| | | | **CO4:** Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors. |
| | | | **CO5:** Analyze the principles of different analytical instruments and |

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| | | | |
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| | | | their applications. |
| | | | **CO6:** Design models for energy by different natural sources. |
| | | | **CO7:** Obtain the knowledge of computational chemistry and molecular machines |
| 4 | I/I | **Programming for Problem Solving using C** | **CO:1** To write algorithms and to draw flowcharts for solving problems |
| | | | **CO:2** To convert flowcharts/algorithms to C Programs, compile and debug programs |
| | | | **CO:3** To use different operators, data types and write programs that use two-way/ multi-way selection |
| | | | **CO:4** To select the best loop construct for a given problem |
| | | | **CO:5** To design and implement programs to analyze the different pointer applications |
| | | | **CO:6** To decompose a problem into functions and to develop modular reusable code |
| | | | **CO:7** To apply File I/O operations |
| 5 | I/I | **Computer Engineering Workshop** | **CO1:** Assemble and disassemble components of a PC |
| | | | **CO2:** Construct a fully functional virtual machine, Summarize various Linux operating system Commands |
| | | | **CO3:** Recognize characters & extract text from scanned images, Create audio files and podcasts. |
| 6 | I/I | **English Communication Skills Laboratory** | **CO1:** Better pronunciation and accent |
| | | | **CO2:** Ability to use functional English |
| | | | **CO3:** Competency in analytical skills and problem solving skills |
| 7 | I/I | **Applied Chemistry Lab** | **CO1:** Student will know structure property relationship and corrosion. |
| | | | **CO2:** Student will know the use of water as an engineering material, its properties and applications. |
| | | | **CO3:** Student will generate usefulness and apply the various instrumental techniques for identification and characterization of materials |
| | | | **CO4:** Student will understand the various types of fuels and combustion. |
| | | | **CO5:** Student will know the types,properties and applications of polymers and nanomaterials. |
| 8 | I/I | **Programming for** | **CO1:** Gains Knowledge on various concepts of a C language. |

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| | | **Problem Solving using C Lab** | **CO2:** Able to draw flowcharts and write algorithms. |
|---|---|---|---|
| | | | **CO3:** Able design and development of C problem solving skills. |
| | | | **CO4:** Able to design and develop modular programming skills. |
| | | | **CO5:** Able to trace and debug a program |
| 9 | I/II | **Mathematics – II** | **CO1:** develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6) |
| | | | **CO2:** solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3) |
| | | | **CO3:** evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5) |
| | | | **CO4:** apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) |
| | | | **CO5:** apply numerical integral techniques to different Engineering problems (L3) |
| | | | **CO6:** apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3) |
| 10 | I/II | **Digital Logic Design** | **CO1:**<br>An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation<br>. |
| | | | **CO2**<br>An ability to understand the different switching algebra theorems and apply them for logic functions |
| | | | **CO3**<br>An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions |
| | | | **CO4** |

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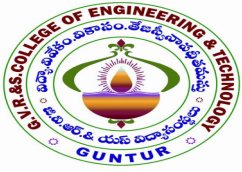*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | | |
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| | | | Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays . |
| | | | **CO5:** Students will be able to design various sequential circuits starting from flip-flop to registers and counters. |
| 11 | I/II | **Python Programming** | **CO1:** Develop essential programming skills in computer programming concepts like data types, containers |
| | | | **CO2:** Apply the basics of programming in the Python language |
| | | | **CO3:** Solve coding tasks related conditional execution, loops |
| | | | **CO4:** Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming |
| 12 | I/II | **Data Structures** | **CO1:** Summarize the properties, interfaces, and behaviors of basic abstract data types |
| | | | **CO2:** Discuss the computational efficiency of the principal algorithms for sorting & searching |
| | | | **CO3:** Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writingprograms |
| | | | **CO4:** Demonstrate different methods for traversing trees |
| 13 | I/II | **Applied Physics** | **CO:1** Explain the need of coherent sources and the conditions for sustained interference (L2). Identifythe applications of interference in engineering (L3). Analyze the differences betweeninterference and diffraction with applications (L4). Illustrate the concept of polarization of lightand its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2) . |
| | | | **CO:2** Explain various types of emission of radiation (L2). Identify the role of laser in engineeringapplications (L3). Describe the construction and working principles of various types of lasers (L1). |

