SYLLABUS
for
I & II Semester B.E. Programmes
2016-2017

Vision
To be recognized as a premier technical institute committed to developing exemplary professionals, offering research based innovative solutions and inspiring inventions for holistic socio economic development.

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### SCHEME OF TEACHING AND EXAMINATION
#### B.E. (I SEMESTER)
#### 2016-2017
#### PHYSICS GROUP

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* Mandatory subject, Question paper will be of objective type. Students have to pass the subject compulsorily, however marks will not be considered for awarding Grade/Class/Rank.

** Only for students who have studied Kannada at Primary level.

*** Students who have not studied Kannada at primary level.

### SCHEME OF TEACHING AND EXAMINATION
#### B.E. (I SEMESTER)
#### 2016-2017
#### CHEMISTRY GROUP

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# SCHEME OF TEACHING AND EXAMINATION

**B.E. (II SEMESTER)**

**2016-2017**

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Uma121c : Engineering Mathematics – I

4 Credits (4-0-0)

Course Objectives:
To enable the students to apply the knowledge of Mathematics in various engineering fields by making them

1. To understand the generalisation of n<sup>th</sup> order derivatives.
2. To study the coordinate method to locate the point and transform Cartesian form to polar form and vice-versa.
3. To understand the mathematical measure of bending of curves.
4. To analyze and compute the variation of function of several variables using partial derivatives.
5. To trace and analyse the Cartesian polar and parametric curves.
6. To evaluate multiple integrals to find area, volume and surface area bounded by the curves.

Course Outcomes:
On completion of this course, students are able

1. To apply the knowledge of the n<sup>th</sup> order derivatives to find the approximate value of the function.
2. To compute the angle between the curves in the polar coordinate system.
3. To apply the knowledge of partial derivatives to optimise the function of several variables.
4. To impart the knowledge of tracing curves to find area, volume surface area bounded by the geometrical curves.
5. To evaluate the function of several variables using multiple integrals.
6. To use radius of curvature in different forms.

UNIT-I

Differential Calculus:
13 Hours
Determination of n<sup>th</sup> derivative of standard functions-problems. Leibnitz's theorem (without proof) and Problems. Polar curves: Angle between the radius vector and tangent, angle between two curves, pedal equation of polar curves. Radius of Curvature- Cartesian, parametric, polar and pedal forms and problems. Taylor's and Maclaurin's theorems for function of one variable (statement only) – problems.

UNIT-II


UNIT-III

Integral Calculus:
13 Hours
Reduction formulae for integration of sin<sup>m</sup>θ, cos<sup>n</sup>θ, tan<sup>m</sup>θ and sin<sup>m</sup>θ x cos<sup>n</sup>θ (m and n are positive integers) and evaluation of these integrals with standard limits—problems. Tracing of standard curves in Cartesian form, parametric and polar forms: i) Lemniscates of Bernoulli ii) Cissoid iii) Astroid iv) Cycloid v) Cardioid.

Applications of Integral Calculus:
Area, perimeter, surface area generated by revolution of curves and volume computation of solids of these intercept of the curves (i) Astroid (ii) Cycloid & (iii) Cardioid.

UNIT-IV

Integral Calculus:
13 Hours
Multiple Multiple integrals: Double integrals-Evaluation by change of order of integration, change of variables. Triple integrals (simple examples). Beta and Gamma functions, properties, relation between Beta and Gamma functions-problems

Total 52 Hours

Resources:

Question Paper Pattern for SEE:
1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.
Course objectives:
1. To understand basic concepts and principles of physics.
2. To learn basics of modern physics and quantum mechanics.
3. To impart the knowledge of basic concepts and properties of metals, semiconductors and superconductors.
4. To learn basics of crystal structures and dielectric materials.
5. To understand the concepts of laser and optical fiber for modern developments.
6. To learn basics of ultrasonic waves and shock waves.

Course outcomes:
1. An ability to apply basic concepts and principles of physics to identify, formulate and solve engineering problems.
2. An ability to use basics of modern physics and quantum mechanics for modern developments in engineering applications.
3. Gain the knowledge of basics, properties and applications of materials.
4. An ability to identify a new material and its crystal structure.
5. Concepts of laser and optical fiber help in design and development of new devices for engineering applications.
6. Gain the knowledge of properties and engineering applications of ultrasonic waves and shock waves.

UNIT-I
Modern Physics and Quantum Mechanics:
Introduction. Quantization of energy levels, Frank-Hertz experiment, Wave particle dualism, de-Broglie hypothesis, de-Broglie wavelength, de-Broglie wavelength associated with electrons. Davison and Germer experiment. Matter waves and their characteristic properties. Phase velocity, group velocity, expression for group velocity (superposition of two waves), Relation between phase velocity and group velocity in dispersive medium, relation between group velocity and particle velocity, Relation between phase velocity, group velocity and velocity of light. Expression for de-Broglie wavelength using group velocity.

Heisenberg's uncertainty principle and its physical significance (no derivation). Application of uncertainty principle (non-existence of electron in the nucleus), Wave function, Properties and physical significance of a wave function, Probability density and normalization of a wave function, Setting up of a one dimensional time independent Schrodinger wave equation, Eigenfunctions and eigenvalues, Applications of Schrodinger wave equation-eigenfunction and energy eigenvalues of a particle in a potential well of infinite height and for a free particle, Finite potential well (qualitative) and tunnel effect (qualitative) and its applications.

UNIT-II
Electrical Properties of Metals and Semiconductors: 13 Hours

Semiconductors, concentration of electrons and holes in intrinsic and extrinsic semiconductors (qualitative), Fermi level in intrinsic and extrinsic semiconductors (qualitative), Direct and indirect band gap semiconductors, Derivation of electrical conductivity for semiconductors, Hall effect, derivations of Hall voltage and Hall coefficient, experimental measurement of Hall voltage and Hall coefficient, Applications of Hall effect.

Superconductivity:
Temperature dependence of resistance in conductors and superconductors, Meissner effect, critical magnetic field, Type I and Type II superconductors. BCS theory (qualitative), Applications of superconductors.

