

CH 111 MATHEMATICS-I**Semester I [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. know the basic linear algebraic concepts.
2. Solve multivariate calculus problems of double integrals and vector differentiation.
3. Find integration of vector functions and find Fourier series and transforms.
4. find Laplace and inverse transforms of a function.

CH 112 ENGINEERING PHYSICS

(Optics, Electromagnetism & Quantum Physics)

Semester I [First Year]**COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. Identify and illustrate wave phenomena such as interference in thin films, concept of diffraction, birefringence and production and detection of different polarized lights.
2. Understanding the basic concepts of lasers, fibers and their applications.
3. Acquire knowledge about the Maxwell's equations and Various terms related to properties of materials such as, permeability, polarization, etc.
4. Some of the basic laws related to quantum mechanics such as wave particle duality, uncertainty principle, Schrodinger wave equation & its applications etc.

CH/CE/EE/ME ENGLISH FOR COMMUNICATION SKILLS

113

Semester I [First Year]**COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. use vocabulary contextually.
 2. compose effectively the various forms of professional communication.
 3. apply grammar rules efficiently in spoken and written forms.
- improve clarity to locate and learn the required information.

CH 151 PHYSICS LAB**Semester I [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students will be able to

1. use CRO, Function generator, Spectrometer for making measurements
2. test the optical instruments using principles of interference and diffraction
3. understand the concepts learned in the Physics theory.
4. carrying out precise measurements and handling sensitive equipment.
5. draw conclusions from data and develop skills in experimental design.

CH/CE/EE/ME 152 ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**Semester I [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students will be able to:

1. comprehend relationships between ideas and make inferences and predictions about spoken discourse.
2. speak English with a reasonable degree of accuracy in pronunciation.
3. develop appropriate speech dynamics in professional situations.
4. use effective strategies and social graces to enhance the value of communication.
5. develop effective communication and presentation skills and using language effectively to face interviews with success.

CH/CS/EC/IT**ENGINEERING GRAPHICS & DESIGN LAB****153****Semester I [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
2. Produce computer generated drawings using CAD software..
3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
4. Develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. Convert pictorial and isometric views of simple objects to orthographic views.

CH 121**MATHEMATICS-II****Semester II [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. solve differential equations which model physical processes.
2. solve physical problems using Bessel's and Legendre's functions
3. develop their attitude towards problem solving of PDEs.
4. solve problems in engineering involving PDEs.

CH 122**CHEMISTRY-I****- 4 40 60****Semester II [First Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. know the structure of molecules and relate it to spectral and magnetic properties.
2. relate the structure of molecules to its reactivity.
3. apply the bonding concept in arriving at the mechanisms of reactions.
4. design simple mechanisms for reactions.

**CH/CE/CS/EE/
EC/IT/ME 123**

PROGRAMING FOR PROBLEM SOLVING

**L T P C Int Ext
3 - - 3 40 60**

Semester II [First Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. develop algorithms and flow charts for simple problems.
2. use suitable control structures for developing code in C.
3. design modular programs using the concepts of functions and recursion.
4. Develop code for complex applications using structures, pointers and file handling features.

CH/ME 124

BASIC ELECTRICAL ENGINEERING

**L T P C Int Ext
3 1 - 4 40 60**

Semester II [First Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. understand the basic electrical circuits and batteries.
2. gain the knowledge on the concept of AC circuits.
3. get the knowledge on the principle and operation of single phase transformer
4. understand the operation of electrical machines.

CH 161

CHEMISTRY LAB

Semester II [First Year]

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

1. estimate the Fe(II) content of a given solution and chloride/hardness content of water.
2. systematically analyze a given organic compounds.
3. measure conductance of solutions, redox potentials of a cell.
4. synthesize a small drug molecule and polymer.

**CH/CE/CS/EE/
EC/IT/ME 162**

PROGRAMING FOR PROBLEM SOLVING LAB

**L T P C Int Ext
- - 4 2 40 60**

Semester II [First Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. develop algorithms and flow charts for simple problems.
2. use suitable control structures for developing code in C.
3. design modular programs using the concepts of functions and recursion.
4. Develop code for complex applications using structures, pointers and file handling features.

CH/CS/EC/IT 163

WORKSHOP PRACTICE LAB

Semester II [First Year]

COURSE OUTCOMES:

After successful completion of the course, the students will be able to

1. will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.

Work shop Practice: (60 hours)

Outcomes:

Up on completion of laboratory, students will be able to gain the manufacturing skills and get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.

CH/ME 164**BASIC ELECTRICAL ENGINEERING LAB****L T P C Int Ext****-- 2 1 40 60****Semester II [First Year]****COURSE OUTCOMES:****After successful completion of the course, the students will be able to:**

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.
4. Understand the basic characteristics of resonance.
5. Verify the network theorems.

CH 211**MATHEMATICS III (PROBABILITY AND STATISTICS)****L T P C Int Ext****3 - - 3 40 60****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Understand the ideas of random variables and various discrete and continuous random variables and their properties.
2. Apply various probability distribution concepts to solve the engineering problems
3. Understand the basic ideas of statistics including correlation , regression , least squares fit to various curves
4. Apply the statistical methods for analyzing experimental data by testing the hypotheses.

CH 212**LIFE SCIENCES FOR ENGINEERS****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Understand and appreciate the cellular organization and its diversity
2. Recognize and understand the molecular basis of different forms of life and their applications
3. Identify the complementarity in the structure and functions of biomolecules
4. Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms

CH 213**PHYSICAL AND ORGANIC CHEMISTRY****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Judge the mechanisms of catalysis and determine the order of a reaction.
2. Choose a suitable method for corrosion prevention related to potential of a system
3. Write the mechanisms for a given organic reaction.
4. Explain the chemistry of polymer formation

CH 214**CHEMICAL PROCESS CALCULATIONS****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Develop the composition relationships.

2. Design air flow operations such as drying and humidification processes.
3. Make material balances on unit operations and processes.
4. Evaluate energy balances on unit operations and processes.

CH 215**MOMENTUM TRANSFER****L T P C Int Ext****3 - - 3 4060****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Apply the concept of hydrostatic equilibrium and to have a knowledge on fluid flow Phenomena
2. Develop the continuity, momentum, and energy balance equations and to solve the fluid flow problems in pipes
3. Determine flow rates, pressure changes and effect of forces acting on flow past immersed bodies and fluidization
4. Identify the appropriate fluid moving and metering machinery based on the process requirement

CH 216**MECHANICAL OPERATIONS****Semester III [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Do the Separation of materials (useful and gangue) from their physical properties.
2. understand the Selection of Machinery for size reduction of the raw materials
3. Perform Power consumption calculation for crushing and grinding
4. Apply different techniques for separation

CH 251**ORGANIC CHEMISTRY LAB****Semester III [Second Year]****COURSE OUTCOMES:****After the successful completion of the course, students are able to**

1. Prepare solutions of different concentrations
2. Propose suitable mechanism for an organic reaction
3. Prepare the required organic compound or derivative and confirm its identity by suitable methods
4. Identify the nature and type of a given organic compound

CH 252**MOMENTUM TRANSFER LAB****Semester III [Second Year]****COURSE OUTCOMES:****After the successful completion of the course, students are able to**

1. Collect quality raw data from an operation
2. Compare observed with predicted performance
3. Communicate the results of their analysis effectively in written and oral reports
4. Function effectively in a lab team

CH 221**NUMERICAL METHODS IN CHEMICAL ENGINEERING****Semester IV [Second Year]****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Apply the numerical methods to solve the linear and non-linear algebraic solutions
2. Gain the knowledge of applying the interpolating, numerical differentiation, regression analysis and numerical integration to solve a few chemical engineering problems
3. Apply the numerical methods to solve both initial and final value problems of ordinary differential

equations

4. Apply the Finite Difference Method to discretise and solve the partial differential equations numerically

CH 222

MATERIAL TECHNOLOGY Semester IV [Second Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Predict the properties of simple metals and alloys based on their phase diagrams, phase transitions and Metal forming process.
2. Apply and integrate knowledge from the major elements of the field structure, properties, processing, and performance) to solve materials selection and design problems and Heat treatment process
3. Use the techniques, skills and modern engineering tools necessary engineering practice for failure of metals and alloys
4. Identify various types of corrosion, illustrate methods to mitigate corrosion and select suitable material for various chemical processes

CH 223

INDUSTRIAL INSTRUMENTATION & INSTRUMENTAL METH ODS OF ANALYSIS Semester IV [Second Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. understand the instrumentation and apply to various industrial processes
2. understand the use of various thermometers to measure the temperature of different ranges
3. understand the principles of manometers to measure the pressure and instrumentation to measure the level and head and also flow metering
4. analyse the composition of various industrial products by the application of analytical instrumentation

CH 224

PROCESS HEAT TRANSFER

Semester IV [Second Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Describe the three modes of heat transfer mathematically and physically
2. Estimate the thermal conductivity, convective heat transfer coefficient and emissivity for any application
3. Calculate convective heat transfer coefficients for forced, free, phase change problems
4. Design or predict the performance of different types of heat exchangers

CH 225

CHEMICAL ENGINEERING THERMODYNAMICS-I Semester IV [Second Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Define a thermodynamic system and apply the thermodynamics to closed and open systems to estimate the heat and work interactions
2. Apply the entropy balance to the thermodynamics systems and be able to calculate the efficiencies of heat engines
3. Derive the thermodynamic relations among various properties to estimate the unknown properties and also be able to estimate the efficiency of power cycles
4. Derive the thermodynamic property relations for various flow processes and also be able to understand the principles of heat pump and refrigeration

CH 226**CHEMICAL REACTION ENGINEERING-I
Semester IV [Second Year]****Course Outcomes:**

- i. Analyze kinetic data and determine the rate expressions (reaction order and specific reaction rate) for a reaction.
- ii. Derive and solve design equations for batch, semi batch and steady state flow reactors.
- iii. Solve appropriate rate expressions for series, parallel and reversible reactions. Understand the performance characteristics and the advantages and disadvantages of major reactor types
- iv. Analyze multiple reactions to determine selectivity and yield.