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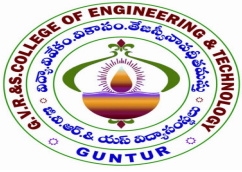*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | | |
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| | | | Explain the working principle of optical fibers (L2). <br> Classify optical fibers based onrefractive index profile and mode of propagation (L2). <br> Identify the applications of optical fibersin medical, communication and other fields (L2). <br> Apply the fiber optic concepts in variousfields (L3). |
| | | | **CO:3**Describe the dual nature of matter (L1). <br> Explain the significance of wave function (L2). <br> Identifythe role of Schrodinger's time independent wave equation in studying particle in onedimensional infinite potential well (L3). <br> Identify the role of classical and quantum free electrontheory in the study of electrical conductivity (L3). <br> Classify the energy bands of solids (L2) |
| | | | **CO:4**Explain the concept of dielectric constant and polarization in dielectric materials (L2). <br> Summarize various types of polarization of dielectrics (L2). <br> Interpret Lorentz field andClaussius-Mosotti relation in dielectrics (L2). <br> Classify the magnetic materials based onsusceptibility and their temperature dependence (L2). <br> Explain the applications of dielectric andmagnetic materials (L2). <br> Apply the concept of magnetism to magnetic devices (L3) |
| | | | **CO:5**Outline the properties of charge carriers in semiconductors (L2). <br> Identify the type ofsemiconductor using Hall effect (L2). <br> Identify applications of semiconductors in electronicdevices (L2). <br> Classify superconductors based on Meissner's effect (L2). <br> Explain Meissner'seffect, BCS theory & Josephson effect in superconductors (L2). |
| 14 | I/II | **Python Programming Lab** | **CO1:** Develop essential programming skills in computer programming concepts like data <br> types, containers |
| | | | **CO2:** Apply the basics of programming in the Python language |
| | | | **CO3:** Solve coding tasks related conditional execution, loops |
| | | | **CO4:** Solve coding tasks related to the fundamental notions and techniques used in objectoriented programming |
| 15 | I/II | **Data Structures Lab** | **CO1:** Use basic data structures such as arrays and linked list. |
| | | | **CO2:** Programs to demonstrate fundamental algorithmic problems including Tree. <br> Traversals, Graph traversals, and shortest paths. |

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|  |  |  | **CO3:** Use various searching and sorting algorithms. |
|---|---|---|---|
| 16 | I/II | Applied Physics Lab |  |
| 17 | I/II | Applied Physics Lab | **CO1:** Demonstrate the concepts of physics experimentally with physical equipment. |
|  |  |  | **CO2:** Summarize the required data to perform experiments related to engineering physics. |
|  |  |  | **CO3:** Calculate the physical values with targeted accuracy by explaining the basic knowledge, principles, and concepts of physics using required instruments. |
| 18 | I/II | CONSTITUTION OF INDIA | CO1:Understand historical background of the constitution making and its importance for building a democratic India. |
|  |  |  | CO2: Understand the functioning of three wings of the government ie., executive, legislative and judiciary. |
|  |  |  | C03: Understand the value of the fundamental rights and duties for becoming good citizen of India. |
|  |  |  | CO4: Analyze the decentralization of power between central, state and local self-government. |
|  |  |  | CO5:Apply the knowledge in strengthening of the constitutional institutions like CAG, Election |

| S.NO. | YEAR/SEM | COURSE NAME | Course Outcomes |
|---|---|---|---|
| 19 | II/I | Database Manageme | **CO1:**. Describe a relational database and object-oriented database |
|  |  |  | **CO2:**. Create, maintain and manipulate a relational database using SQL |

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| | | **nt Systems** | **CO3:**.<br>Describe ER model and normalization for database design |
| | | | **CO4:**<br>Examine issues in data storage and query processing and can formulate appropriate solutions |
| | | | **CO5:**Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage |
| **20** | **II/I** | **Object Oriented Programming with Java** | **CO1**<br>Able to realize the concept of Object Oriented Programming & Java Programming Constructs |
| | | | **CO2:**<br>Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords |
| | | | **CO3:**.<br>Apply the concept of exception handling and Input/ Output operations |
| | | | **CO4:** .<br>Able to design the applications of Java & Java applet |
| | | | **CO5:**<br>Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit |
| **21** | **II/I** | **Introduction to Artificial Intelligence and** | **CO1:**<br>Enumerate the history and foundations of Artificial Intelligence |
| | | | **CO2:** |

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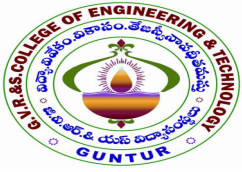*(Approved by AICTE, Affiliated to JNTUK, Govt.of.A.P, India.)*
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| | | Machine Learning | Apply the basic principles of AI in problem solving |
|---|---|---|---|
| | | | **CO3:** Choose the appropriate representation of Knowledge |
| | | | **CO4:** Enumerate the Perspectives and Issues in Machine Learning |
| | | | **CO5:** Identify issues in Decision Tree Learning |
| 22 | II/I | **MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE** | **CO1:** Comprehend mathematical principles and logic |
| | | | **CO2:** Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software |
| | | | **CO3:.** Manipulate and analyze data numerically and/or graphically using appropriate Software |
| 23 | II/I | **MATHEMATICS - III** | **CO1:** Interpret the physical meaning of different operators such as gradient, curl and divergence (L5) |
| | | | **CO2:** Estimate the work done against a field, circulation and flux using vector calculus (L5) |
| | | | **CO3:** Apply the Laplace transform for solving differential equations (L3) |
| | | | **CO4:** Find or compute the Fourier series of periodic signals (L3) |
| | | | **CO5:** Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3) |
| | | | **CO6:** . Identify solution methods for partial differential equations that model physical processes (L3) |
| 24 | II/I | **Introduction to** | **Co1:** Apply the basic principles of AI in problem solving using |