UNIT-III
Crystal Structure:
Space lattice, unit cell, primitive cell, lattice parameters, crystal systems, Bravais lattices, Directions and planes in a crystal, Miller indices, Expression for interplanar spacing in terms of Miller indices, Co-ordination number, atomic packing factor for SC, BCC, FCC. Relation between lattice constant and density of material, Crystal structures of CsCl, NaCl, ZnS and Diamond. Bragg's Law and Bragg's X-ray spectrometer-determination of wavelength, Determination of cubic crystal structures using diffractions.

Dielectric materials:
Polar and non-polar dielectrics, Dielectric polarization, Polarization process in polar and non-polar dielectrics, polarization mechanisms. Dielectric constant, relation between polarization and dielectric constant, Internal field and derivation of internal field in solids and liquids (one dimensional),

9

10
Clausius-Mossotti relation, Frequency dependence of polarization, Dielectric loss (derivation), Ferroelectrics and piezoelectrics, Applications of dielectric materials.

UNIT-IV

**Lasers:**

13 Hours

Introduction, absorption, spontaneous emission and stimulated emission, Einstein's coefficients (expression for energy density), Conditions for laser action, Requisites of a laser system, working mechanism, Characteristics of a laser, Construction and working of Nd:YAG, carbon dioxide and semiconductor diode lasers, Applications of lasers-industry, defense, medical and environmental, Holography-construction and reconstruction of a hologram, Applications of holography.

**Optical fibers:**

Introduction, propagation mechanism in optical fibers, angle of acceptance, numerical aperture and its derivation. Modes of propagation (qualitative), types of optical fibers and attenuation, Applications-optical fiber communication system and optical fiber as a sensor.

**Ultrasonic and Shock waves:**

Ultrasonic waves: Introduction, Generation of ultrasonic waves (magnetostriiction and piezoelectric methods) and properties, Measurement of velocity of ultrasonic waves in solid and liquids, Applications of ultrasonic waves-non destructive testing of materials, Determination of elastic constants in solids and liquids, Medical.


**Total 52 Hours**

**Reference:**

2. Kenneth Krane, ”Modern physics”, second edition, Wiley India Pvt. Ltd.

**Question Paper Pattern for SEE:**

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2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

**Text Books:**

Course objectives:
After taking this course the students shall be able:
1. To understand basic concepts of energy sources, utilization of energy, light bulbs and electricity.
2. To have an understanding of types of steam, steam properties, working of steam boilers.
3. To have the knowledge of water and steam turbines.
4. To have the knowledge of automobiles, power transmission, electrical and hybrid vehicles.
5. To learn concepts of refrigeration and air conditioning.
6. To understand the working of lathe, drilling, milling, and grinding machines.
7. To learn welding and other metal joining processes, lubrication and bearings, concept of Industrial Engineering.

Course outcomes:
At the end of this course the student will be:
1. Able to have the basic concepts of energy, steam properties, boilers and turbines.
2. Able to understand automobiles, power transmission, refrigeration and air conditioning.
3. Able to understand machine tools.
4. In a position to understand metal joining operations, bearings and lubrication and concepts of industrial engineering.

UNIT-I 12 Hours

Energy: Forms, Sources and classification of energy, Utilization of energy with simple block diagrams.

Steam formation: Types of steam, Steam properties: specific volume, enthalpy and internal energy (numerical problems), Working of steam boilers: Babcox and Wilcox Boiler, Lancashire Boiler, List of mountings, accessories, their locations and applications. (No sketches for mountings and accessories).

Water Turbine: Classification, Working principle and operation of Pelton wheel, Francis turbine and Kaplan turbine

Steam Turbine: Classification, Working principle and operation of Impulse and Reaction turbine, Necessity of compounding of Impulse turbine

UNIT-II 13 Hours

Automobile Engineering: Introduction, History and development of an automobile, Classification of automobiles, Layout of four wheeler (Layout diagram), Definition and working (function and block diagram): clutch, gear box, rear axle, Differential.


UNIT-III 14 Hours


Lubrication and Bearings: Lubricants: classification and properties, Classification of bearings, Working with sketch: Bush bearing, pedestal bearing, pivotal bearing, collar bearing and antifriction bearing.

Power transmission: Belt drives: open belt drive, crossed belt drive, Derivation: Length of belt for open system and crossed systems, velocity ratio of belt drives, power transmitted by a belt drive, Comparison between flat and V belt drives, problems.

Gear drives: Type of gear drives, working with sketch of spur gear, advantage of gear drives, dis-advantages of gear drives, velocity ratio of gear drives, gear trains: simple and compound gear trains, problems.

Industrial Engineering: Concept of Industrial Engineering: Definition, History and development, Roles of Industrial Engineer, Application of Industrial Engineering, Scope of Industrial Engineering

UNIT-IV 13 Hours


**Total 52 Hours**

**Note:** Use of steam table permitted in examination.

**Reference Books:**

1. Elements of Mechanical Engineering, G.M. Sunag, Dr. P. B. Gangavati & B. K. Venkanna, Elite publishers, Mangalore, 2006
6. Work Study ILO Universal Book Corporation
7. Automobile Engineering by G.B.S. Narang
8. Automobile Engineering by Kirpalsinghvol I, V II

**Question Paper Pattern for SEE:**

1. Total of eight Questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five Full questions are to be answered choosing at least One from each unit.

**Scheme of paper setting:** Within the units chapters can be clubbed.

**UEE125C / UEE225C: BASIC ELECTRICAL ENGINEERING**

**4 CREDITS (4-0-0)**

**Course objectives:**

At the end of this course the student will be able:

1. To learn conventional power generation.
2. To study Electromagnetic Induction and its significance.
3. To compare magnetic and electric circuits.
4. To study fundamentals of single phase and three phase AC systems.
5. To study Transformer, AC/DC power generators & AC/DC motors.