CH 261**PROCESS HEAT TRANSFER LAB.
Semester IV [Second Year]****COURSE OUTCOMES:**

After the successful completion of the course, students are able to

1. Collect quality raw data from an operation
2. Compare observed with predicted performance
3. Communicate the results of their analysis effectively in written and oral reports
4. Function effectively in a lab team

CH 262**MECHANICAL OPERATIONS LAB.
Semester IV [Second Year]****COURSE OUTCOMES:**

After the successful completion of the course, students are able to

1. Understand the properties of solids and different types of size reduction principles
2. Use the best screening and settling methods in chemical industries
3. Decide the best separation operation needed in chemical process industries
4. Design a liquid solid separation equipments

CH 263**COMPUTATIONAL PROGRAMMING LAB.
Semester IV [Second Year]****COURSE OUTCOMES:**

After the successful completion of the course, students are able to

1. Apply the numerical method to solve various equations
2. Write the algorithms for various numerical methods to solve model equations
3. Write the programmes to compute various chemical quantities by solving the model equations
4. Interpolate the data by using computational tools

CH 311**MASS TRANSFER OPERATIONS-I
Semester V [Third Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. Estimate the rate of material transfer in different mass transfer operations.
2. Calculate the mass transfer coefficients
3. Design the Humidification tower
4. Design the drying and crystallizer equipment.

CH 312**CHEMICAL ENGINEERING THERMODYNAMICS-II
Semester V [Third Year]****COURSE OUTCOMES:**

After successful completion of the course, the students are able to

1. Compute the sensible heat integral and apply the same in industrial reactions to estimate the heats of reaction and final temperatures
2. Estimate fugacity & fugacity coefficients of gas mixtures & solutions, and be able to apply the property models to estimate the activity coefficients
3. Apply the Raoult's law and Modified Raoult's law for VLE to perform bubble and dew point calculations
4. Estimate the reaction equilibrium constant and the composition of the mixtures at chemical equilibrium conditions

CH 313

CHEMICAL REACTION ENGINEERING-II
Semester V [Third Year]

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. Explain the thermal characteristics and design of adiabatic reactors for single and multiple reactions
2. Apply the non-ideality concepts in the reacting system for better understanding the deviations from ideality and to use the tanks-in-series model and the dispersion model for a first order reaction, to solve
3. Develop the progressive conversion model and shrinking core model for explaining the fluid particle reaction
4. Understand the principles and mechanism involved in heterogeneous catalysis and analyze the data of heterogeneous catalytic reactions

CH 314

INORGANIC CHEMICAL TECHNOLOGY
Semester V [Third Year]

COURSE OUTCOMES:**After successful completion of the course, the students are able to**

1. Apply fundamentals of Water treatment and Alkali industries
2. Understand the manufacture of Ceramics, Cements, Glass and Industrial gases and their applications
3. Apply the knowledge of NPK fertilizers in real life applications
4. Apply the knowledge of HCl, H₂SO₄, and Alum and Nuclear industries in their career

CH 351

MASS TRANSFER OPERATIONS-I LAB.
Semester V [Third Year]

COURSE OUTCOMES:**After the successful completion of the course, students are able to**

1. Evaluate the diffusivity and mass transfer coefficients
2. Optimize the parameters in mass transfer column
3. Design gas – liquid absorption columns
4. Analyse drying rates of wet solids

CH 352

CHEMICAL REACTION ENGINEERING LAB
Semester V [Third Year]

COURSE OUTCOMES:

- i. Design ideal continuous reactors operating at isothermal conditions given kinetic data and conversion.
- ii. Solve for conversion in a non-ideal reactor given a residence time distribution
- iii. To understand how to measure reaction rates using integral and differential methods
- iv. Students are aware that materials, construction, operability, safety and ethical issues must be considered in reactor

List of Experiments:

1. Determination of the order of a reaction using a Batch reactor and analyzing the data by
 - (a) differential method
 - (b) integral method.
2. Determination of activation energy of a reaction using a batch reactor
3. To determine the specific reaction rate constant of a reaction of known order using a batch reactor
4. To determine the specific reaction rate constant of a reaction of known order using a CSTR (Continuous Stirred Tank Reactor).
5. To determine the order of the reaction and the rate constant using tubular reactor.
6. To determine the order of the reaction and the rate constant using a plug flow reactor
7. Langmuir adsorption isotherm. To determine the surface area of activated charcoal.
8. To determine the RTD and the dispersion number in a tubular reactor using a tracer
9. To determine the RTD and the dispersion number in a CSTR
10. To determine the RTD and the dispersion number in a CSTR's in series.
11. To determine the RTD and the dispersion number in a combined reactor.
12. Mass transfer with chemical reaction (Liquid–Liquid system) to determine the mass transfer coefficient in the stirred cell
13. Mass transfer with chemical reaction (Solid-liquid system). To determine the mass transfer coefficient of stirred cell.
14. Axial mixing in a packed-bed. To determine the RTD and the dispersion number for a packed-bed using a tracer

CH 321

MASS TRANSFER OPERATIONS-II
Semester VI [Third Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Evaluate the equilibrium data for distillation and design.
2. Evaluate the equilibrium data for the liquid–liquid extractions and design the LLE.
3. Design the absorption equipment.
4. Understand leaching & adsorption and design of solid extractor & adsorber.
- 5.

CH 322

PROCESS DYNAMICS & CONTROL
Semester VI [Third Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Analyze typical process dynamics with and without feedback control using both time domain and Laplace domain approaches
2. Analyze open loop and closed loop system properties and stability of control systems by using Routh test & root locus.
3. Apply frequency response based analysis for control system stability and performance
4. Design, simulation and analysis of feedback, multi-loop and model based controllers & control valves

CH 323

ORGANIC CHEMICAL TECHNOLOGY
Semester VI [Third Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Understand the manufacture of Rubbers, fibres and Petroleum products
2. Understand the manufacture of Plastics, Paints and varnishes
3. Understand the manufacture of Carbohydrates, Pulp and Paper industries
4. Understand the manufacture of Oils, Soaps and Detergents

CH 324

PROCESS MODELING AND SIMULATION
Semester VI [Third Year]

COURSE OUTCOMES:

After successful completion of the course, the students are able to

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. know Petrochemical industry-Feedstock, various important Chemicals produced from methane, ethane, ethylene
2. produce different petrochemicals from C3, C4 and higher carbon atoms, polymerization and production of various polymers
3. produce different petroleum aromatics
4. produce different intermediate chemicals, synthetic fibers

CHEL04 NATURAL GAS PRODUCTION AND ITS APPLICATIONS L T P C Int Ext

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Have knowledge on Natural Gas potential, composition and resources
2. Apply different liquification techniques
3. Understand different steps in NG processing
4. Have knowledge associated with safety aspects of NG, transportation and storage

CHEL09 COMPUTER SIMULATORS

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Apply the numerical methods to simulate the chemical engineering problems
2. Utilize the MATLAB programming for the simulation of chemical engineering model equations
3. Simulate the chemical processes in the controlling environment by using the Simulink
4. Design the Chemical Engineering Processes involving various chemical equipment by using ASPEN Plus Design software

CHEL10 COMPUTER AIDED PROCESS ENGINEERING L T P C Int Ext

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Use the simulators like MATLAB and ASPEN PLUS to solve the mathematical model equations
2. Apply the simulators to compute mass balances
3. Use the simulators to simulate mass transfer equipment and chemical reactors
4. Use the simulators to simulate heat exchanging equipment and some industrial examples

CHEL11 COMPUTER AIDED DESIGN L T P C Int Ext

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Prepare process flow sheets for design showing reactors, distillation columns and other process equipment
2. Apply knowledge of mathematics, science and engineering in design
3. Design a system, component, or process to meet desired needs
4. Use the techniques, skills and modern engineering computer tools necessary for engineering practice

CHEL12 COMPUTATIONAL FLUID DYNAMICS L T P C Int Ext

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Understand the basic principles of formulation of governing equations
2. Apply the finite difference techniques
3. Apply the finite difference techniques to solve convective equations
4. Write the algorithms for one, two and three dimensional equations

CHEL13 ELECTROCHEMICAL ENGINEERING L T P C Int Ext**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Understand balanced electrochemical reactions; analyse the open circuit potentials of electrochemical cells, including liquid-junction potentials and understand the structure of the electric double layer, based partly on surface-tension data
2. Understand the reaction mechanisms and kinetics to obtain electrode over potentials and mass-transfer phenomena, including the estimation of limiting currents
3. Explain the principles and working conditions of the different types of primary and secondary batteries
4. Understand the uses of electrodes in various electro industries and acquire basic knowledge on corrosion

CHEL14 INDUSTRIAL HAZARDS AND SAFETY ANALYSIS. L T P C Int Ext**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Attain the knowledge of human errors and human factors, principles and how they relate to Process Safety Management
2. Improve human performance by reducing human error-likelihood by work situations through design, improved work instructions, training and the recognition of human factors hazards
3. Practice performing human factors, procedures and analyses in realistic situations dealing with toxic and flammable materials
4. Reduce the process hazards by using protective equipment

CHEL15 FLUIDIZATION ENGINEERING L T P C Int Ext**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Explain the difference between fixed and fluidized beds
2. Explain about various types of fluidized beds and their use in industries
3. Derive minimum fluidization mass velocity and pressure drop equation for minimum fluidization
4. Predict the Pressure drop in stick-slip flow, aerated flow, beds, cyclones and fluidized bed reactors

CHEL16 BIO-CHEMICAL ENGINEERING L T P C Int Ext**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Understand and use the basic principles of biology and biochemistry to operate a biochemical process
2. Derive the kinetic expression for the rates of enzyme catalysed reactions
3. Understand the factors effecting cell growth and the design various bioreactors
4. Apply various unit operations and unit processes for downstream processing

CHEL17 NANOTECHNOLOGY L T P C Int Ext**COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Explain about molecular nanotechnology, nanolithography
2. Explain the concept of preparation of nanomaterials, sol-gels
3. Explain the applications of rotaxanes, catenanes Proteins, lipids and DNA
4. Explain about drug delivery systems and impact on environment