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| | | Artificial Intelligence and Machine Learning Lab | LISP/PROLOG |
|---|---|---|---|
| | | | **CO2**: Implement different algorithms using LISP/PROLOG |
| | | | **CO3:** Develop an Expert System using JESS/PROLOG |
| 25 | II/I | Object Oriented Programming with Java Lab | **CO1:** Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings |
| | | | **CO2:** Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism |
| | | | **CO3:** Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism |
| | | | **CO4:** Construct Threads, Event Handling, implement packages, developing applets |
| 26 | II/I | Database Management Systems Lab | **CO1:** Utilize SQL to execute queries for creating database and performing data manipulation operations |
| | | | **CO2:** Examine integrity constraints to build efficient databases |
| | | | **CO3** Apply Queries using Advanced Concepts of SQL |
| | | | **CO4** Build PL/SQL programs including stored procedures, functions, cursors and triggers . |
| | | | |

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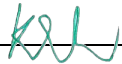GVR & S College of Engg. & Tech.
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| 27 | II/I | Mobile App Development | **CO1:**Identify various concepts of mobile programming that make it unique from programming for other platforms |
| | | | **CO2:**.Critique mobile applications on their design pros and cons |
| | | | **CO3:** Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces, |
| | | | **CO4:** Program mobile applications for the Android operating system that use basic and advanced phone features and |
| | | | **CO5:**Deploy applications to the Android marketplace for distribution. |
| 28 | II/I | Essence of Indian Traditional Knowledge l | **CO1** Understand the significance of Indian Traditional Knowledge |
| | | | **CO2**: Classify the Indian Traditional Knowledge |
| | | | **CO3:** Compare Modern Science with Indian Traditional Knowledge system. |
| | | | **CO4**. Analyze the role of Government in protecting the Traditional Knowledge |
| | | | **CO5**. Understand the impact of Philosophical tradition on Indian Knowledge System |
| 29 | II/II | PROBABILITY AND STATISTICS | **CO1:** Classify the concepts of data science and its importance (L4) or (L2) |
| | | | **CO2** Interpret the association of characteristics and through correlation and regression tools (L4) |
| | | | **CO3** Make use of the concepts of probability and their applications (L3) |
| | | | **CO4:** Apply discrete and continuous probability distributions (L3) and event handling |
| | | | **CO5:**Design the components of a classical hypothesis test (L6) |

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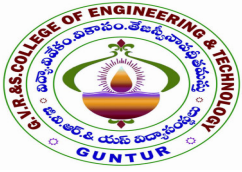GVR & S College of Engg. & Tech.
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| | | | |
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| | | | **CO6:** Infer the statistical inferential methods based on small and large sampling tests (L4) |
| 30 | II/II | **FORMAL LANGUAGES AND AUTOMATA THEORY** | **CO1:** Classify machines by their power to recognize languages |
| | | | **CO2:** Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy |
| | | | **CO3:** Employ finite state machines to solve problems in computing |
| | | | **CO4:** Illustrate deterministic and non-deterministic machines |
| | | | **CO5:** Quote the hierarchy of problems arising in the computer science |
| 31 | II/II | **MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY** | **CO1:** The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product |
| | | | **CO2:** The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs |
| | | | **CO3:** . The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units . |
| | | | **CO4:** The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis |
| | | | **CO5:** The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making |
| 32 | II/II | **Computer Organization** | **CO1:** Develop a detailed understanding of computer systems |
| | | | **CO2** Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations |
| | | | **CO3:** . Develop a detailed understanding of architecture and functionality of central processing |

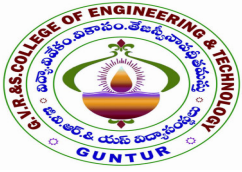# GVR&S COLLEGE OF ENGINEERING AND TECHNOLOGY

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| | | | unit |
| | | | **CO4**<br>Exemplify in a better way the I/O and memory organization |
| | | | **CO5**<br>Illustrate concepts of parallel processing, pipelining and inter processor communication |
| **33** | **II/II** | **R PROGRAMMING LAB** | **CO1:** Access online resources for R and import new function packages into the R workspace |
| | | | **CO2**: Import, review, manipulate and summarize data-sets in R |
| | | | **CO3:** Explore data-sets to create testable hypotheses and identify appropriate statistical tests. |
| | | | **CO4:** . Perform appropriate statistical tests using R |
| | | | **CO5:** Create and edit visualizations with R |
| 34 | **II/II** | **Data Warehousing and Mining** | **CO1**<br>Summarize the architecture of data warehouse |
| | | | **CO2**<br>Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data. |
| | | | **CO3:**<br>Construct a decision tree and resolve the problem of model overfitting |
| | | | **CO4:**<br>Compare Apriori and FP-growth association rule mining algorithms for frequent itemset generation |
| | | | **CO5:**<br>Apply suitable clustering algorithm for the given data set |
| **35** | **II/II** | **Data Mining using Python Lab** | **CO1:**<br>Apply preprocessing techniques on real world datasets |
| | | | **CO2:**<br>Apply apriori algorithm to generate frequent itemsets. |