**Course outcomes:**

Student will understand

1. Concept of conventional power generation
2. Concept of Electromagnetic Induction and its significance.
3. Comparison of magnetic and electric circuits
4. Fundamentals of single phase and three phase AC systems
5. Transformer concepts
6. Concept of AC/DC power generator and AC/DC motors

**UNIT – I**

**Electrical Power Generation and Safety:** 05 Hours

**Hydel Power Generation:** Site selection, line diagram explanation, classification, merits & demerits.

**Thermal Power Generation:** Site selection, line diagram explanation, classification, merits & demerits.

**Nuclear Power Generation:** Site selection, line diagram explanation, classification, merits & demerits.

**Safety:** Fuses, current limiter (MCB), necessity of earthing. 02 Hours

**Electromagnetism:** 06 Hours

Definitions of magnetic field, flux, flux density, magnetizing force, permeability, mmf and reluctance. Magnetic circuits, comparison between magnetic and electric circuits, Faraday’s laws, Lenz’s law, Fleming’s rules, statically and dynamically induced emf, self and mutual inductance, coefficient of coupling, inductances in series aiding and series opposing, energy stored in a magnetic field.
UNIT – II

Introduction to DC Circuits & Single – Phase A.C. Circuits: 09 Hours

Three – Phase A.C. Circuits: 04 Hours
Generation of three phase A.C. voltage, phase sequence, voltage and current relationship for star and delta connection. Measurement of power using two wattmeters (for balanced load only), expression for power factor in terms of wattmeter readings, effect of power factor on wattmeter readings. Advantages of three phase supply over single phase.

UNIT – III

D.C. Machines: 07 Hours
Generator: Construction, principle of operation, emf equation, types of DC generators.

Motor: Principle of operation, types of motors, derivation of voltage, speed and torque equations significance of back emf, characteristics of motors, necessity of starter and 3-point starter, applications of DC motors.

Alternator: 06 Hours
Construction, types and principle of operation. Expression for frequency and emf equation. Discussion and derivations of pitch factor (coil span factor) and distribution factor.

UNIT – IV

Transformer: 07 Hours
Principle of operation and construction of single phase transformer and its classification, emf equation. Transformer no-load and on-load operation (explanation with phasor diagrams), losses in the transformer, efficiency, condition for maximum efficiency, KVA for maximum efficiency and voltage regulation.

Three Phase Induction Motor: 06 Hours
Construction of induction motor and types of motors, principle of operation of three phase induction motor, production of rotating magnetic field, frequency of rotor current, torque equation, torque slip characteristics, necessity of starters and star delta starter. Applications of induction motors.

Total: 52 Hours

Text Books:

Reference Books:

Question Paper Pattern:
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2. Each Question should not have more than four sub divisions.
3. Any five Full questions are to be answered choosing at least one from each unit.
UCS130C/UCS230C COMPUTER CONCEPTS
& C PROGRAMMING
4 CREDITS (4-0-0)

Course objectives:
At the end of the course student will be able:
1. To Introduce general problem solving process and applying the process for problem solving.
2. To familiarize the basic concepts of computer programming
3. To present the syntax and semantics of the C language.
4. To provide a comprehensive study of the C programming language.
5. To develop the attitude of application development using C.

Course outcomes:
1. Identify the parts of the computer system and explain functioning of computer components.
2. Design an algorithmic solution and write a C program for a given problem.
3. Trace the given C program manually.
4. Write a C program for simple applications of real life.
5. Explain role of Operating system in computer system and applications of computer networks.

UNIT-I 13 Hours


Overview of C language: Introduction, features, structure of C program, Compilation and Execution on Windows and Linux Platform. Constants, Variables and Data types: Character set, C tokens, keywords and identifiers, constants, variables, data types, declaration of variables, Coding Standards. Operators and Expressions: Arithmetic operators, logical operators, relational operators, assignment operators, increment and decrement operators, conditional operators, bitwise operators, special operators, arithmetic expressions, evaluation of expressions, precedence of arithmetic operators, type conversion in expressions, operator precedence and associativity.

Managing Input/Output operations: Formatted and Unformatted input/output statements.

UNIT-II 13 Hours

Decision making and Branching: Decision making with if, if-else, nested if statements, else-if ladders, switch statement, ?: Operator, goto statement.
Loops: while statement, do while statement, for statement, jumps in loops.
Arrays: One dimensional arrays, declaration of one-dimensional arrays, initialization of one dimensional arrays, Declaration of two-dimensional arrays, initialization of two-dimensional arrays, Examples.

Strings: Introduction, Declaration of strings, initialization of strings, string-handling functions.

UNIT-III 13 Hours

Introduction to pointers: Definition, declaration, initialization of pointers, usage of pointers.

User defined functions: Need of user-defined functions, a multifunction program, elements of user defined functions, definition of function, return values and their types, function calls, function declaration, category of functions, no arguments and no return values, arguments but no return values, arguments with return values, no arguments but a return value, functions that return multiple values, nesting of functions, Introduction to recursion(factorial), passing arrays to functions, passing strings to functions, scope visibility and life time of variables, Command line arguments, multi-file programs.

UNIT-IV 13 Hours

Introduction to structures: Defining a structure, Declaring structure variables, accessing structure members, Initialization, Copying and comparing structure variables, Operations on individual members, array of structures.

Introduction to files: Defining and opening a file, closing a file, Input output operations on files.

Hardware and Software: Hardware - Input devices – keyboard, mouse, Output devices-Monitors, printers, Storage devices- Magnetic storage devices, optical storage devices, Flash memory, processors, Software - System software, Application software, Operating system - Definition, Purpose, types of operating systems, providing user interface, running programs, managing hardware, enhancing operating system with utility software.


Introduction to parallel programming.
Text Books:

Reference Books:

Question Paper pattern for SEE
1. Total of eight Questions with two from each Unit to be set uniformly covering the entire syllabus.
2. Each question should not have more then four sub divisions.
3. Any five full Questions are to be answered choosing at least One from each unit.

UCS126 / UCS226M : CONSTITUTION OF INDIA (Mandatory subject)

Course objectives:
1. To gain the knowledge of Indian Constitution.
2. To understand the fundamental rights and duties.
3. To learn constitutional design of institutions with their structures and actual working.