CHEL18 **INDUSTRIAL POLLUTION CONTROL** **L T P C Int Ext****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Describe and quantify health risks due to toxic chemicals
2. Perform basic mass balances, formulate flow sheets and carry out preliminary sizing for biological unit operations for pollutant removal including activated sludge and trickling filters
3. Describe mobile and stationary sources of air pollutants and their removal processes from the environment
4. Define hierarchies for pollution prevention and to discuss concepts of waste minimization

CHEL19 **ADVANCED SEPARATION PROCESSES** **L T P C Int Ext****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Design the super-critical fluid extractor
2. Explain basic concepts for the prepare the membrane modules
3. Analyse the suitable application for particular separation
4. Design the pervaporation unit and dialysis

CHEL20 **OPTIMIZATION OF CHEMICAL PROCESS** **L T P C Int Ext****COURSE OUTCOMES:****After successful completion of the course, the students are able to**

1. Fit data to linear and nonlinear functions
2. Formulate chemical processes as optimization problems
3. Solve linear convex objective functions
4. Simplify and solve complex chemical engineering processes

CH V01 **ENGLISH COMPETENCY DEVELOPMENT PROGRAMME** **L T P C Int Ext**
[NON-CREDIT COURSE - ACTIVITY BASED] **2 - - - 100 -****LECTURE PLAN****Session Topic**

1. Self Introduction
2. Self Introduction
3. Introducing Others
4. Mind Mapping -Small Talk
5. Random Operation
6. JAM & Extempores
7. Starting a Conversation-Rapid Fire
8. Story Telling
9. Narrating Life Stories
10. Tense Buster
11. Describing people
12. Picture Perception & Description
13. Movie Reviews
14. News Articles-Open Discussion & Debate
15. Everyday Life-Communicative Activities
16. Role Plays
17. Short Versions
18. Contemporary Novels-Critical Appreciation Round

19. CHOL01 ENERGY ENGINEERING

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Understand the importance of environment and conservation of natural resources
2. Succeed in the competitive exams of energy industry
3. Utilize the non conventional energies in place of conventional energies and its manufacture
4. Maintain the sustainability in the environment

CHOL02

BIOFUELS

L T P C Int Ext

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Describe the functional principle of biofuel technologies in small and large scale
2. Describe the main steps and components in bioethanol, biodiesel and biogas production
3. Participate actively in teamwork and work with case related problem solving
4. Work with professional problem solving in an industrial environment

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOMES (R18 Regulation)

Year & Semester	Course Code & Name	Course Outcomes
Semester I [First Year]	CE111 Mathematics-I	After successful completion of the course, the students are able to 1. Evaluate certain improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions. 2. Know fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems. 3. Understand Fourier series and deal with functions of several variables. 4. Do problems on matrices and linear algebra in a comprehensive manner
Semester I [First Year]	CE112 Engineering Physics	After successful completion of the course, the students are able to 1. Understand the vector mechanics for a classical system. 2. Understand the basics of Harmonic oscillators 3. Analyze the planar rigid body dynamics and 3-Dimensional rigid body motion. 4. Acquire the knowledge of basic concepts of mechanics of solids.
Semester I [First Year]	CE113 English for Communication Skills	After successful completion of the course, the students are able to 1. Use vocabulary contextually. 2. Compose effectively the various forms of professional communication. 3. Apply grammar rules efficiently in spoken and written forms. 4. Improve clarity to locate and learn the required information
Semester I [First Year]	CE 151 Physics Laboratory	After successful completion of the course, the students will be able to 1. use CRO, Function generator, Spectrometer for making measurements 2. test the optical instruments using principles of interference and diffraction 3. understand the concepts learned in the Physics theory. 4. carrying out precise measurements and handling sensitive equipment. 5. draw conclusions from data and develop skills in experimental design

Semester I [First Year]	CE152 English Language Communication Skills Lab	After successful completion of the course, the students will be able to: 1. comprehend relationships between ideas and make inferences and predictions about spoken discourse. 2. speak English with a reasonable degree of accuracy in pronunciation. 3. develop appropriate speech dynamics in professional situations. 4. use effective strategies and social graces to enhance the value of communication. 5. develop effective communication and presentation skills and using language effectively to face interviews with success
Semester I [First Year]	CE 153 Workshop Practice Laboratory	After successful completion of the course, the students will be able to 1. Will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
Semester II [First Year]	CE 121 Mathematics – II	After successful completion of the course, the students are able to 1. solve differential equations which model physical processes.. 2. evaluate multiple integrals and their usage. 3. integrate vector functions. 4. Understand differentiation and integration of functions of a complex variable and apply them in various engineering problems
Semester II [First Year]	CE 122 Engineering Chemistry	After successful completion of the course, the students are able to 1. Student can identify stable complexes and suitable electrochemical energy systems for end usage. 2. apply his knowledge for effective water treatment and corrosion prevention. 3. identify chemical reactions that are used in the synthesis of molecules and polymers 4. Distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques.
Semester II [First Year]	CE 123 Programming for Problem Solving	After successful completion of the course, the students are able to 1. develop algorithms and flow charts for simple problems. 2. use suitable control structures for developing code in C. 3. design modular programs using the concepts of

		<p>functions and recursion.</p> <p>4. Develop code for complex applications using structures, pointers and file handling features</p>
Semester II [First Year]	CE 124 Basic Mechanical Engineering	<p>After successful completion of the course, the students are able to</p> <ol style="list-style-type: none"> 1. Know how the power is transmitted through belt and gear drives, estimate the tensions, power transmitted, length of the belt required etc. 2. Know the basic concepts of thermodynamics, efficiencies and performance of 2-stroke and 4 stroke IC Engines. 3. Understand working principles of Babcock and Wilcox boilers, different mountings and accessories used in the boilers. They will be able to know basic working of refrigerator and air conditioning. 4. Know the difference between refrigeration and air-conditioning, Renewable and Non-Renewable resources
Semester II [First Year]	CE125 Engineering Mechanics	<p>After successful completion of the course, the students are able to</p> <ol style="list-style-type: none"> 1. apply principles of statics and solve problems involving concurrent forces in a plane 2. solve problems involving parallel forces and general case of forces in a plane 3. solve problems with forces oriented in three-dimensions and apply principle virtual work to system of rigid bodies 4. calculate moments of areas and moments of inertia
Semester II [First Year]	CE 161 Chemistry Laboratory	<p>After successful completion of the course, the students will be able to</p> <ol style="list-style-type: none"> 1. estimate the Fe(II) content of a given solution and chloride/hardness content of water. 2. measure molecular properties such as surface tension, viscosity. 3. measure conductance of solutions, redox potentials of a cell. 4. synthesize a small drug molecule and polymer
Semester II [First Year]	CE 162 Programming for Problem Solving Laboratory	<p>After successful completion of the course, the students are able to</p> <ol style="list-style-type: none"> 1. develop algorithms and flow charts for simple problems. 2. use suitable control structures for developing code in C. 3. design modular programs using the concepts of functions and recursion. 4. Develop code for complex applications using structures, pointers and file handling features
Semester II	CE 163 Engineering	<p>After successful completion of the course, the students are able to</p> <ol style="list-style-type: none"> 1. Prepare engineering drawings as per BIS conventions

[First Year]	Graphics & Design Laboratory	mentioned in the relevant codes. 2. Produce computer generated drawings using CAD software.. 3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings. 4. Develop isometric drawings of simple objects reading the orthographic projections of those objects. 5. Convert pictorial and isometric views of simple objects to orthographic views
Semester III [Second Year]	CE 211 Surveying	After successful completion of the course, the students are able to 1. To determine the relative positions of a point on the existing ground by conducting the survey. 2. To take the levels of existing ground and to determine the reduced levels and can calculate area and volume of the tract. 3. To find out the reduced level of different locations using tacheometer. 4. To design and layout curves for roads and railways also gain knowledge about the latest Surveying Instruments
Semester III [Second Year]	CE 212 Solid Mechanics - I	After successful completion of the course, the students are able to 1. Can determine stress and strain in axially loaded bars 2. Can determine stress and strain in biaxially/triaxial loaded bodies 3. Able to visualize internal forces in beams 4. Can determine normal and shear stresses in beams 5. Understands torsion of circular bars
Semester III [Second Year]	CE 213 Fluid Mechanics	By the end of the course the students will be able to 1. Understand properties of fluids and compute hydrostatic forces 2. Apply conservation laws to derive the basic governing equations of fluid flow 3. Measure the discharge using various flow measuring devices 4. Analyze and design simple pipe systems
Semester III [Second Year]	CE 214 Engineering Geology	After successful completion of the course, the students are able to 1. Understand the importance of geology in civil engineering 2. Students are familiar with identifying the geological process of the region related to the civil engineering works 3. Students are able to evaluate the formation and properties of the minerals, rocks and soil

		4. Develops the ability to understand the site and solutions for different geological problems
Semester III [Second Year]	CE 215 Building Materials & Construction	After successful completion of the course, the students are able to 1. Students are familiar with various building materials 2. Acquire the knowledge about plastics, paints, distempers and water proofing materials. 3. Understand brick masonry, specifications in plastering, stairs, lifts and knowledge regarding acoustics of building. 4. Students will have knowledge regarding building components, scaffolding, shoring, underpinning and formwork
Semester III [Second Year]	CE 251 Strength of Materials Laboratory	After the successful completion of the course, students are able to 1. Behavior of materials like steel, wood, concrete etc under direct tension, compression, shear, torsion and bending. 2. Finding properties like young's modulus, modulus of rigidity of materials. 3. Determining hardness, impact resistance of the given materials by conducting relevant tests. 4. Determining the percentage of water absorption of bricks
Semester III [Second Year]	CE 252 Engineering Geology Laboratory	After the successful completion of the course, students are able to 1. Students are able to understand the importance of geology in civil engineering 2. Students are familiar with identifying the geological process of the region related to the civil engineering works 3. Students are able to evaluate the formation and properties of the minerals, rocks and soil 4. Develops the ability to prepare the geological section and maps and interpret the site conditions
Semester III [Second Year]	CE 253 Computer Aided Civil Engineering Drawing Laboratory	After the successful completion of the course, students are able to 1. Basic Auto CAD commands 2. Various conventional signs, symbols of materials and building services 3. Drawing plan, section and elevations of buildings and various building components 4. Basics of creating 3D building model and rendering the model
Semester III [Second Year]	CE 254 Communicative English	Upon completion of the course students shall. 1. Recognise the need of good communication skills for professional courses. 2. Understand the basic tenets of communication.