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| | | | | **CO3**<br>Apply Classification and clustering algorithms on different datasets. |
|---|---|---|---|---|
| 36 | II/II | **Web Application Development Lab** | | **CO1:**<br>Develop Single Page Applications |
| | | | | **CO2:**<br>Develop NodeJS&ReactJS Reusable Service |
| | | | | **CO3**.<br>Store the data in MySQL |
| | | | | **CO4:**<br>Get acquainted with the latest web application development trends in the IT industry |
| 37 | II/II | **Natural Language Processing with Python** | | **CO1:**<br>Explore natural language processing (NLP) libraries in Python |
| | | | | **CO2:**<br>Learn various techniques for implementing NLP including parsing & text processing |
| | | | | **CO3**.<br>Understand how to use NLP for text feature engineering |

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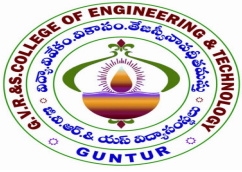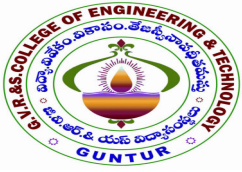*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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**Master of Business Administration Course Outcomes**
**For the Academic Year 2023-2024**

| S.No. | Year/Sem | Course Name | Course Outcomes |
|-------|----------|-------------|-----------------|
| Master of Computer Applications I&II Sem Course Outcomes for the Academic Year | | | |
| 1 | I/I | MANAGEMENT AND ORGANIZATION BEHAVIOUR | **CO1:** Discuss the Basic concepts of Management in business Organizations |
| | | | **CO2:** Conduct the seminars and group discussions through PPT and paper presentations. |
| | | | **CO3:** Identify other examples of recent trends of Management in business organizations. |
| 2 | I/I | MANAGERIAL ECONOMICS | **CO1:** Apply the basic rules and theorems of Managerial Economics |
| | | | **CO2:** Students will be acquiring minimum awareness of Economy and its alternate factors influencing the organizational goals that are to be useful to manage the economy. |
| | | | **CO3:** Learn how to calculate the Economy by adopting the simple managerial and Economical principles and procedures . |
| | | | **CO4:** Helps to develop the Economical trends In recent era. |
| | | | **CO5:** Apply graph theory for real time to understand the real time market economy |
| 3 | I/I | ACCOUNTING FOR MANAGERS | **CO1:** To enumerate the fundamental concepts of managerial accounting appropriate for all organizations |
| | | | **CO2:** Leaners will absorb about basic accounting fundamentals and to prepare Vertical Financial Statements as per Indian Companies Act 2013. |
| | | | **CO3:** To discuss appropriate financial information to make operational decisions. |
| | | | **CO4:** Learners will mature in financial analysis skills and learn to prepare Cash Flow Statement, Estimated Working Capital and Receivables management. |
| | | | **CO5:** Learners will mature in financial analysis skills and learn to prepare Cash Flow Statement, Estimated Working Capital and Receivables management. |
| 4 | I/I | QUANTITATIVE APTITUDE FOR BUSINESS DECISIONS | CO1. Relate a formal quantitative approach to problem solving and decision making and acquire the knowledge about mean, median, mode and measures of dispersion. 3 45. Outline quantitative models to decision making and problem analysis, and their interpretations in transportation problems and game theory. |

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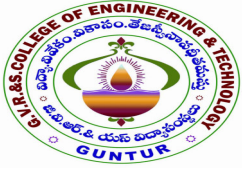*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| | | | CO2. Apply the concepts of probabilistic distributions in solving problems. |
| | | | CO3: Recall the knowledge of hypothesis testing for large and small samples. |
| | | | CO4. Extend the ability to solve linear programming problems by graphical and simple methods. |
| 5 | I/I | LEGAL AND BUSINESS ENVIRONMENT | CO1Given the circumstances, the learner will be able to infer legal aspects of doing business &plan business activities. In a given situation, the learner will be able make use of provisions of the Contract Act to evaluate a contract used in commercial practice. |
| | | | CO2: In a given situation, learner will be able to distinguish between various types of Companies and explain their comparative advantages and disadvantages. The learner will be able to explain the legal process involved in formation of a company and understand the relationships amongst the various stakeholders of the compa |
| | | | CO3: In context of Intellectual Property Rights (IPR) the learner will understand various components of IPR and differentiate between them. The learner can also identify the uses of IPR in business |
| | | | CO4: Under the given scenario, the learner will be able to describe various provisions of IT Act and will be able to use various provisions of Consumer Protection Act. |
| | | | CO5: A learner will be able to analyze the elements of Social, political, economic environment around a firm. |
| 6 | I/I | BUSSINESS COMMUNICATION AND SOFT SKILS | CO1: Demonstrate the use of basic and advanced business writing skills. |
| | | | CO2: Produce clear and concise written business documents. |
| | | | CO3: Develop interpersonal communications skills that are required for social and business interaction. |
| | | | CO4: Plan and conduct effective meetings. |
| | | | CO5: Employ proper public speaking techniques. |
| 7 | I/I | CROSS CULTURE MANAGEMENT | CO1: Understanding the modern interpretation of the national culture and impact of culture to the major management process |
| | | | CO2: Knowledge of the main parameters characterizing the national cultures and the methodology of its measurement |
| | | | CO3: Understanding the major peculiarities of the cross-cultural management process and development of the skills based on cross-cultural differences application to the company' management. |
| | | | CO4: Developing skills in communication, team-building, motivation |