Course outcomes:
1. An ability to have knowledge of Indian Constitution.
2. Students can understand their rights and duties thereby they can behave as responsible citizens in the country.
3. Understand unique federal system of our governments’ structure.

UNIT – I 06 Hours
Salient features of Indian Constitution and Preamble of the Indian Constitution. Fundamental rights meaning, significance and their enforcement.

UNIT – II 07 Hours
Directive principles of state policies-Relevance of DPs in governance
Fundamental duties & their significance
Union Government - Union Executive-President-Vice-president-Prime Minister- Council of Ministers-their qualifications-election / appointment-term and functions.

UNIT – III 07 Hours

UNIT – IV 07 Hours

Total 26 Hours

Texts Books
1. Sukla. V.N.: “Introduction of the constitution of India” (Latest Edn)

Question Paper Pattern for SEE:
Question paper is of objective type covering all the four units.
Students have to pass this subject compulsory for the award of degree. However, marks will not be considered for awarding Grades / Class / Ranks.
1.5 CREDITS (0-0-3)

Course objectives:
1. To make students understand the basic concepts of structure of C program, C program development and developer tools/used.
2. To enable the students to use constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
3. To facilitate the students on use of conditional statements and looping statements to solve problems associated with conditions and repetitions.
4. To imbibe the skills of handling of set of data using arrays, structures and pointers. File handling for permanent storage of data or records.
5. To inculcate the modular programming skills using Functions.

Course outcomes:
1. Design an algorithmic solution for a given problem and draw flowcharts for the solution.
2. Write a C program for a given algorithm.
3. Write well documented and indent program according to coding standards.
4. Develop the debugging skills, apply learnt techniques for problem solving.

PART - I

1. Given the marks in three subjects, write a C program to check the eligibility of a student for an admission to professional course by considering following conditions.
   a) Marks in Mathematics >=60
   b) Marks in Physics >=50
   c) Marks in Chemistry >=40
   d) Total in all three subjects >=200 or Total in Mathematics and Physics >=150.

2. If cost and selling price of an item are the inputs, write a C program to determine whether the seller has made profit or incurred loss. Also determine how much profit he made or loss he incurred.

3. Given the coordinates of three points on a plane, write a C program to check whether they form the triangle.

4. Write a C program to find all the roots of a quadratic equation.

5. Write a C program to display the position of a given point with coordinates (x, y) on a plane.

6. Write a C program to read a double type value X that represents angle in degrees and character variable T that represents type of trigonometric function and display the value of
   a) sin(X) if s or S is assigned to T
   b) cos(X) if c or C is assigned to T
   c) tan(X) if t or T is assigned to T using switch statement.

7. Write a C program to read N integers and count total number of positive and negative numbers.

8. Write a C program to find the GCD and LCM of two integer numbers.

9. Write a C program to check whether the number is prime or not. Display appropriate message.

10. Write a C program to find the sum of the following series:
    \[ \cos(X) = 1 - X^2/2! + X^4/4! - X^6/6! + \ldots \]

PART-II

1. Write a C program to read N integer numbers and arrange them in ascending order using bubble sort technique.

2. Write a C program to read sorted list of N integer numbers and search the given key element using binary search method. Display the result using the suitable message.

3. Write a C program to read a matrix of order M x N and find the sum of principal and secondary diagonal elements.

4. Write a C program to accept a string and reverse it without using library functions. Display the original and reversed string and also check whether string is palindrome or not.

5. Write a C program to read N elements into an array and compute the sum of all the elements stored in an array using pointer and also display the elements of an array in reverse order.

6. Write a C program to find the factorial of a given integer number using recursive function. Accept number as a command line argument.

7. Write a C program to read list of integer numbers and find the mean, standard deviation and count number of integers less than mean of the list. Display all results in main function.
Define the following functions:

i. To read given list of numbers.

d. To find mean and standard deviation (single function).

t. To find the number of elements those are less than the mean of that list.

8. Write a C program to read a matrix of order (M x N) and (P x Q) and compute the product of two matrices. Define functions,

i. To read matrix.

ii. To compute the product of two matrices.

iii. To print matrix.

9. Write a C program to read N students information consisting of roll number, Name, marks of three subjects and display the information with appropriate headings, where each student information consists of roll number, Name, marks of three subjects and total marks scored.

10. Write a C program to create a file of integers - intdata. Read intdata file and count Number of integers greater than 100.

NOTE:

1. Each assignment in Part-I and PART- II will be evaluated for 1.5 marks.

2. The Continuous Internal Evaluation (CIE) is done for a total of 30 marks.

3. The lab test for CIE will be conducted for 20 marks and evaluated as per the following: Write-up: 5 marks, Execution of program: 10 marks, Viva: 5 marks.

4. In Semester End Exam (SEE), the student has to execute one assignment from each part and evaluated as per the following: Write up: 25% marks, Execution of program: 50% marks, Viva: 25% marks.

UPH139L/ UPH239L: ENGINEERING PHYSICS LABORATORY

2 CREDITS (0-1-3)

Course objectives:

1. To practice independent experimental skills.
2. To understand the basics of precision in measurements.
3. To learn the ability to construct electrical circuits.
4. To measure the physical properties of materials.

Course outcomes:

1. An ability to develop individual experimental skills.
2. An ability to use basic measuring tools for precision measurements.
3. Gain the knowledge to use basic electrical components in constructing circuits.
4. An ability to understand the properties and applications of materials.

LIST OF EXPERIMENTS IN ENGINEERING PHYSICS LABORATORY:

1. Verification of Stefan's law.
2. Planck's constant (determination of Planck's constant using LED or photoelectric effect method).
4. Ultrasonic interferometer (measurement of velocity of ultrasonic waves in solids or liquids).
5. Electrical resistivity by four probe method.
6. Determination of Fermi energy for a conductor.
7. Determination of dielectric constant.
8. Study of frequency response in series and parallel LCR circuits.
9. Black box experiment (to identify passive components and estimate their values).
10. Torsional pendulum.
11. Determination of cubic crystal structures.
12. Determination of Young's modulus of a material (single cantilever or uniform bending method).
13. Photo diode characteristics.
14. Optical fiber (measurement of numerical aperture and attenuation).
16. Hall effect.
Note:
1. Twelve experiments are to be conducted.
2. Candidate has to perform two experiments in the semester end examination.