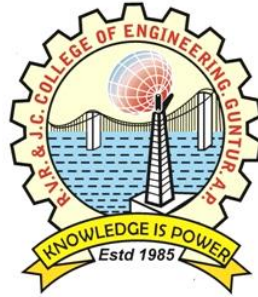
Year]	Laboratory	3. Articulating syllables clearly, speaking fluently with correct pronunciation. 4. Develop their self awareness. 5. Understand the importance of group dynamics
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R. V. R. & J. C. COLLEGE OF ENGINEERING

(Autonomous)

ACCREDITED BY NBA AND NAAC WITH 'A' GRADE

Chowdavaram, GUNTUR – 522 019



COMPUTER SCIENCE & ENGINEERING

I/IV B.Tech I Semester

CS/IT 111 - Mathematics - I

Course outcomes:

1. Evaluate certain improper integrals apart from some other applications they will have a basic understanding of Beta and Gamma functions.
2. Know fallouts of Role's theorem that is fundamental to application of analysis to Engineering problems.
3. Understand linear algebra including linear transformations in a comprehensive manner.
4. Find matrix Eigen values and know diagonalization and orthogonalization.

CS/IT 112 - Engineering Physics

Course Outcomes:

1. Necessity of periodical potentials and conditions for explaining the properties and band formation with the help of quantum physics.
2. The theory of P-N junction diode from the basics of semiconductor concepts.
3. The theory and application of Optoelectronic devices.
4. Measurement techniques employed in transport phenomena and variation of properties in low dimensions.

CS/IT/EC 113 Basic Electrical Engineering

Course Outcomes:

1. Understand the basic electrical circuits and batteries.
2. Gain the knowledge on the concept of AC circuits.
3. Get the knowledge on the principle and operation of single phase transformer.
4. Understand the operation of electrical machines.

CS/IT 151 Physics Lab

Course Outcomes:

1. Able to use CRO, Function generator, Spectrometer for making measurements.
2. Able to test the optical instruments using principles of interference and diffraction.
3. Able to understand the concepts learned in the Physics theory.
4. Trained in carrying out precise measurements and handling sensitive equipment.
5. Learn to draw conclusions from data and develop skills in experimental design

CS/IT/EC 152 Basic Electrical Engineering Lab

Course Outcomes:

1. Get an exposure to common electrical components and their ratings.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical measuring instruments.

4. Understand the basic characteristics of resonance.
5. Verify the network theorems.

CS/IT/CH/EC 153 Engineering Graphics and Design Lab

Course Outcomes:

1. Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
2. Produce computer generated drawings using CAD software.
3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
4. Develop isometric drawings of simple objects reading the orthographic projections of those objects.
5. Convert pictorial and isometric views of simple objects to orthographic views.

I/IV B.Tech II Semester

CS/IT 121 Mathematics – II

Course Outcomes:

1. Deal with functions of several variables that are essential in most branches of engineering.
2. Evaluate multiple integrals.
3. Understand concepts like divergence, curl and integration of vector function.
4. Solve differential equations which model physical processes.

CS/CE/IT 122 Engineering Chemistry

Course Outcomes:

1. Student can identify stable complexes and suitable electrochemical energy systems for end usage.
2. Student can apply his knowledge for effective water treatment and corrosion prevention.
3. Able to identify chemical reactions that are used in the synthesis of molecules and polymers
4. Distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques.
- 5.

CS/CE/CH/IT/EE/ EC/ME 123 Programming for Problem Solving

Course Outcomes:

1. Develop algorithm and flowchart for simple problems.
2. Use suitable control structures and arrays for developing code in C.
3. Design modular structured programs using functions and recursion.
4. Develop code for complex applications using structures, pointers and file handling features.

CS/CH/IT/EC 124 English for Communication Skills

Course Outcomes:

1. Use vocabulary contextually.
2. Compose effectively the various forms of professional communication.
3. Apply grammar rules efficiently in spoken and written forms.

CS/CE/IT 161 Chemistry Lab

Course Outcomes:

1. Estimate the Fe(II) content of a given solution and chloride/hardness content of water.
2. Measure molecular properties such as surface tension, viscosity.
3. Measure conductance of solutions, redox potentials of a cell.
4. Synthesize a small drug molecule and polymer.

CS/CE/CH/IT/EE/ EC/ME 162 Programming for Problem Solving Lab

Course Outcomes:

1. Develop algorithm and flowchart for simple problems.
2. Use suitable control structures and arrays for developing code in C.
3. Design modular structured programs using functions and recursion.
4. Develop code for complex applications using structures, pointers and file handling features.

CS/CH/IT/EC 163 Workshop Practice Lab

Course Outcomes:

1. Students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.

CS/CH/IT/EC 164 English Language Communication Skills Lab

Course Outcomes:

1. Comprehend relationships between ideas and make inferences and predictions about spoken discourse.
2. Speak English with a reasonable degree of accuracy in pronunciation.
3. Develop appropriate speech dynamics in professional situations.
4. Use effective strategies and social graces to enhance the value of communication.
5. The students are capable of using language effectively to face interviews with success.
6. Develop effective communication and presentation skills.
7. Students will be able to use higher order skills.

II/IV B. Tech – I Semester

CS/IT 211 Mathematics – III

Course Outcomes:

1. The ideas of random variables and various discrete and continuous random variables and their properties.
2. The application of various probability distribution concepts to solve the engineering problems.
3. The basic ideas of statistics including correlation, regression, least squares fit to various curves.
4. The statistical methods for analyzing experimental data by testing the hypotheses.

CS/IT 212 Life Sciences for Engineers

Course Outcomes:

1. Understand and appreciate the cellular organization and its diversity.
2. Recognize and understand the molecular basis of different forms of life and their applications.
3. Identify the complementarity in the structure and functions of biomolecules.
4. Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms.

CS/IT 213 Digital Electronics

Course Outcomes:

1. Illustrate number system and demonstrate various digital circuits in digital electronics.
2. Analyze and design various combinational circuits.
3. Analyze and design various sequential circuits.
4. Compare and build various semiconductor memories.

CS/IT 214 Discrete Mathematics

Course Outcomes:

1. Apply Propositional logic and first order logic to solve problems.
2. Apply basic counting techniques to solve combinatorial problems.
3. Formulate and solve recurrence relations.
4. Formulate and solve graph problems.

CS/IT 215 Data Structures

Course Outcomes:

1. Select appropriate data structures as applied to specified problem definition.
2. Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.

3. Implement Linear and Non-Linear data structures, and design advance data structures for the real world problems.
4. Implement appropriate sorting/ searching technique for given problem.

CS/IT 216 Object Oriented Programming

Course Outcomes:

1. Develop simple Java applications.
2. Design and implement APIs and Multitasking applications.
3. Design and implement, File management, and web based applications.
4. Develop GUI applications using AWT and Swing components.

CS/IT 251 Digital Electronics Lab

Course Outcomes:

1. Develop a digital logic and apply it to solve real life problems.
2. Design and implement combinational logic circuits.
3. Design and implement sequential logic circuits.
4. Classify different semiconductor memories.

CS/IT 252 Data Structures Lab

Course Outcomes:

1. Implement various ADTs.
2. Identify appropriate data structure for a given application.
3. Develop application using suitable ADTs

CS/IT 253 Object Oriented Programming Lab

Course Outcomes:

1. Develop secure Java applications.
2. Create simple Java user interfaces.
3. Develop File management, and web based applications.
4. Construct event driven GUI applications using AWT and Swing components.

Course Outcomes of all subjects as per Autonomous syllabus(R18)

S.No	Sub Code (R18)	SUBJECT NAME	COs	CO Text
1	EC111	Mathematics - I	C111.1	evaluate certain improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
			C111.2	know fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
			C111.3	understand Fourier series and deal with functions of several variables.
			C111.4	do problems on matrices and linear algebra in a comprehensive manner.
2	EC112	Engineering Chemistry	C112.1	Student can identify stable complexes and suitable electrochemical energy systems for end usage.
			C112.2	apply his knowledge for effective water treatment and corrosion prevention.
			C112.3	identify chemical reactions that are used in the synthesis of molecules and polymers
			C112.4	distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques..
3	EC113	Basic Electrical Engineering	C113.1	understand the basic electrical circuits and batteries.
			C113.2	gain the knowledge on the concept of AC circuits.
			C113.3	get the knowledge on the principle and operation of single phase transformer
			C113.4	understand the operation of electrical machines.
4	EC151	Chemistry Lab	C151.1	estimate the Fe(II) content of a given solution and chloride/hardness content of water.
			C151.2	measure molecular properties such as surface tension, viscosity.
			C151.3	measure conductance of solutions, redox potentials of a cell.
			C151.4	synthesize a small drug molecule and polymer.
5	EC152	Basic Electrical Engineering Lab	C152.1	Get an exposure to common electrical components and their ratings.
			C152.2	Make electrical connections by wires of appropriate ratings.
			C152.3	Understand the usage of common electrical measuring instruments.
			C152.4	Understand the basic characteristics of resonance.
			C152.5	Verify the network theorems.
7	EC153	Engineering Graphics & Design Lab	C153.1	Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
			C153.2	Produce computer generated drawings using CAD software..