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| | | | leadership and negotiation in multicultural environment |
|---|---|---|---|
| | | | **CO5:** Developing skills in communication, team-building, motivation leadership and negotiation in multicultural environment |
| 8 | I/I | **INFORMATION TECHNOLOGY LAB** | **CO1:** Gain in depth knowledge about the functioning ofcomputers and its uses for managers |
| | | | **CO2:** Learn to use Internet and its applications |
| | | | **CO3:** Understand and implement Word processing software |
| | | | **CO4:** Learn applications on Spread sheet software |
| | | | **CO5:** Analyze and learn Presentation software |
| 9 | I/I | **BUSSINESS COMMUNICATION AND SOFT SKILS LAB** | **CO1** :Understand fundamentals of communication and able to use concept in day to day world |
| 10 | I/II | **FINANCIAL MANAGEMENT** | **CO1:** Understand various concepts related to financial management |
| | | | **CO2:** Able to use various tools and techniques in the area of finance |
| | | | **CO3:** Develop analytical skills this which facilitate the decision making in Business situations. |
| 11 | I/II | **HUMAN RESOURSE MANAGEMENT** | **CO1:** Demonstrate the role of HRM in an organization |
| | | | **CO2:** Utilize the knowledge to gain competitive advantage through people |
| | | | **CO3:** Develop and Design HRM system |
| 12 | I/II | **MARKETING MANAGEMENT** | **CO1:** Relate Marketing Mix as a framework for Marketing Decision making. |
| | | | **CO2:** Understand the need, importance and process of Marketing Planning and Control. |
| | | | **CO3:** Learn and examine the students to the dynamic nature of Marketing Function. |
| | | | **CO4:** Acquire an understanding of fundamental concepts of Marketing |
| 13 | I/II | **OPERATION MANAGEMENT** | **CO1:** Analyze importance of Operations & SCM and how it can provide a competitive advantage in the marketplace |
| | | | **CO2:** Classify the relationship between Operations & SCM and other business functions, such as Marketing, Finance, Accounting, and Human Resources. |
| | | | **CO3:** Experiment with the knowledge of the issues related to designing and managing Operations & SCM and the techniques to do so. |
| 14 | I/II | **BUSINESS RESEARCH METHODS** | **CO1:** Knowledge of concept / fundamentals for differenttypes of research. |
| | | | **CO2:** Applying relevant research techniques. |

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|  |  |  | **CO3:**Understanding relevant scaling & measurement techniques and should use appropriate sampling techniques |
|  |  |  | **CO4:** Synthesizing different techniques of coding,editing, tabulation and analysis in doing research. |
| 15 | I/II | **PROJECT MANAGEMENT** | **CO1:** Following this course, students will be able to describe a project life cycle, and can skillfully map each stage in the cycle |
|  |  |  | **CO2:** Students will identify the resources needed for each stage, including involved stakeholders, tools and supplementary materials |
|  |  |  | **CO3:**Students will describe the time needed to successfully complete a project, considering factors such as task dependencies and task length |
|  |  |  | **CO4:** Students will be able to provide internal stakeholders with information regarding project costs by considering factors such as estimated cost, variances and profits |
| 16 | II/I | **STRATAGIC MANAGEMENT**<br><br>**[COMMON SUBJECT]** | **CO1**: Formulate organizational vision, mission, goals, andvalues. |
|  |  |  | **CO2**: Develop strategies and action plans to achieve anorganization's vision, mission, and goals. |
|  |  |  | **CO3**: Develop powers of managerial judgment, how toassess business risk, and improve ability to make sound decisions and achieve effective outcomes |
| 17 | II/I | **OPERATIONS RESEARCH**<br><br>**[COMMON SUBJECT]** | **CO1**: Solve linear programming problems using appropriate techniques and optimization solvers, interpret the results obtained. |
|  |  |  | **CO2**: Determine optimal strategy for Minimization of Cost of shipping of products from source to Destination/ Maximization of profits of shipping products using various methods, Finding initial basic feasible and optimal solution of the Transportation problems |
|  |  |  | **C03**: Optimize the allocation of resources to Demand points in the best possible way using various techniques and minimize the cost or time of completion of number of jobs by number of persons. |
|  |  |  | **CO4:** Model competitive real-world phenomena using concepts from game theory. Analyse pure and mixed strategy games |
| 18 | II/I | **LEADERSHIP AND CHANGE** | **CO1:** Critically analyse leadership and change management theory and principles. |
|  |  |  | **CO2:** Evaluate and apply an integrated leadership and change management approach. |