Reference:

Laboratory assessment:
1) Each laboratory subject is evaluated for 100 marks (50 CIE and 50 SEE).
2) Allocation of 50 Marks for CIE:
   • Performance and journal writeup: Marks for each experiment = 30 marks / No of proposed experiments.
   • One practical test for 20 marks (5 writeup, 10 conduction, calculation, results etc., 5 viva-voce).
3) Allocation of 50 marks for SEE: 25% writeup, 50% conduction, calculations, result etc., 25% viva-voce.

**UBE148L / UBE248L : BASIC ENGINEERING LABORATORY-I**

1.5 CREDITS (0-0-3)

**Course objectives:**
1. To understand the concept of measurement and assembly of parts.
2. To understand the concept of welding and soldering.
3. To develop an understanding of related ergonomic principles fundamental to the workplace and conducting experiments to do the environmental analysis like industrial noise and industrial lighting and Measurement of Effect of Work on Human Body to optimize the integration of man and machine so as to improve the work rate and accuracy design.
4. To understand the working dynamics and structure of two wheeler.
5. Introduction to automotive machining process for reboring of engine cylinders.
6. To facilitate the UG students to learn about the methods of taking out basic field measurements such as distances and angles. This also includes, learning about the basic accessories such as chains, tapes and arrows used for taking out fundamental measurements.
7. To enable the students to learn about the different methods of testing the materials used for constructions.
8. To understand the basic measurement of cell and its separation for quantification of biomass.

**Course outcomes:**
1. The student will develop the the knowledge and skill of measurement and assembly of parts.
2. The student will develop the knowledge and skill of welding and soldering.
3. Ability to identify possible cause and effect relationships between component and system to match the abilities, needs, and limitations of people in order to improve productivity, safety, performance, and user happiness.
4. With technical background about two wheeler, effective utility covering a fuel efficiency, write quality and environmental aspects can be gained.
5. Exposure to automotive machining process regarding reboring of engine cylinder.
6. The students will acquire knowledge about the fundamental accessories used for taking basic measurements for civil engineering surveys.
7. The method and importance of testing of different construction materials will be understood by the students.
8. Ability to measure the cell
9. Ability to separate the biomass and its quantification.

LIST OF EXPERIMENTS IN BASIC ENGINEERING LABORATORY-I

1. Assembly of parts for different joints.
2. Welding and sheet metal soldering
5. Study of two wheeler layout.

Note:
All Ten experiments are to be conducted in a semester by each student.

Laboratory Assessment:
1) Each Laboratory subject is evaluated for 100 marks (50 CIE and 50 SEE)
2) Allocation of 50 Marks for CIE: Performance and Journal writeup: Marks for each experiment = 5 Marks.
3) Allocation of 50 marks for SEE: Secured marks in CIE is considered for SEE.

UCH129C/UCH229C: ENGINEERING CHEMISTRY
4 CREDITS (4–0–0)

Course objectives:
1. To impart fundamental knowledge of materials chemistry and their engineering applications.
2. To impart the knowledge about chemical analysis with high degree of accuracy and precession for engineering applications.
3. To understand mechanism of corrosion and preventive methods along with modern metal finishing techniques for the development of modern engineering appliances.
4. To learn the significance of green chemistry, green synthesis, Nano materials and Nano devices for future technological developments.
5. To learn atomic and molecular structure in terms of wave functions charged densities and energy level diagram.
6. To impart the knowledge about polymers, elastomers and conducting polymers for the need of modern society.

Course outcomes:
At the end of the course students will be able to;
1. Estimate the impurities present in water which creates awareness about water quality.
2. Understand various modes of corrosion and hence will be able to develop methods for prevention of corrosion which encourage the effective utilization of metals.
3. Gain the knowledge of eco friendly chemical synthesis, which in turn creates the awareness about renewable material source and importance of prevention of environmental pollution for the future.
4. Understand the importance of the materials in nanoscale and their properties, which will encourage them to think of new material world.
5. Analyze the chemical transformation of materials and their behavior on the basis of structure.
6. Gain the knowledge of replacement of conventional materials by polymers for various engineering applications.

UNIT – I
Principles of Chemical analysis: 06 Hours
Water Technology: 07 Hours

UNIT - II
Corrosion Science: 07 Hours
Introduction, Corrosion: – Definition, Types of corrosion-Chemical (Dry) and Electrochemical (Wet) corrosion, Theory of electrochemical corrosion by taking Iron as an example. Types of Electrochemical corrosion - Differential metal corrosion, Differential aeration corrosion e.g. pitting corrosion and water line corrosion. Stress corrosion e.g. Caustic embrittlement. Factors affecting the rate of corrosion; Related to metal – Nature of metal. Relative areas of anodic and cathodic parts & Nature of corrosion product. Related to environment-pH of the medium, temperature.

Metal Finishing: 06 Hours
Introduction, Technical importance of metal finishing. Factors governing electroplating - Polarization, Decomposition potential and Over voltage.

Electroplating process:

UNIT - III
Green Chemistry: 07 Hours

Nano Technology: 06 Hours

UNIT - IV
Structure, Bonding in organic molecules & Structure and Reactivity: 06 Hours
Coulomb forces, ionic and covalent bonds, electron dot model of bonding.
Kinetics and thermodynamic of simple chemical processes. Acids and bases, electrophiles and nucleophiles, functional groups, rotation around single bonds, confirmations, chapter integration problems.

Polymers: 07 Hours
Text Books:
3. A Text Book of Engineering Chemistry- by Renu Bapna Renu Gupta , Macmillan Publisher's India Ltd.,

Reference Books:
8. Nano word by C.N.R.Rao
12. Concept of Nanochemistry by Cademartiri, Ozin Publication Wiley – VCH.