			C153.3	Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
			C153.4	Develop isometric drawings of simple objects reading the orthographic projections of those objects.
			C153.5	Convert pictorial and isometric views of simple objects to orthographic views.
8	MC002	Environmental Science		evaluate the implications of human activities and thereby promote ecofriendly technologies.
				promote awareness among the members of the society for a sustainable environment.
				include and give priority to environmental protection in all developmental projects.
9	EC121	Mathematics-II	C121.1	solve differential equations which model physical processes..
			C121.2	evaluate multiple integrals and their usage.
			C122.3	integrate vector functions.
			C122.4	understand differentiation and integration of functions of a complex variable and apply them in various engineering problems.
10	EC122	Engineering Physics	C122.1	necessity of periodical potentials and conditions for explaining the properties and band formation with the help of quantum physics.
			C122.2	2. the theory of P-N junction diode from the basics of semiconductor concepts.
			C122.3	3. the theory and application of Optoelectronic devices.
			C122.4	4. measurement techniques employed in transport phenomena and variation of properties in low dimensions.
11	EC123	Programming for Problem Solving	C123.1	develop algorithms and flow charts for simple problems.
			C123.2	use suitable control structures for developing code in C.
			C123.3	design modular programs using the concepts of functions and recursion.
			C123.4	Develop code for complex applications using structures, pointers and file handling features.
12	EC124	English for Communication Skills	C124.1	use vocabulary contextually.
			C124.2	compose effectively the various forms of professional communication.
			C124.3	apply grammar rules efficiently in spoken and written forms.
			C124.4	improve clarity to locate and learn the required information.
13	EC161	Physics Lab	C161.1	use CRO, Function generator, Spectrometer for making measurements
			C161.2	test the optical instruments using principles of interference and diffraction

			C161.3	understand the concepts learned in the Physics theory.
			C161.4	carrying out precise measurements and handling sensitive equipment.
			C161.5	draw conclusions from data and develop skills in experimental design.
14	EC16 2	Programming for Problem Solving	C162.1	develop algorithms and flow charts for simple problems.
			C162.2	use suitable control structures for developing code in C
			C162.3	design modular programs using the concepts of functions and recursion.
			C162.4	Develop code for complex applications using structures, pointers and file handling features.
15	EC163	Workshop Practice Lab	C163.1	will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
16	EC164	English Language Communication Lab	C164.1	comprehend relationships between ideas and make inferences and predictions about spoken discourse.
			C164.2	2. speak English with a reasonable degree of accuracy in pronunciation.
			C164.3	3. develop appropriate speech dynamics in professional situations.
			C164.4	4. use effective strategies and social graces to enhance the value of communication. 5. develop effective communication and presentation skills and using language effectively to face interviews with success.
17	MC00 1	Constitution India	C001.1	understand the significance of many provisions of the Constitution as well as to gain insight into their back ground. They will also understand number of fundamental rights subject to limitations in the light of leading cases.
			C001.2	2. Study guidelines for the State as well as for the Citizens to be followed by the State in the matter of administration as well as in making the laws. It also includes fundamental duties of the Indian Citizens in Part IV A (Article 51A).
			C001.3	3. Understand administration of a State, the doctrine of Separation of Powers.
			C001.4	4. Know how the State is administered at the State level and also the powers and functions of High Court.
			C001.1	5. Understand special provisions relating to Women empowerment and also children. For the stability and security of the Nation, Emergency Provision are Justified.
			C001.2	6. Understand election commission as an independent body with enormous powers and functions to be followed both at the Union and State level. Amendments are necessary, only major few amendments have been included.

18	MC003	Essence Of Indian Traditional Knowledge	C003.1	understand the concept of traditional knowledge and its importance.
			C003.2	Apply significance of traditional knowledge protection.
			C003.3	Analyze the various enactments related to the protection of traditional knowledge.
			C003.4	Evaluate the concepts of intellectual property to protect the traditional knowledge and the traditional knowledge in different sectors .
19	EC211	Mathematics - III	C214.1	finding Laplace and inverse transforms of a function.
			C214.2	how integral transforms can be used in engineering.
			C214.3	solving system of equations numerically
			C214.4	how to apply numerical methods to solve the mathematical models
20	EC212	Electronic Devices	C212.1	Understand the functioning of pn junction diode in various biasing conditions.
			C212.2	2. Understand the functioning of bipolar junction transistor and its characteristics.
			C212.3	3. Analyze and obtain the operating point of BJT for different biasing schemes.
			C212.4	4. Understand the working of MOS capacitor and MOSFET for various regions.
21	EC213	Signals & Systems	C213.1	Demonstrate knowledge in Representation of signals and systems,Fourier series representation of periodic signals,Fourier transform of signals,Convolution and correlation of functions.
			C213.2	apply convolution functions to signals and find the response of LTI systems
			C213.3	describe sampling theorem, aliasing and its effects
			C213.4	apply Laplace transform to various applications
22	EC214	Circuit Theory	C253.1	Explain the concepts of various laws and analyze the dc circuits using various analyzing techniques.
			C251.2	Solve the ac circuits by applying concept of phase and phase difference and analyzing the series, parallel and compound ac circuits.
			C252.1	Analyze the dc, ac circuits by applying various network theorems. Explain bandwidth, quality factor; identify magnification in series and parallel resonance circuits and its importance.
			C252.2	Describe the transient and steady state behavior of the series, parallel and compound circuits. Apply the Laplace transforms and Inverse Laplace transforms to analyze response of dc and ac circuits. Analyze the responses of circuits using P-Spice software.
23	EC215	Electromagnetic Field Theory	C215.1	compute the electric field and electric potential due to various charge distributions. space.
			C215.2	find the boundary conditions and capacitances of various configurations propagation of electromagnetic waves in free

				find steady magnetic fields and magnetic potentials.
			C215.3	Understand the Maxwell's equations and propagation of electromagnetic waves in free space.
24	EC251	Electronic Devices Lab	C251.1	Obtain the characteristics of devices like p-n Junction diode, zener diode, BJT in CE, CB configurations, JFET.
			C251.2	Calculate the parameters from the characteristics like static, dynamic and reverse resistances of p-n junction diode, h-parameters of BJT..
			C251.3	Design a circuit to achieve the specified operating point.
			C251.4	Measure the amplitude and frequency of given waveform using CRO
25	EC252	Communicative English Lab	C252.1	Recognise the need of good communication skills for professional courses.
			C252.2	Understand the basic tenets of communication.
			C252.3	Articulating syllables clearly, speaking fluently with correct pronunciation.
			C252.4	Develop their self awareness. 5. Understand the importance of group dynamics.
26	EC221	Basic Civil & Mechanical Engineering	C221.1	Acquire knowledge of surveying and materials used in construction industry
			C221.2	Understanding the concepts of foundation and structures , Understanding the concepts of mechanics
			C221.3	Be acquainted with power plants and the equipment used in power plants
			C221.4	Understand the working principles of IC engines, refrigeration systems and transmission of mechanical energy.
27	EC222	Life Science for Engineers	C222.1	Understand and appreciate the cellular organization and its diversity
			C222.2	Recognize and understand the molecular basis of different forms of life and their applications
			C222.3	Identify the complementarity in the structure and functions of biomolecules
			C222.4	Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms
28	EC223	Digital Electronics & Logic Design	C223.1	Demonstrate the knowledge in number systems, Boolean algebra, Combinational, sequential circuits, Programmable logic devices and Logic families.
			C223.2	Analyze and Design various combinational Circuits
			C223.3	Analyze and Design various sequential Circuits
			C223.4	Implement combinational circuit functionality with Programmable logic devices.
29	EC224	Network analysis & Transmission Lines	C224.1	Demonstrate various network functions and parameters.
			C224.2	Design and analyze various circuits like filters, attenuators and transmission lines useful for communication systems.

			C224.3	Demonstrate the performance of transmission lines at low and high frequencies. 4. Measure basic transmission line parameters such as reflection coefficient, SWR and impedance.
30	EC225	Analog Circuits	C225.1	Demonstrate knowledge in : (i) Single stage BJT and MOSFET amplifiers. (ii) Multistage amplifiers (iii) Feedback amplifiers
			C225.2	Design and Develop electronic circuits such as voltage amplifiers, feedback amplifiers for the given specifications.
			C225.3	Apply course knowledge pertaining to the various BJT amplifiers and MOSFET amplifiers to find small signal parameters for the given set of specifications.
			C225.4	Select and identify the appropriate frequency region of operation for understanding the frequency response , amplification factors and impedance matching properties of electronic circuits
31	EC261	Basic Civil & Mechanical Engineering Lab	C261.1	Prepare basic surveying reports
			C261.2	Use the civil engineering instruments appropriately
			C261.3	Study the operation of Pumps and IC engines
			C261.4	Conduct performance tests on IC engines 5. Able to find viscosity, flash & fire points of oils and fuels
32	EC262	Signals & systems Lab	C262.1	Design and analyse generation of unit step, impulse, ramp and sinusoidal sequences.
			C262.2	2Generate and analyse the discrete time sequence using sampling theorem.
			C262.3	Design and implement various filters
			C262.4	Realize and analyse random signals
33	EC263	Digital Electronics & Logic Design Lab	C263.1	Demonstrate the fundamental knowledge in logic gates, Combinational circuits and Sequential circuits
			C263.2	Desig Combinational logic circuits and verify their functionality.
			C263.3	Desig Sequential logic circuits and verify their functionality.
			C263.4	Design counters and shift registers and verify their functionality with truth tables.
34	MC004	Design Thinking & Product Innovation	C004.1	Interpret the concepts of Design Thinking.
			C004.2	Investigate a problem to getermine its root cause.
			C004.3	Take part in group thinking and experiment with different solutions.
			C004.4	Develop innovative thinking and creative problem solving

R.V.R. & J. C. COLLEGE OF ENGINEERING (Autonomous)
Chandramoulipuram, Chowdavaram, Guntur - 522019
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING



COURSE OUTCOMES OF SUBJECTS UNDER R-18(AUTONOMOUS)
CURRICULUM (upto 4th Semester)

		COURSE OUTCOMES
EE111	Mathematics-I	After successful completion of the course, the students are able to 1. Find the matrix eigenvalues, and obtain the tool of power series and Fourier series for learning advanced Engineering Mathematics. 2. Evaluate multiple integrals and their usage. 3. Understand concepts like divergence, curl and integration of vector function. 4. Solve differential equations which model physical processes.
EE/EC/ME 112	Engineering Chemistry	1. identify stable complexes and suitable electrochemical energy systems for end usage. 2. apply his knowledge for effective water treatment and corrosion prevention. 3. identify chemical reactions that are used in the synthesis of molecules and polymers 4. distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques
EE/CE/CH/ME 113	English for communication skills	1. Use vocabulary contextually. 2. Compose effectively the various forms of professional communication. 3. Apply grammar rules efficiently in spoken and written forms. 4. Improve clarity to locate and learn the required information.
EE/EC/ME 151	Chemistry Lab	1. Estimate the Fe(II) content of a given solution and chloride/hardness content of water. 2. Measure molecular properties such as surface tension, viscosity. 3. Measure conductance of solutions, redox potentials of a cell. 4. Synthesize a small drug molecule and polymer.
EE/CE/CH/ME 152	English Language Communication Skills Lab	1. Comprehend relationships between ideas and make inferences and predictions about spoken discourse. 2. Speak English with a reasonable degree of accuracy in pronunciation. 3. Develop appropriate speech dynamics in professional situations. 4. Use effective strategies and social graces to enhance the value of communication. 5. Develop effective communication and presentation skills and using language effectively to face interviews with success.
EE/CE/ME 153	Workshop Practice Lab	1. Gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
MC001	Constitution of India	1. Understand the significance of many provisions of the Constitution as well as to gain insight into their back ground. They will also understand number of fundamental rights subject to limitations in the light of leading cases.