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| | | MANAGEMENT | **CO3:** Appraise how principle elements of leadership impact on self, employees, organisations, and society. |
| 19 | II/I | **PERFORMANCE EVALUATION AND COMPAENSATION MANAGEMENT** | Acquaint with perspective of different facets of management of an enterprise |
| | | | **CO2:** Understand inputs with reference to the Investment and take decisions along with the techniques for those dicision. |
| | | | **CO3:** Evaluate parameters of enterprise in terms of expenses, control systems and pricing |
| | | | **CO4:** Summarize concept of auditing and its applicability as performance management tool |
| | | | **CO5:** Develop proficiency in driving a practical view of the performance management, advise improvements and provide means to recognize the next levels of initiatives for improving performance, |
| 20 | II/I | **HUMAN RESEARCH METRICS AND ANALYSIS** | **CO1:** Relate the importance of using data-based reasoning to support HR decisions. |
| | | | **CO2:** Calculate absenteeism costs, turnover costs, and return-on-investment. |
| | | | **CO3:** Develop recommendations for workforce planning (e.g., staffing needs) based on the results of analysis |
| | | | **CO4:** Develop effective surveys for use in an organizational setting. |
| | | | **CO5:** Translate research findings into practical conclusions and recommendation |
| 21 | II/I | **HUMAN CAPITAL MANAGEMENT** | **CO1:** Understand the basics of Human Resource Management |
| | | | **CO2:** Learn the global Human Resource practices |
| | | | **CO3:** Learn the global Human Resource practices |
| | | | **CO4:** Learn the learning and development strategies |
| | | | **CO5:** Learn the HR Information Systems and the tools used |
| 22 | II/I | **EMESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT** | **CO1:** The student will be able to apply concept oftime value of money in computing the value of fixed income securities. The student will also be able to understand the relationship between interest rates, yield and bond prices. |
| | | | **CO2:** The student will be able to compute and compare the value of a company's equity share with other company's equity by using various methods and tools of equity valuation . |
| | | | **CO3:** The student will be able to build and evaluate the relationship between the concept of risk and return and will be able to relate its implication on creating portfolio. |
| | | | **CO4:** The student will be able to learn the theoretical concepts of underlying the portfolio creation |
| | | | **CO5:** The student will be able to assess the tools and strategies for portfolio creation and evaluation and will also be able to evaluate the portfolios of mutual funds by using the tools of portfolio evaluation |
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| 23 | II/I | **MANAGING BANKS AND FINANCIAL INISTITUTIONS** | **CO1:** To develop an understanding of the concepts of scheduled and non- scheduled banks, structure of banking system in India, Narasimham committee and strength, weakness, opportunity and threats of Indian commercial banks. |
| | | | **CO2:** To enable learners to understand about structure and regulation of the financial services industry, Banking norms, NPA, E-Banking, CAR and functions and framework of NBFC. |
| | | | **CO3:** To incorporate the understanding of financial market: Primary market, Secondary capital market, its recent development and Indian money market along with its instruments and intermediaries. |
| | | | **CO4:** It includes Mutual funds, UTI, RBI, SEBI, their functions and objectives. It also includes credit rating, leasing, hire purchase, factoring, venture capital and merchant banking. |
| 24 | II/I | **FINANCIAL MARKETS AND SERVIES** | **CO1:** On successful completion of the course students will be able to: |
| | | | **CO2:** Understand the role and importance of the Indian financial market |
| | | | **CO3:** Apply and analyse the Concepts relevant to Indian financial markets and financial institutions |
| | | | **CO4:** Understand and analyse the mechanics and regulation of financial instruments and determine how the value of stocks, bonds, and securities are calculated. |
| 25 | II/I | **MERGERS ACQUISITIONS AND CORPORATE RESTRUCTURING** | **CO1:** Understanding of different types of mergers and acquisitions and the process involved in executing their deals. |
| | | | **CO2:** Develop an ability to understand factors influencing the valuation of a business and different methods used in Business Valuation. |
| | | | **CO3:** Basic understanding about regulatory environment of mergers and acquisitions in India.. |
| | | | **CO4:** Analyze investment opportunities in fixed income securities. |
| | | | **CO5:** Assess various case studies to analyze valuation strategies, pre and post merger issues and challenges. |
| 26 | II/I | **CONSUMER BEHAVIOUR** | **CO1:** Upon successful completion of this course, students will have acquired experience in: |
| | | | **CO2:** preparation for and participation in classroom discussion; |

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| | | | **CO3**: group project management; preparation of written reports that demonstrate professionalism and proficiency in communication; |
| 27 | II/I | **RETAIL MANAGEMENT** | **CO1**:Clarify the concept and related terms in retailing. |
| | | | **CO2**:Comprehend the ways retailers use marketing tools and techniques to interact with their customers. |
| | | | **C03**:Understand various formats of retail in the industry |
| | | | **CO4**:Recognize and understand the operations-oriented policies, methods, and procedures used by successful retailers today's global economy. |
| 28 | II/I | **CUSTOMER RELATIONSHIP MANAGEMENT** | CO1: Able to understand and explain Introduction to customer relationship management |
| | | | **CO2:** Understand relationships and identify organizational and customer relationship management issues, plan and implement customer relationship management projects, and develop, manage and use customer related databases. |
| | | | **CO3:** Able to understand and explain Customer portfolio management, customer relationship and customer experience, create value for customers, manage customer life cycle: customer acquisition, customer retention and development, how to manage network for customer relationship management performance and information technology for customer relationship management. |
| 29 | II/I | **STRATEGIC MARKETING MANAGEMENT** | **CO1:** Demonstrate a strategic, global and ethically informed understanding of the marketing management process, taking account of established and emerging practices in digital marketing |
| | | | **CO2:** Show critical awareness of the analytical processes used to evaluate market opportunities and propose appropriate marketing strategies to achieve competitive advantage in a variety of global and dynamic market contexts. |
| | | | **CO3:** Understand the activities and organisational structures, including networking and partnerships, required to implement, monitor and measure the performance of marketing strategies . |
| | | | **CO4:** Use evidence-based and data mining techniques to creatively segment and target markets as well as position products/ services |