Question paper pattern for SEE:
1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four sub divisions.
3. Any five full questions are to be answered choosing at least one from each unit.
Course objectives:
The course is intended to provide the knowledge about
1. To understand semiconductor theory, diode and transistor concepts.
2. To learn the biasing concepts of transistor and VI characteristics of FET.
3. To impart the knowledge of number system, Boolean algebra and basic logic circuits.
4. To provide the knowledge on oscillators, communication system and general applications of electronics.

Course outcomes:
A student who successfully completes this course should be able to
1. Analyze diode and transistor circuits.
2. Distinguish transistor biasing methods and analyze FET characteristics.
3. Do number system conversion, and design basic logic circuits.
4. Analyze and design oscillators.
5. Realize the necessity of communication systems and general applications of electronics.

UNIT-I
13 Hours

UNIT-II
13 Hours

UNIT-III
13 Hours

UNIT-IV
13 Hours

Total 52 Hours

Text Books:

Reference Books

Question paper pattern for SEE:
1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four sub divisions.
3. Any five full questions are to be answered choosing at least one from each unit.
UCV146C/UCV246C: ENGINEERING MECHANICS
4 CREDITS (4-0-0)

Course objectives:
1. The main objective of mechanics should be to develop in the engineering student the ability to analyze any problem in a simple & logical manner and to apply to its solution a few, well understood basis principles.
2. To highlight the role & functions of a civil engineering & study about the different materials used in Civil engineering Construction.

Course outcomes:
1. Students will be able to understand the scope of civil engineering branch, and the properties of construction materials.
2. Students will develop an ability to understand the field problems related to the action of forces.
3. Students will be able to analyses the problems related with centroid and moment of inertia of different composite areas.
4. Students will develop basic knowledge about friction etc.

UNIT-I
Introduction to Engineering mechanics: 07 Hours

Moment and couple: 06 Hours
Definition of moments, couple, moment of a couple, characteristics of a couple, equivalent force couple system, Varignon's principle, Resultant of coplanar non concurrent forces system. Numerical problems

UNIT-II
Support Reactions: 06 Hours

Bending moment and shear forces in beams: 07 Hours
Introduction, shearing force and bending moment in beams. Relationship between load, shear force, and bending moment, Expression for shear force and bending moment equations. SFD and BMD with salient values for cantilever, simply supported and Overhanging beams considering point loads, UDL, UVL and couple.

UNIT-III
Trusses: 06 Hours

Friction: 07 Hours

UNIT-IV
Centroid: 06 Hours
Locating centroid of a triangle, rectangle, circle, semi circle, quadrant of a circle by using method of integration centroid of simple built up sections. Numerical problems.

Moment of Inertia: 07 Hours

Total 52 Hours

Text Books:

Reference books:


**Question Paper Pattern for SEE:**

1. Total of eight Questions with two from each unit to be set uniformly covering the entire syllabus.

2. Each question should not have more than four subdivisions.

3. Any five Full questions are to be answered choosing at least One from each Unit.

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**UME147C/UME247C: ENGINEERING GRAPHICS**

4 CREDITS (4-0-0)

**Course objectives :**

1) To make the student to realize Engineering Graphics as the language of Engineers.

2) To study the objects of 1. Dimension 2 dimensions, 3 dimensions, from engineers perspective.

3) To study the lateral surface of the solids for the development of the object.

4) To study and understand to represent orthographic view of the object in the isometric view that can be understand by common man.

**Course outcomes :**

1. The student will realize the Engineering Graphics and its significance for Engineering Application.

2. The student is able to visualize different types of objects through Engineering Graphics.

3. The student is capable of imagining the objects in the universe.

**UNIT-I**

**Orthographic Projections, Projection of points, lines**

14 Hours

Introduction, Definitions-Planes of projection, reference line and conventions employed, Projections of points in all the four quadrants, Projections of straight lines (located in First quadrant/first angle only), True and apparent lengths, True and apparent inclinations to reference planes. Application examples like Rope and Guy wires, Tripod, Flag post and distance between objects in a room.

**UNIT II**

**Orthographic Projections of Plane Surfaces :**

10 Hours

(First Angle Projection only)

Introductions, Definitions- Projection of plane Surfaces-Triangle, Square, Rectangle, Rhombus, Pentagon, Hexgon and Circle, Planes in different positions by change of position method only, problems on punched plates.

**UNIT III**

**Projections of Solids**(First angle projection only)

14 Hours

Introduction, Definitions, Projections of Solids, (Prisms, pyramids, Cones and Cylinders), resting on HP, axis/base inclined to HP only and profile views.
Developments of lateral surface of Solids
Developments of lateral surface of right regular Prisms, Pyramids, Cylinders and Cones with base on HP and their frustums and truncations. (No problems on lateral surfaces of trays, tetrahedrons, spheres and Transition pieces).

UNIT IV

Isometric projections (Using Isometric Scale only) 14 Hours
Introduction, Isometric scale, Isometric projection of simple plane figures, Isometric projection of right regular Prisms, Pyramids, Cylinders, Cones, Spheres, cut spheres and combination of coaxial of two solids.

Total 52 Hours

Text Books:

Reference Books:

Question Paper Pattern for SEE:
1. Total of eight Question with two from each unit to be set uniformly covering the entire Syllabus.
2. Each question should not have more than four subdivisions.
3. Any five Full question are to be answered choosing at least One from each unit.

UBT 133M/UBT233M : ENVIRONMENTAL STUDIES
(MANDATORY SUBJECT)

Course objectives:
1. To understand basic aspect of environment and ecosystem.
2. To study the impacts of human activities on environment.
3. To study the natural resources.
4. To study the environmental pollution its types, causes, impacts and environmental issues.
5. To know about the government legislations and acts about environmental protection.

Course outcomes:
1. Ability to understand basic aspects of environment.
2. Ability to understand impacts of human activities on nature.
3. Ability to recognize the natural resources and its uses.
4. Ability to understand the pollution and its effects on environment.
5. Ability to understand environmental protection acts.

UNIT-I

Environment and Ecology: 03 Hours
Definition, environmental segments, Ecosystem and classification of ecosystem.

