BS1201 Engineering Mathematics-II

Teaching Scheme: **Examination Scheme:**

Lectures: 3 Hrs/Week In-Semester: 50 Marks

Tutorial: 1 Hr /Week End-Semester: 50 Marks

Credits: 4

Course Objectives:
Mathematics is a necessary path to scientific knowledge which opens new perspective of mental activity. Our aim is to provide sound knowledge of engineering mathematics to make the students think mathematically and strengthen their thinking power to analyse and solve engineering problems in their respective areas.

Course Outcomes: Students will be able to
1. Solve first order first degree DE, apply it to model and solve simple engineering problems like R-C circuit, conduction of heat etc.
2. Apply Beta, Gamma, Error function and Leibnitz's rule of DUIS to solve integration of univariate function
3. Identify the characteristics of the given function and trace the curve.
4. Integrate multivariate functions over the given region and apply the knowledge to find area, volume, mass, density etc.
5. Obtain Fourier series of given periodic function; Find nth harmonics for given data.

Course Contents:

Unit – I: First order first degree Differential Equation (07)

Definition, Order and degree of Differential Equation, Formation of differential equation, solutions of differential equation, Exact differential equation, Linear differential equation and equations reducible to these types.

Unit – II: Applications of Differential Equations (05)

Applications of differential equations to engineering problems: simple electrical circuits, applications of chemical engineering, applications of mechanical engineering and applications of physics.

Unit – III: Integral Calculus (07)

Special Functions:-Gamma Function, Beta Function, Error function. Differentiation Under integral sign (Leibnitz's rule). Curve tracing of Cartesian form, polar form.

Unit – IV: Multiple Integrals (08)
Transformation of Co-Ordinate systems Spherical, Polar and Cylindrical, Double and Triple integrals with limits, Double and Triple integrals without limits. Dirichlet's theorem.

Unit – V: Applications of Multiple Integrals (06)

Area of cartesian curves, Area of polar curves, Volume of solid, Mass of plane lamina, Mass of solid.

Unit – VI: Fourier Series and Harmonic Analysis (09)

Definition of Fourier series, Dirichlet's conditions, full range Fourier series, half range Fourier Sine series, half range Fourier Cosine Series, Practical Harmonic analysis and applications to problems in Engineering.

Text Books:

1. B.S. Grewal, 'Higher engineering Mathematics', Khanna publishers, Delhi (40th edition), 2008 .

2. B. V. Ramana, 'Higher Engineering Mathematics ',Tata McGraw Hill Publications, (2007)

Reference Books:

1. C.R.Wylie, L.C. Barrette, 'Advanced Engineering Mathematics', McGraw Hill Publications, New Delhi.(6th edition),(2003)

2. Peter V. O'neil, 'Advanced Engineering Mathematics', Thomson Brooks / Cole, Singapore (5th edition), (2007).

3. Erwin Kreyszig, 'Advanced Engineering Mathematics' ,Wiley Eastern Ltd.(8th Student Edition), (2004).

BS 1202 PHYSICS– II

Teaching Scheme:

Lectures: 2Hrs/Week

Tutorial: 1Hr/Week

Credits: 3

Examination Scheme:

In-Semester: 50 Marks

End-Semester: 50 Marks

Course Objective:

The objective of this course is to provide an 'algorithmic' introduction of the basic principles of Quantum Physics to the first year students of engineering. Throughout the course, the applications of Quantum Physics will be discussed by emphasizing the laws of combining 'probability amplitudes'. This will be done through several case studies and experimental situations.

Course Outcomes:

By taking this course, the learner will be able to –

1: **Apply** the laws of combining probability amplitudes for obtaining intensity distributions of ensembles of identical microscopic systems.
2: Differentiate between domain – specific nature of probability amplitudes in elementary quantum mechanical situations.
3: Justify the use of the laws of combining probability amplitudes in situations involving photons and two – state and multi – state quantum systems.

Unit – I: Probability Amplitudes: (4)

The laws for combining amplitudes; The two-slit interference patter; Scattering from a crystal

Unit – II: Identical Particles: (4)

Bose particles and Fermi particles; Case studies involving use of the exclusion principle

Unit – III: The Dependence of Amplitudes on Time: (4)

Stationary states; Potential energy and energy conservation; The precession of a spin-half particle

Unit – IV: The Hamiltonian Matrix: (4)

Resolving state vectors; How state changes with time; Hamiltonian Matrix

Unit – V: Two-state Systems and Single Qubit Logic Gates: (4)

Experiments with bullets, waves and electrons; The uncertainty principle

Unit – VI: Band Theory of Solids and Semiconductor Physics: (4)