		<ol style="list-style-type: none"> 2. Study guidelines for the State as well as for the Citizens to be followed by the State in the matter of administration as well as in making the laws. It also includes fundamental duties of the Indian Citizens in Part IV A (Article 51A). 3. Understand administration of a State, the doctrine of Separation of Powers. 4. Know how the State is administered at the State level and also the powers and functions of High Court. 5. Understand special provisions relating to Women empowerment and also children. For the stability and security of the Nation, Emergency Provision are Justified. 6. Understand election commission as an independent body with enormous powers and functions to be followed both at the Union and State level. Amendments are necessary, only major few amendments have been included.
MC002	Environmental Science	<ol style="list-style-type: none"> 1. Evaluate the implications of human activities and thereby promote eco friendly technologies 2. Promote awareness among the members of the society for a sustainable environment 3. Include and give priority to environmental protection in all developmental projects
MC003	Essence of Indian traditional knowledge	<ol style="list-style-type: none"> 1. Understand the concept of traditional knowledge and its importance. 2. Apply significance of traditional knowledge protection. 3. Analyze the various enactments related to the protection of traditional knowledge. 4. Evaluate the concepts of intellectual property to protect the traditional knowledge and the traditional knowledge in different sectors .
EE121	Mathematics-II	<ol style="list-style-type: none"> 1. find Laplace and inverse transforms of a function. 2. know how integral transforms can be used in engineering. 3. solve system of equations numerically. 4. know how to apply numerical methods in the mathematical models.
EE122	Engineering Physics	<ol style="list-style-type: none"> 1. Identify and illustrate physical concepts and terminology used in waves & oscillations. 2. The optical phenomena such Interference, diffraction, basics concepts of lasers and their applications 3. Some of the basic laws related to quantum mechanics such as wave particle duality, uncertainty principle, Schrodinger wave equation & its applications etc. 4. Basic concepts in physics of solids & semiconductors.
EE/CE/CH/CS/ EC/IT/ME 123	Programming for Problem Solving	<ol style="list-style-type: none"> 1. Develop algorithm and flowchart for simple problems. 2. Use suitable control structures and arrays for developing code in C. 3. Design modular structured programs using functions and recursion. 4. Develop code for complex applications using structures, pointers and file handling features.
EE124	Electrical Circuits	<ol style="list-style-type: none"> 1. Develop the knowledge on the fundamental laws and elements of electrical circuits. 2. Gain the knowledge on alternating current analysis and resonance. 3. Apply network theorems for the analysis of electrical circuits.

		4. Obtain the transient and steady-state response of electrical circuits.
EE161	Physics Lab	<ol style="list-style-type: none"> 1. use CRO, Function generator, Spectrometer for making measurements 2. test the optical instruments using principles of interference and diffraction 3. understand the concepts learned in the Physics theory. 4. carrying out precise measurements and handling sensitive equipment. 5. draw conclusions from data and develop skills in experimental design.
EE/CE/CH/CS/ EC/IT/ME 162	Programming for Problem Solving Lab	<ol style="list-style-type: none"> 1. Develop algorithm and flowchart for simple problems. 2. Use suitable control structures and arrays for developing code in C. 3. Design modular structured programs using functions and recursion. 4. Develop code for complex applications using structures, pointers and file handling features.
EE/CE/ME 163	Engineering Graphics & Design Lab	<ol style="list-style-type: none"> 1. Prepare engineering drawings as per BIS conventions mentioned in the relevant codes. 2. Produce computer generated drawings using CAD software. 3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings. 4. Develop isometric drawings of simple objects reading the orthographic projections of those objects. 5. Convert pictorial and isometric views of simple objects to orthographic views.
EE164	Electrical Circuits Lab	<ol style="list-style-type: none"> 1. Get an exposure to common electrical components and their ratings. 2. Make electrical connections by wires of appropriate ratings. 3. Understand the usage of common electrical measuring instruments. 4. Understand the basic characteristics of resonance. 5. Verify the network theorems.
EE211	Electrical Circuit Analysis	<ol style="list-style-type: none"> 1. Learn the calculation of power in 3-phase circuits 2. Connect the use of Fourier transforms for electrical circuit analysis 3. Gain knowledge on two port networks and applications of coupled circuits 4. Get familiarity on design of filters and synthesis of networks
EE212	Electronic Devices & Circuits	<ol style="list-style-type: none"> 1. Be acquainted with the basics of semiconductor devices. 2. Understand the principle of operation, characteristics and applications of Diode, Tunnel diode. 3. Understand the principle of operation and characteristics of Bipolar Junction Transistor, photo transistor, biasing and thermal stabilization of transistor. 4. Design various Equipment which are used in the construction and operation of electronic devices. 5. Analyze the frequency response of transistor amplifier circuits
EE213	DC Machines	<ol style="list-style-type: none"> 1. Get an idea of magnetic circuits and their applications, to get the

		<p>knowledge of different properties magnetic materials and get knowledge of electro mechanical energy conversion</p> <ol style="list-style-type: none"> 2. Gain the knowledge of working principle, construction, types of D.C generators, get an idea of armature reaction and commutation. 3. Get the complete idea of characteristics of D.C generators and their applications, to gain knowledge of principle of D.C motors and torque equations. 4. Get the complete idea of characteristics of D.C motors and their applications, gain the knowledge of speed control of D.C motors and necessity of starters. 5. Get the knowledge of testing of D.C motors and calculation of efficiency.
EE214	Electromagnetic Fields	<ol style="list-style-type: none"> 1. Understand concepts of fields. 2. Solve electrostatic field problems. 3. Understand electric and magnetic properties of material media and how these properties can be exploited in engineering applications. 4. Solve various magneto static field problems. 5. Understand the concepts of Maxwell's equations and their usage.
EE215	Basic Civil & Mechanical Engineering	<ol style="list-style-type: none"> 1. Acquire knowledge of surveying and materials used in construction industry 2. Understanding the concepts of foundation and structures , Understanding the concepts of mechanics 3. Be acquainted with power plants and the equipment used in power plants 4. Understand the working principles of IC engines, refrigeration systems and transmission of mechanical energy.
EE216	Digital Electronics	<ol style="list-style-type: none"> 1. Understand the basic digital logic fundamentals such as numbering systems. Get knowledge of Boolean functions minimization methods. 2. Know the operation and design procedure of combinational circuits. 3. Comprehend the operation and design methodology for sequential circuits. 4. Become familiar with different types of IC logic families & memory elements.
EE251	Electronic Devices & Digital Electronics Lab	<ol style="list-style-type: none"> 1. Obtain the characteristics of devices like p-n Junction diode, zener diode, BJT in CE, CB configurations, JFET, UJT, Design the self bias circuit. 2. Design the Zener voltage regulator to meet the specifications. 3. Design Combinational logic circuits such as adders, subtractors, Code converters, decoders, multiplexers. 4. Design Sequential logic circuits such as flip-flops, shift registers, synchronous and asynchronous counters.
EE252	DC Machines Lab	<ol style="list-style-type: none"> 1. Design circuits for DC and AC analysis with theorems. 2. Predetermine performance of DC machine. 3. Determine performance of DC machines by direct tests. 4. Develop programs for circuit analysis using PSPICE.
EE253	Basic Civil & Mechanical Engineering Lab	<ol style="list-style-type: none"> 1. Prepare basic surveying reports 2. Use the civil engineering instruments appropriately 3. Study the operation of Pumps and IC engines 4. Conduct performance tests on IC engines 5. Able to find viscosity, flash & fire points of oils and fuels.