Biogeochemical Cycles:
Hydrologic cycle, Carbon cycle, Nitrogen cycle, Sulphur cycle, Phosphorus cycle.

Environmental Impacts of Human activities: 03 Hours
Agriculture, Housing, Transportation, Industry, Mining, Urbanization, Irrigation projects, Environmental Impact Assessment (EIA), Sustainable development.

UNIT-II

Natural Resources: 03 Hours
Forest, Water, Mineral, Food and Land resources.

Energy: 04 Hours
Growing Energy needs, Types & Sources of Energy, Renewable and non-renewable energy sources.

Renewable Energy:
Solar energy, Wind energy, Hydropower, Tidal energy, Ocean thermal energy, Geothermal energy, Biomass energy, Biogas, Biofuels, Hydrogen as fuel.

Non-renewable energy: Coal, Petroleum, Natural gas, Nuclear energy
UNIT-III

Environmental pollution: 03 Hours

Environmental Issues of concern: 04 Hours
Population growth, Green house effect, Green house gases and Global warming, Climate change, Acid rain, Ozone layer depletion, Animal husbandry and Solid waste management

UNIT-IV

Environmental Protection: 06 Hours
Introduction, Role of Government- various legislations, Functions of government agencies. Environmental clearance, Role of Non-Governmental Organization (NGO). Environmental movements, Environmental education, Women and Education

Total: 26 Hours

Text Books:

Reference Books:

Question Paper Pattern for SEE:
Question paper is of objective type covering all the four units.
Students have to pass this subject compulsory for the award of degree. However, marks will not be considered for awarding Grades / Class / Ranks.

UCH134L/UCH234L: ENGINEERING CHEMISTRY LABORATORY

1.5 CREDITS (0–0–3)

Course objectives:
1. To practice independent experimental skills and analytical ability.
2. To utilize appropriate instrumentation and techniques.

Course outcomes:
By the end the course the students should be able to:
1. Develop the skills to perform the experiments and analyze the results.
2. Get the solid base of chemical principles which will serve as the foundation to deal with more advanced and specific chemistry related problems for engineering applications.

PART – A
1. Determination of pKa of a weak acid using standard NaOH by pH meter.
2. Study of titration curve of Na2CO3 versus HCl.
3. Potentiometric estimation of FAS by using standard K2Cr2O7 solution.
5. Conductometric estimation of HCl & CH3COOH in the acid mixture using standard NaOH.
6. Determination of viscosity coefficient of a given liquid using Ostwalsd's Viscometer

PART – B
1. Estimation of total hardness of water sample using standard solution of disodium salt of EDTA solution.
2. Determination of percentage of copper in Brass by using standard sodium thiosulphate solution.
3. Determination of alkalinity of given water sample using standard Hydrochloric acid solution.
4. Determination of amount of CaO present in the given sample of cement solution by EDTA method.
5. Determination of water of hydration in Mohr's salt using standard K2Cr2O7 solution.
References:

Note:
SEE for Practical:
Minimum 10 experiments should be completed to get eligibility for SEE practical examination conducted for 3 hours duration for 50 marks.
For SEE Examination, one experiment from Part - A & one experiment from Part - B shall be set. Different experiments may be set under Part - A & Common experiment from Part-B.

CIE for Practical:
30 marks for regular lab conduction and journal write up for 10 experiments
(10 x 3 = 30)
20 marks Lab CIE Test (5 marks for write up, 5 marks for viva and 10 marks for estimation.

UME138L/UME238L: COMPUTER AIDED ENGINEERING DRAWING LABORATORY
2 CREDITS (0-0-4)

Course objectives:
1. To study the computer applications in Engineering field.
2. To develop drawing skills using softwares.

Course outcomes:
1. The student is able to realize the importance of computing systems in Engineering.
2. The student is able to develop geometrical models like lines, planes, solids.

Projection of points:
Projection of points located in all four quadrants.

Projections straight lines:
Projection of lines located in first quadrant only, line parallel to both the planes, perpendicular to one plane and parallel to other, inclined to one plane and parallel to other, and inclined to both the planes. Determination of true length and true inclinations with principal planes.

Projection of planes:
Projection of planes – perpendicular to both the planes, parallel to one plane and perpendicular to other, inclined to one plane and perpendicular to other and inclined to both the planes.

Projection of solids:
Projection of solids (Prisms, Pyramids, Cones, and Cylinders), resting on HP, axis/base inclined to HP only and profile views. No problems on Tetrahedron

Development of solids:
Development of lateral surface of Prisms, Pyramids, Cones, and Cylinders cut by auxiliary inclined planes. Development of transition pieces-circular to hexagon, square to pentagon.
Isometric projections:
Isometric projections of Prisms, Pyramids, Cones, and Cylinders, combination
of solids. (Maximum of two solids Co-Axial Only)

Note: Students are informed to make free hand sketch only in worksheet.

Laboratory Assessment:
(a) Each laboratory subject is evaluated for 100 marks (50 CIE and 50 SEE)
(b) Allocation of 50 marks for CIE. (30 marks for term work [sketching and
printouts from SOLID EDGE] & 20 marks for one practical test)
(c) The SEE practical is conducted for 50 marks of three hour duration,
five questions to be set from above syllabus. Student has to answer any
three questions.

UBE149L/UBE249L: BASIC ENGINEERING LABORATORY-II
1.5 CREDITS (0–0–3)

Course objectives:
1. To give exposure to students basic functional hardware of the
computer and word processing software like MS office (MS word, MS
Power Point, MS excel).
2. To understand the importance and working of computer networks and
web searching.
3. To impart knowledge on electronic measurement/instrumentation.
4. To learn wiring, concept of power, energy and power factor.
5. To provide concept of diode as rectifier and transistor as an amplifier.

Course outcomes:
1. Able to identify the basic functional hardware of a digital desktop
computer like mother board, hard disk, monitor, memory cards,
various cables etc.
2. Able to create one word document which includes tables, insertion of
pictures etc, one simple presentation and one simple sheet.
3. Able to share the resources over the network and use search engine.
4. Ability to use temperature sensor for a given application.
5. Ability to understand basics of single and two-way wiring, the
concept of power, energy, and power factor, and the operating power
factor of different domestic loads.
6. Able to analyze the rectifier and amplifier circuits.