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| | | | against market needs and competitive offerings. |
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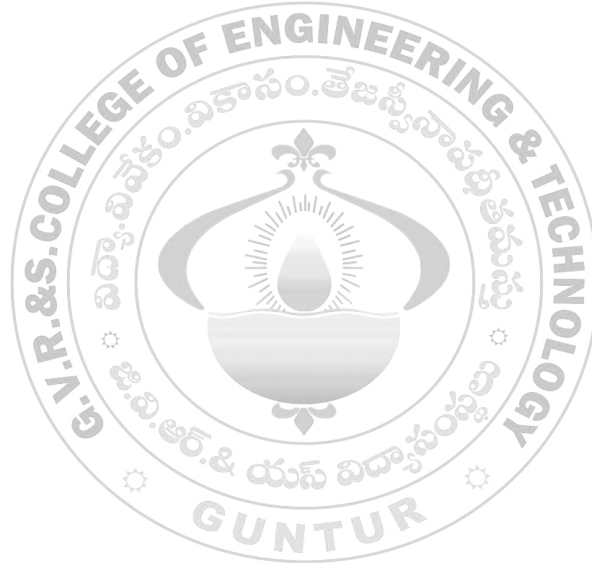PRINCIPAL
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| 30 | II/II | **SUPPLY CHAIN MANAGEMENT AND ANALYSIS** <br><br> **[COMMON SUBJECT]** | **CO1**: Develop an understanding of the importance of logistics in the formulation of the business strategy and the conduct of supply chain operations.. |
| | | | **CO2:** Develop an in-depth understanding of logistics operating areas and their interrelationship |
| | | | **C03**: Strengthen integrative management analytical and problem-solving skills. |
| 31 | II/II | **INNOVATION AND ENTERPRENUERSHIP** <br><br> **[COMMON SUBJECT]** | CO1: Able to design and implement innovation strategies in organizations, corporate foresight and technology with the aim of detecting sources of competitive advantage for evaluating and selecting R&D proposals.. |
| | | | **CO2:** Acquainted with the principles of management multidisciplinary human teams for innovations. . |
| | | | **CO3:** Aware of the innovation systems and public programs underpinning technology cooperation agreements with different actors and know how to use external funds. |

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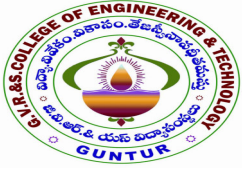*Ganginenipuram, Budampadu, Etukuru (P.O), Guntur (Dt) – 522017, A.P, India.*
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| 32 | II/II | **LABOUR WELFARE AND EMPLOYMENT LAWS** | **CO1:** Students should able to elaborate the concept of Industrial Relations |
| | | | **CO2:** The students should able to illustrate the role of trade union in the industrial setup. |
| | | | **CO3:** Students should able to outline the important causes & impact of industrial disputes. |
| | | | **CO4:** Students should able to elaborate Industrial Dispute settlement procedures. |
| | | | **CO5:** Student should be able to summarize the important provisions of Wage Legislations, in reference to Payment of Wages Act 1936, Minimum Wages Act 1948 & Payment of Bonus Act 1965 |
| 33 | II/II | **INTERNATIONAL HRM** | **CO1:** Integrated perspective on role of HRM in modern business. Ability to plan human resources and implement techniques of job design |
| | | | **CO2:** Competency to recruit, train, and appraise the performance of employees |
| | | | **CO3:** Rational design of compensation and salary administration |
| | | | **CO4:** Ability to handle employee issues and evaluate the new trends in HRM |
| 34 | II/II | **EMPLOYEE RELATION AND ENGAGEMENT** | **CO1:** identify and describe the meaning of employee engagement and its different component |
| | | | **CO2:** appreciate the strategic issues associated with employee engagement |
| | | | **CO3:** describe the changes in systems of employee relations |
| | | | **CO4:** appreciate the impact of structures of management and ownership on employee engagement |
| | | | **CO5:** reflect on the current state of employee engagement in an organisation. |
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| 35 | II/II | HUMAN RESOURSE DEVELOPMENT | **CO1** Students will be able to gain a broad understanding of various concepts of HRD process. This helps them develop a well-rounded perspective and prepares them to face and handle various future challenges. |
| | | | **CO2:** Overall knowledge of HRD concepts: understanding helps students make and improve their decision making capacity. |
| | | | **CO3:** Seed knowledge in various HR concepts and practices for students so that they can apply their skills in HR, HR planning, HR auditing, HR accounting, HRIS and IHRM. |
| | | | **CO4:** Students can learn how to use HRIS programs for their future requirement |
| | | | **CO5:** Provision of case study practices that are applicable in student's future careers growth. |
| 38 | II/II | FINANCIAL DERIVATIVES | **CO1:** Demonstrate knowledge of all aspects of derivative market theory and the roles they play in the financial markets |
| | | | **CO2:** Identify how derivative instruments can be used to change or hedge risk and evaluate risks and pay-offs associated with trading such instruments and their implications |
| | | | **CO3:** Understand the basic risk management and trading strategies using futures and options |
| 39 | II/II | GLOBAL FINANCIAL MANAGEMENT | **CO1:** Identify the operations of the developed global financial markets, the trading of financial instruments, and the role of regulatory bodies |
| | | | **CO2:** Apply competences with financial analytical skills required to evaluate the performance of the firm, including the interpretation of financial data |
| | | | **CO3:** Evaluate the financial instruments used in the equity and debt markets for funding the corporation |
| 40 | II/II | FINANCIAL RISK MANAGEMENT | **CO1:** Learn and compare the advantages and disadvantages of several methodologies for the measurement of various types of risk, including market, interest rate, credit, operational, liquidity and model risk |
| | | | **CO2:** Integrate the methodologies into an overall framework for enterprise risk management |
| 41 | II/II | STRATAGIC FINANCIAL MANAGEMENT | **CO1:** Understand financial strategy and control of a company. |
| | | | **CO2:** Learn the relevance of risk and uncertainty in making strategic decisions. Learn various aspects of capital budgeting. |
| | | | **CO3:** Understand the capital structure, dividend policy, financial distress, restructuring |
| 42 | II/II | SERVICES MARKETING | **CO1:** Implement the best practices of the Services marketing . |
| | | | **CO2:** Apply knowledge of Customer Relationship techniques in the corporate world |