EE221	Mathematics – III	<ol style="list-style-type: none"> 1. The ideas of random variables and various discrete and continuous random variables and their properties. 2. The application of various probability distribution concepts to solve the engineering problems. 3. The basic ideas of statistics including correlation, regression, least squares fit to various curves. 4. The statistical methods for analyzing experimental data by testing the hypotheses.
EE222	Life sciences for Engineers	<ol style="list-style-type: none"> 1. Understand and appreciate the cellular organization and its diversity 2. Recognize and understand the molecular basis of different forms of life and their applications 3. Identify the complementarity in the structure and functions of biomolecules 4. Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms
EE223	Electronic Circuit Analysis	<ol style="list-style-type: none"> 1. a) Derive the expressions and plot the responses of RC high-pass and low-pass circuits to different types of inputs, describe the application of high-pass circuit as a differentiator and low-pass circuit as an integrator. b) Describe the working of different types of multivibrators and derive expressions for the frequency of oscillations. 2. Analyze the four ideal feedback circuit configurations and determine circuit characteristics including input and output resistances. 3. Determine the maximum power efficiency of several circuit configurations of class-A and class-AB power amplifiers. 4. a) Analyze oscillators that provide sinusoidal signals at specified frequencies. b) Describe UJT, transistor sweep generators and circuits that can improve the linearity of the voltage sweep.
EE224	AC Machines	<ol style="list-style-type: none"> 1. Get an idea of a transformer and their applications, to get the knowledge of different types of losses and testing of transformers and to solve the problems related to transformers. 2. To gain the knowledge of different types of connections like star-delta, 3-ph to 2-ph and get the knowledge of parallel operation and load sharing. 3. Get the complete idea of poly phase induction motor and its testing and to draw Equivalent circuit. 4. Get an idea to draw the circle diagram and to get an idea about starters, speed control and also get an idea about the induction generator and its applications. 5. Get the knowledge of 1-ph induction motors and their characteristics and their applications.
EE225	Electrical Power generation	<ol style="list-style-type: none"> 1. To know various factors associated with power plants, power plant economics. 2. To know about factors affecting selection of type of power generating station & tariff structure. 3. To make the student to understand various types of electrical power generation in detail. 4. To understand the significance of non-conventional energy resources, power generation using solar, wind, tidal, geo thermal and fuel cells.
EE226	Open Elective –	

	I	
	[DS & Algorithms]	
EE261	AC Machines Lab	<ol style="list-style-type: none"> 1. Understand the testing of transformers. 2. Operate the transformers in parallel. 3. Provide supply in industries when 2-phase is required like furnaces by using Scott connection. 4. Analyze the performance characteristics of Induction motors. 5. Draw the equivalent circuits of the transformers and Induction motors. 6. Asses the performance of the given transformers and Induction motors.
EE262	Pulse and Digital circuits Lab	<p>Upon successful completion of this practical course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Design the linear and Non-linear wave shaping circuits using active and passive components. 2. Analyze the frequency response and to determine the various parameters of the single-stage and two-stage amplifiers. 3. Persist practical knowledge on the applications of IC's and OP-AMPs. 4. Design the power amplifiers, oscillators and feedback amplifiers.
EE263	Communicative English Lab	<ol style="list-style-type: none"> 1. Recognise the need of good communication skills for professional courses. 2. Understand the basic tenets of communication. 3. Articulating syllables clearly, speaking fluently with correct pronunciation. 4. Develop their self-awareness. 5. Understand the importance of group dynamics.
MC004	Design thinking & product innovation	<ol style="list-style-type: none"> 1. Interpret the concepts of Design thinking. 2. Investigate a problem to determine its root cause. 3. Take part in group thinking and experiment with different solutions. 4. Develop innovative thinking and creative problem solving.

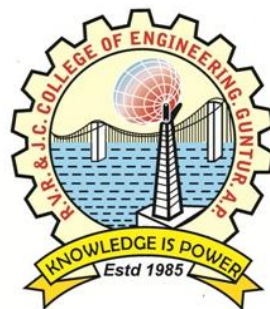
R. V. R. & J. C. COLLEGE OF ENGINEERING

(Autonomous)

DEPARTMENT OF INFORMATION TECHNOLOGY

ACCREDITED BY NBA AND NAAC WITH 'A' GRADE

Chowdavaram, GUNTUR – 522 019



INFORMATION TECHNOLOGY

Course Outcomes for R18 syllabus

I/IV B.Tech. – I SEMESTER

IT111 MATHEMATICS-I

After completion of the course the students will be able to:

IT111.1	evaluate certain improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
IT111.2	know fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
IT111.3	understand linear algebra including linear transformations in a comprehensive manner.
IT111.4	find matrix eigen values and know diagonalization and orthogonalization.

IT 112 ENGINEERING PHYSICS

After completion of the course the students will be able to:

IT112.1	necessity of periodical potentials and conditions for explaining the properties and band formation with the help of quantum physics.
IT112.2	the theory of P-N junction diode from the basics of semiconductor concepts.
IT112.3	the theory and application of Optoelectronic devices.
IT112.4	measurement techniques employed in transport phenomena and variation of properties in low dimensions.

IT 113 BASIC ELECTRICAL ENGINEERING

After completion of the course the students will be able to:

IT113.1	understand the basic electrical circuits and batteries.
IT113.2	gain the knowledge on the concept of AC circuits
IT113.3	get the knowledge on the principle and operation of single phase transformer
IT113.4	understand the operation of electrical machines.

MC 001 CONSTITUTION OF INDIA(Mandatory Course)

After completion of the course the students will be able to:

MC001.1	understand the significance of many provisions of the Constitution as well as to gain insight into their back ground. They will also understand number of fundamental rights subject to limitations in the light of leading cases.
MC001.2	Study guidelines for the State as well as for the Citizens to be followed by the State in the matter of administration as well as in making the laws. It also includes fundamental duties of the Indian Citizens in Part IV A (Article 51A).
MC001.3	Understand administration of a State, the doctrine of Separation of Powers.
MC001.4	Know how the State is administered at the State level and also the powers and functions of High Court.

IT V02 INTRODUCTION TO COMPUTING(Value Added Course)

After completion of the course the students will be able to:

ITV02.1	The student will learn the algorithm and flowchart.
ITV02.2	The student will learn to formulate fundamental algorithms for logical problems.
ITV02.3	The student will be able to develop an algorithm using Factoring Methods.
ITV02.4	The student will be able to design an algorithm using array related problems.

IT 151 PHYSICS LAB

After completion of the course the students will be able to:

IT151.1	use CRO, Function generator, Spectrometer for making measurements
IT151.2	test the optical instruments using principles of interference and diffraction
IT151.3	understand the concepts learned in the Physics theory.
IT151.4	carrying out precise measurements and handling sensitive equipment.
IT151.5	draw conclusions from data and develop skills in experimental design.

IT 152 BASIC ELECTRICAL ENGINEERING LAB

After successful completion of the course, the students will be able to:

IT152.1	Get an exposure to common electrical components and their ratings.
IT152.2	Make electrical connections by wires of appropriate ratings.
IT152.3	Understand the usage of common electrical measuring instruments.
IT152.4	Understand the basic characteristics of resonance.
IT152.5	Verify the network theorems.

IT 153 ENGINEERING GRAPHICS & DESIGN LAB

After successful completion of the course, the students will be able to:

IT153.1	Prepare engineering drawings as per BIS conventions mentioned in the relevant codes.
IT153.2	Produce computer generated drawings using CAD software..
IT153.3	Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings.
IT153.4	Develop isometric drawings of simple objects reading the orthographic projections of those objects.
IT153.5	Convert pictorial and isometric views of simple objects to orthographic views.

I/IV B.Tech. – II SEMESTER

IT 121 MATHEMATICS-II

After successful completion of the course, the students are able to

IT121.1	deal with functions of several variables that are essential in most branches of engineering.
IT121.2	evaluate multiple integrals.
IT121.3	understand concepts like divergence, curl and integration of vector function.
IT121.4	solve differential equations which model physical processes.

IT 122 ENGINEERING CHEMISTRY

After successful completion of the course, the students are able to

IT122.1	Student can identify stable complexes and suitable electrochemical energy systems for end usage.
IT122.2	apply his knowledge for effective water treatment and corrosion prevention.
IT122.3	identify chemical reactions that are used in the synthesis of molecules and polymers.
IT122.4	distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques.

IT 123 PROGRAMING FOR PROBLEM SOLVING

After successful completion of the course, the students are able to

IT123.1	develop algorithms and flow charts for simple problems.
IT123.2	use suitable control structures for developing code in C.
IT123.3	design modular programs using the concepts of functions and recursion.
IT123.4	Develop code for complex applications using structures, pointers and file handling features.

IT 124 ENGLISH FOR COMMUNICATION SKILLS

After successful completion of the course, the students are able to

IT124.1	use vocabulary contextually.
IT124.2	compose effectively the various forms of professional communication.
IT124.3	apply grammar rules efficiently in spoken and written forms.
IT124.4	improve clarity to locate and learn the required information.

MC 002 ENVIRONMENTAL SCIENCE(Mandatory Course)

After successful completion of the course, the students are able to

MC002.1	evaluate the implications of human activities and thereby promote ecofriendly technologies.
MC002.2	promote awareness among the members of the society for a sustainable environment.
MC002.3	include and give priority to environmental protection in all developmental projects.

MC 003 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE(Mandatory Course)

After successful completion of the course, the students are able to

MC003.1	understand the concept of traditional knowledge and its importance.
MC003.2	Apply significance of traditional knowledge protection.
MC003.3	Analyze the various enactments related to the protection of traditional knowledge.
MC003.4	Evaluate the concepts of intellectual property to protect the traditional knowledge and the traditional knowledge in different sectors .

IT 161 CHEMISTRY LAB

After successful completion of the course, the students will be able to

IT161.1	estimate the Fe(II) content of a given solution and chloride/hardness content of water.
IT161.2	measure molecular properties such as surface tension, viscosity.
IT161.3	measure conductance of solutions, redox potentials of a cell.
IT161.4	synthesize a small drug molecule and polymer.

IT 162 PROGRAMING FOR PROBLEM SOLVING LAB

After successful completion of the course, the students will be able to

IT162.1	develop algorithms and flow charts for simple problems.
IT162.2	use suitable control structures for developing code in C.
IT162.3	design modular programs using the concepts of functions and recursion.
IT162.4	Develop code for complex applications using structures, pointers and file handling features.

IT 163 WORKSHOP PRACTICE LAB

After successful completion of the course, the students will be able to

IT163.1	will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.
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IT 164 ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

After successful completion of the course, the students will be able to

IT164.1	comprehend relationships between ideas and make inferences and predictions about spoken discourse.
IT164.2	speak English with a reasonable degree of accuracy in pronunciation.
IT164.3	develop appropriate speech dynamics in professional situations.
IT164.4	use effective strategies and social graces to enhance the value of communication.
IT164.5	develop effective communication and presentation skills and using language effectively to face interviews with success.