 LIST OF EXPERIMENTS IN BASIC ENGINEERING LABORATORY-II
1. Network setup and resource sharing.
2. Search information through search engines.
3. Exposure to the office tools.
4. Exposure to the computer systems.
5. Temperature measurement using Resistance Temperature Detector
(RTD).
7. Simple wiring Exercises.
9. Full wave rectifier circuit without and with capacitor filter.
10. Frequency responses of single stage RC coupled common emitter
amplifier.
Note:
All Ten experiments are to be conducted in a semester by each student.

Laboratory Assessment:
1. Each Laboratory subject is evaluated for 100 marks (50 CIE and 50 SEE)
2. Allocation of 50 Marks for CIE :
   Performance and Journal writeup: Marks for each experiment = 5 Marks.
3. Allocation of 50 marks for SEE: Secured marks in CIE is considered for SEE.

UMA221C: ENGINEERING MATHEMATICS-II
4 CREDITS (4-0-0)

Course objectives:
To enable students to apply the knowledge of Mathematics in various engineering fields by making them.

1. To understand the concept of matrix theory and elementary transformations.
2. To recognise and solve the first and higher order differential equation
3. To understand solving of IVP and BVP arising in various Engineering problems using different analytical techniques.
4. To determine the velocity and acceleration of a moving particle in space.
5. To understand Laplace transform of elementary functions.

Course outcomes:
1. To apply the matrix techniques to solve linear system of equations.
2. To impart the knowledge of various analytical technique for solving initial and boundary value problem arising in various physical and Engineering problems.
3. To use curl and divergence of a vector valued functions in various applications.
4. To analyze position, velocity and acceleration in two or three dimensions using the calculus of vector valued functions.
5. To apply the Laplace transforms method to solve the IVP, BVP without finding the general solution of a given differential equation.

UNIT - I

Linear Algebra:
13 Hours
Rank of matrix, Echelon form, Fundamental theorem of linear system of equations (without proof), Gauss elimination method, Gauss seidel method, Eigen values and Eigen vectors.

Differential Equations:
Solution of first order and first degree differential equations. Linear and reducible to linear, Exact & reducible to exact forms. Applications – Orthogonal trajectories, Newton’s law of cooling, flow of electricity, laws of decay and growth.

UNIT-II

Higher Order Differential Equations:
13 Hours
Preliminary Theory: Linear differential equations: Initial and boundary value problems. Homogeneous and non homogeneous equations, reduction of order,
homogenous linear equations with constant coefficients. Method of variation of parameters (second order only). Solutions of Legendre's and Cauchy's homogeneous linear equations.

UNIT-III

**Vector Calculus:**
13 Hours
Scalar point function and vector point function, derivative of a vector valued function, velocity and acceleration-problems. Gradient, divergence, curl, Laplacian, solenoidal and irrotational vectors - problems.

**Vector Integration:**
Line integrals, surface integrals and volume integrals. Green's theorem, Stoke's theorem, Gauss divergence theorem (without proof) - problems

UNIT-IV

**Laplace Transforms:**
13 Hours
Definition - Transforms of elementary functions. Derivatives and integrals of transforms. Periodic function, unit step function and unit impulse function – problems.

**Inverse Laplace transforms:**

_Total 52 Hours_

**Resources:**

Question paper pattern for SEE:
1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

**UHS143K/243K: ENGLISH**
(Compulsory Subject)

I. A Textual Approach towards Listening, Speaking, Reading and Writing.

**Exploring English:**
2. Not just Oranges -Isai Tobolsky
3. Functions of education - J.Krishnamurthy
4. The Open Window - Saki
5. The Election - Hans Peter Ritcher

II. Vocabulary:
1. One-word Equivalent
2. Confusing Words
3. Homonyms and Homophones
4. Synonyms and Antonyms
5. Idioms and Phrases

III. Grammar:
1. Common Errors
2. Parts of Speech, Usage of Prepositions and Articles, Punctuation.
3. Transformation of Sentences.
   i. Active to Passive
   ii. Direct to Indirect

IV. Writing Skills:
1. Note Making
2. Essay Writing
3. Precise Writing
4. Letter Writing
5. Preparation of C.V./Resume/Bio-Data

_Total 26 Hours_

**Reference Books:**
Lesson 1.
Introducing each other-I
Personal Pronouns, Impersonal Pronouns, Reflexive Pronouns

Lesson 2.
Introducing each other-2
Emphatic pronouns, Demonstrative pronouns, Indefinite pronouns

Lesson 3.
About Ramayana
Distributive pronouns, Relative pronouns / which, where, when, whose etc.

Lesson 4.
Enquiring about a room for rent
Qualitative and Quantitative Adjectives

Lesson 5.
Enquiring about the college.
Predicative forms, Locative Case

Lesson 6.
In the Vegetable Market
Dative Case, Defective Verbs

Lesson 7.
About Medical College
Numbers; ordinal/cardinal, Plurals, Markers

Lesson 8.
Plan for a picnic
Imperative, Permissive and hortative

Lesson 9.
Conversation between a Doctor and a patient:
Verb- 'iru', negation- 'illa', potential forms, accusative case

Lesson 10
In a Cloth Shop
Colour Adjectives, defective Verbs

Lesson 11.
Plan to go to a movie
Comparative degree, non-past tense, instrumental and ablative case

Lesson 12.
About Brindavana Garden
Past Tense, negation

Lesson 13.
Routine Activities of a Student
Simple Present, Present Continuous

Lesson 14.
Telephone Conversation
Past and Present Perfect, Past Continuous, and negations

Lesson 15.
About Beluru and Halebidu
Relative Participles, negations and Participle Nouns

Lesson 16.
Discussion on Examination and Future Plans
Simple and Negative Conditions

Lesson 17.
Karnataka (Lesson)

Lesson 18.
Kannada Bhashe (Lesson)

Lesson 19.
Tongue Twisters

Lesson 20.
Bekubedagalu

Total 26 Hours