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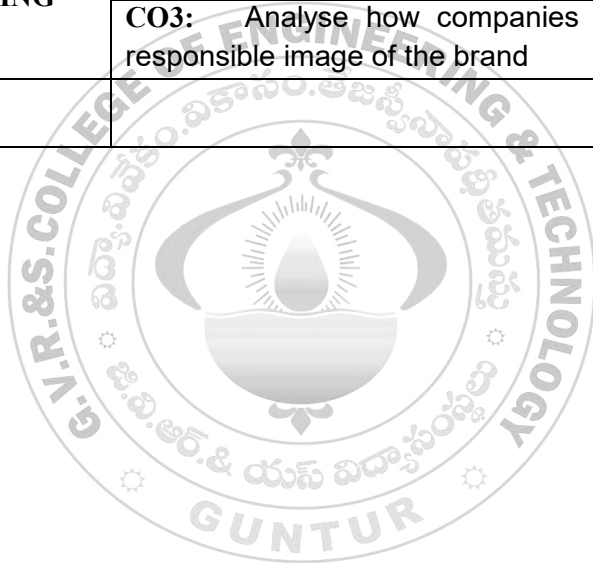
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|  |  |  | **CO3:** Analyze, interpret and solve problems in service Recovery |
|  |  |  | **CO4:** Perform lifelong learning and professional development to enrich the services marketing strategies. |

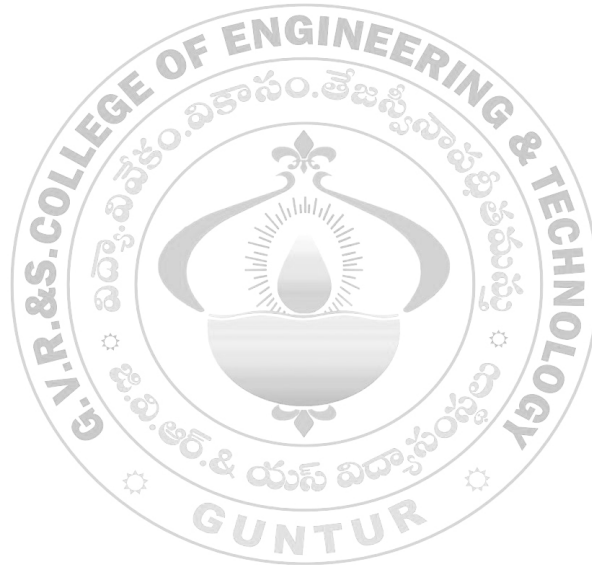|  |  |  |  |
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| 43 | II/II | **PROMOTIONAL AND DISTRIBUTION MANAGMENT** | **CO1:** Discuss the Basic concepts of Management in business Organizations |
|  |  |  | **CO2**: The strategic skill and competencies needed for achieving sales targets |
|  |  |  | **CO3:** The ability to avoid common mistakes made by sales professionals and negotiators; |
| 44 | II/II | **GREEN MARKETING** | **CO1:** Describe the business case for green marketing |
|  |  |  | **CO2:** Identify the current marketing techniques which communicate environmental and socially responsible practices of business |
|  |  |  | **CO3:** Analyse how companies can build a green and socially responsible image of the brand |
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| 45 | II/II | ADVERTISING AND BRAND MANAGEMENT | **CO1:** To understand the nature, role, and importance of brand management and advertising in marketing strategy |
|----|-------|--------------------------------|----------------------------------------------------------------------------------------------------------------|
|    |       |                                | **CO2:** To understand effective design and implementation of advertising strategies |
|    |       |                                | **CO3:** To present a general understanding of content, structure, and appeal of advertisements |
|    |       |                                | **CO4:** To understand ethical challenges related to responsible management of advertising and brand strategy |

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