II/IV B.Tech. – III SEMESTER

IT 211 MATHEMATICS - III

After successful completion of the course, the students will be able to

IT211.1	The ideas of random variables and various discrete and continuous random variables and their properties.
IT211.2	The application of various probability distribution concepts to solve the engineering problems.
IT211.3	The basic ideas of statistics including correlation, regression, least squares fit to various curves.
IT211.4	The statistical methods for analysing experimental data by testing the hypotheses.

IT 212 LIFE SCIENCE FOR ENGINEERS

After successful completion of the course, the students will be able to

IT212.1	Understand and appreciate the cellular organization and its diversity
IT212.2	Recognize and understand the molecular basis of different forms of life and their applications
IT212.3	Identify the complementarity in the structure and functions of biomolecules
IT212.4	Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms

IT 213 DIGITAL ELECTRONICS

After successful completion of the course, the students will be able to

IT213.1	Illustrate number system and demonstrate various digital circuits in digital electronics.
IT213.2	Analyze and design various combinational circuits.
IT213.3	Analyze and design various sequential circuits.
IT213.4	Compare and build various semiconductor memories.

IT 214 DISCRETE MATHEMATICS

After successful completion of the course, the students will be able to

IT214.1	apply Propositional logic and first order logic to solve problems.
IT214.2	apply basic counting techniques to solve combinatorial problems.
IT214.3	formulate and solve recurrence relations.
IT214.4	formulate and solve graph problems.

IT 215 DATA STRUCTURES

After successful completion of the course, the students will be able to

IT215.1	Select appropriate data structures as applied to specified problem definition.
IT215.2	Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures.
IT215.3	Implement Linear and Non-Linear data structures, and design advance data structures for the real world problems.
IT215.4	Implement appropriate sorting/searching technique for given problem.

IT 216 OBJECT ORIENTED PROGRAMMING

After successful completion of the course, the students will be able to

IT216.1	Develop simple Java applications.
IT216.2	Design and implement APIs and Multitasking applications.
IT216.3	Design and implement, File management, and web based applications.
IT216.4	Develop GUI applications using AWT and Swing components.

MC 004 DESIGN THINKING AND PRODUCT INNOVATION(Mandatory Course)

After successful completion of the course, the students will be able to

MC004.1	Interpret the concepts of Design Thinking.
MC004.2	Investigate a problem to determine its root cause.
MC004.3	Take part in group thinking and experiment with different solutions.
MC004.4	Develop innovative thinking and creative problem solving.

IT 251 DIGITAL ELECTRONICS LAB

After successful completion of the course, the students will be able to

IT251.1	Develop a digital logic and apply it to solve real life problems.
IT251.2	Design and implement combinational logic circuits.
IT251.3	Design and implement sequential logic circuits.
IT251.4	Classify different semiconductor memories.

IT 252 DATA STRUCTURES LAB

After successful completion of the course, the students will be able to

IT252.1	Implement various ADTs.
IT252.2	Identify appropriate data structure for a given application.
IT252.3	Develop application using suitable ADTs.

IT 253 OBJECT ORIENTED PROGRAMMING LAB

After successful completion of the course, the students will be able to

IT253.1	Develop secure Java applications.
IT253.2	Create simple Java user interfaces.
IT253.3	Develop File management, and web based applications.
IT253.4	Construct event driven GUI applications using AWT and Swing components.

R.V.R. & J.C. College of Engineering

DEPARTMENT OF MECHANICAL ENGINEERING

R-18 COURSE OUTCOMES

COURSE	COURSE OUTCOMES
	On completion of these courses, the students will have/be able to:
ME 111	<ol style="list-style-type: none"> 1. evaluate certain improper integrals apart from some other applications they will have a basic understanding of beta and gamma functions. 2. know the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems. 3. understand Fourier series and deal with functions of several variables that are essential in most branches of engineering 4. do problems on matrices and linear algebra in a comprehensive manner.
ME 112	<ol style="list-style-type: none"> 1. Student can identify stable complexes and suitable electrochemical energy systems for end usage. 2. Student can apply his knowledge for effective water treatment and corrosion prevention. 3. Able to identify chemical reactions that are used in the synthesis of molecules and polymers 4. Distinguish the ranges of the electromagnetic spectrum and characterize a given compound using analytical techniques.
ME 113	<ol style="list-style-type: none"> 1. Use vocabulary contextually. 2. Compose effectively the various forms of professional communication. 3. Apply grammar rules efficiently in spoken and written forms.
ME 151	<ol style="list-style-type: none"> 1. Estimate the Fe(II) content of a given solution and chloride/hardness content of water. 2. Measure molecular properties such as surface tension, viscosity. 3. Measure conductance of solutions, redox potentials of a cell. 4. Synthesize a small drug molecule and polymer.
ME 152	<ol style="list-style-type: none"> 1. Comprehend relationships between ideas and make inferences and predictions about spoken discourse. 2. Speak English with a reasonable degree of accuracy in pronunciation. . 3. Develop appropriate speech dynamics in professional situations. 4. Use effective strategies and social graces to enhance the value of communication. 5. The students are capable of using language effectively to face interviews with success. 6. Develop effective communication and presentation skills. 7. Students will be able to use higher order skills.
ME 153	<p>Students will gain knowledge of the different manufacturing processes which are commonly employed in the industry to fabricate components using different materials.</p> <p>Work shop Practice:</p>

	Up on completion of laboratory, students will be able to gain the manufacturing skills and get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
ME 121	<ol style="list-style-type: none"> 1. solve of differential equations which model Physical processes 2. evaluate multiple integrals and their usage. 3. Integrate vector functions 4. Understand differentiation and integration of functions of a complex variable and apply them in various engineering problems.
ME 122	<ol style="list-style-type: none"> 1. Identify and illustrate physical concepts and terminology used in oscillations. 2. Identify the basic phenomena of mechanical waves in medium. 3. Identify the propagation of light and interference phenomena. 4. Identify the basic concepts of diffraction phenomena and lasers.
ME 123	<ol style="list-style-type: none"> 1. Develop algorithm and flowchart for simple problems. 2. Use suitable control structures and arrays for developing code in C. 3. Design modular structured programs using functions and recursion. 4. Develop code for complex applications using structures, pointers and file handling features.
ME 124	<ol style="list-style-type: none"> 1. Understand the basic electrical circuits and batteries. 2. Gain the knowledge on the concept of AC circuits. 3. Get the knowledge on the principle and operation of single phase transformer 4. Understand the operation of electrical machines.
ME 161	<ol style="list-style-type: none"> 1. Able to use CRO, Function generator, Spectrometer for making measurements 2. Able to test the optical instruments using principles of interference & diffraction. 3. Able to understand the concepts learned in the physics labtrained in carrying out precise measurements and handling sensitive equipment. 4. Learn to draw conclusions from data and develop skills in experimental design
ME 162	<ol style="list-style-type: none"> 1. Develop algorithm and flowchart for simple problems. 2. Use suitable control structures and arrays for developing code in C. 3. Design modular structured programs using functions and recursion. 4. Develop code for complex applications using structures, pointers and file handling features.
ME 163	<ol style="list-style-type: none"> 1. Prepare engineering drawings as per BIS conventions mentioned in the relevant codes. 2. Produce computer generated drawings using CAD software. 3. Use the knowledge of orthographic projections to represent engineering information / concepts and present the same in the form of drawings. 4. Develop isometric drawings of simple objects reading the orthographic projections of those objects. 5. Convert pictorial and isometric views of simple objects to orthographic views.
ME 164	<ol style="list-style-type: none"> 1. Get an exposure to common electrical components and their ratings. 2. Make electrical connections by wires of appropriate ratings. 3. Understand the usage of common electrical measuring instruments. 4. Understand the basic characteristics of resonance. 5. Verify the network theorems.

ME 212	<ol style="list-style-type: none"> 1. Understand and appreciate the cellular organization and its diversity 2. Recognize and understand the molecular basis of different forms of life and their applications 3. Identify the complementarity in the structure and functions of biomolecules 4. Differentiate the genetic phenomena and demonstrate the genetic engineering of organisms
ME 213	<ol style="list-style-type: none"> 1. understand the Fundamentals of casting process 2. understand the fundamentals of bulk and sheet deformation process 3. understand the varieties of fabrication methods used in manufacturing 4. Understand Unconventional manufacturing methods employed for making different products.
ME 214	<ol style="list-style-type: none"> 1. Apply energy balance to systems and control volumes, and able to calculate heat and work transfers. 2. Apply I law of thermodynamics to systems and engineering devices and can evaluate heat, work, internal energy and enthalpy. 3. Evaluate the performance of energy conversion devices like heat engine, refrigerator and heat pump and also able to evaluate entropy changes for various systems. 4. Differentiate between high grade and low grade energies and able to evaluate exergy and irreversibility for different systems and also evaluate air standard thermal efficiency, mean effective pressure of air standard cycles
ME 215	<ol style="list-style-type: none"> 1. understand various mechanisms and terminology used in kinematics 2. analyze the mechanisms and machines regarding velocities and accelerations 3. understand the concepts of synthesis in respect of CAM systems 4. understand the Gear terminology and able to analyze gear trains
ME 216	<ol style="list-style-type: none"> 1. to mathematically analyze simple flow situations. 2. gain experience with boundary layer concepts 3. evaluate the performance of turbines 4. evaluate the performance of Pumps
ME 251	<ol style="list-style-type: none"> 1. Student can identify and apply sectional views for different drawings 2. Student can identify different types of threaded fasteners and their applications. 3. Students can apply their knowledge on keys and joints in practical situations 4. Students can able to assemble parts of different machines and produce their drawings
ME 252	<ol style="list-style-type: none"> 1. Recognise the need of good communication skills for professional courses. 2. Understand the basic tenets of communication. 3. Articulating syllables clearly, speaking fluently with correct pronunciation. 4. Develop their self awareness. 5. Understand the importance of group dynamics.
ME 253	<ol style="list-style-type: none"> 1. Obtain the characteristics of devices like P-N junction diode,zener diode,BJT in CE,CB configurations,JFET,etc 2. Design the half-wave and full-wave rectifiers 3. Design combinational logic circuits such as adders ,subtractors and code converters 4. Design Adder,subtractor,differentiator,integrator using IC 741.