States for an electron in a lattice; Electrons and holes in semiconductors; The Hall effect; Rectification at a semiconductor junction; The transistor

Text Book:

R. P. Feynman, R. B. Leighton and M. Sands, **'The Feynman Lectures on Physics'**, *Pearson Education* (2006)

Reference Books:

1. J. Walker, D. Halliday, R, Resnick, **'Principles of Physics'**, Wiley *Student Edition* (10^{th} Edition)
2. H. Young and Roger Freedman, **'University Physics'**, Pearson Addison Wesley (12^{th} Edition)

BS-1203 Chemistry II

Teaching Scheme:

Lectures: 2 Hrs/Week

Tutorial: 1 Hr/Week

Examination Scheme:

In-Semester: 50 Marks

End-Semester: 50 Marks

Credits: 3

Course Objectives:

The Chemistry course is designed for the learners to develop a sound background of fundamental concepts and principles relevant in the engineering context. The course facilitates undergraduates to evaluate the role of chemical substances in different methods of preparation and analysis.They analyze chemical processes related to engineering applications. Also the course inculcates basic problem solving skills involving chemistry principles.

Course Outcomes:

By taking this course, the students will be able to

CO1: Apply spectral and analytical techniques for chemical analysis.

CO2: State laws, definitions and identify physical parameters affecting composition of systems.

CO3:Elucidate on structure and synthesis of materials.

CO4: Evaluate types, factors, mechanisms related to corrosion and its preventive methods.

CO5: Analyze materials for their properties and applications such as fuel or speciality materials.

Unit – I: Instrumental methods of Analysis II (04)

Basic principles, theory, instrumentation and applications of Uv-Vis Spectrophotometry; Flamephotometry.

Unit – II: Polymer Chemistry (07)

Basic terms, molecular weight determination, types of polymerization and its mechanism (free radical and ionic), compounding of plastics, Speciality polymers, Recycling of polymers

Unit – III: Chemistry of fuels (09)

Calorific value, Bomb & Boys' calorimeter, Proximate and Ultimate analysis of coal, Crude

oil: refining, knocking, alternate fuels, rocket propellants, Combustion: calculation of air required for combustion.

Unit – IV: Corrosion **(04)**

Dry and wet corrosion mechanism, types, factors affecting corrosion, Protection against corrosion: Cathodic and anodic protection, powder coating and metallic coatings.

Unit – V: Phase Rule **(03)**

Gibbs Phase Rule, one Component system- Water system, Sulphur system, Two component system- (Pb-silver alloy). Applications and limitations of phase rule.

Unit – VI: Nanomaterials **(03)**

Introduction to nanomaterials, synthesis by top down and bottom up methods, properties and typical applications of nanomaterials.

Text Books:

1. Arun Bahl and G.D. Tuli, **'Essentials of Physical Chemistry'**, (2014/2016)
2. S.S. Dara **'Engineering Chemistry'** *S.Chand Publications* (2010)
3. Puri, Sharma, Kalia **'Principles of Physical Chemistry'** *Milestone Publication* (2009)
4. B.S. Chauhan **'Engineering Chemistry'** *Univ Sc Press.*(2015)
5. Shashi Chawla **'A Text Book Of Engineering Chemistry'** *Dhanpat Rai & Co.* (2015)
6. S.K. Kulkarni **'Nanotechnology: principles and practices'** (2014)
7. Gurdeep Chatwal **'Instrumental methods of Chemical Analysis'** *Himalaya publishing house* (1996)

Reference Books:

1. Ram D. Gupta,**'Hydrogen as a fuel'** *C.R.C.Publication* (2009)
2. Puri,Sharma,Pathania **'Principles of Physical Chemistry'** *Vishal Publishing Co.* (2015-16)
3. **Robert D. Braun 'Instrumental methods of analysis'** ***Pharmamed press*** **(2010)**

ES 1201 Basic Electrical and Electronics Engineering – II

Teaching Scheme:
Lectures: 3 Hrs/Week
Credits: 3

Examination Scheme:
In-Semester: 50 Marks
End-Semester: 50 Marks

Pre-requisite : Semiconductor physics

Course Objectives:
1. To make students familiar with the fundamental concepts of AC circuits
2. To familiarize the students with three phase supply
3. To develop a clear understanding of operation and application of transformer
4. To make students familiar with Digital Circuits
5. To introduce Basics operational amplifier (IC 741) and its applications

Course Outcome:
Having successfully completed this course, the student will be able to:
1. Analyze and determine parameters of single phase AC circuit.
2. Quantify parameters of single phase transformer related to its operation and use .
3. Develop applications of logic gates for building combinational and sequential circuits.
4. Build simple linear and non-linear circuits using operational amplifier.
5. Analyze characteristics of different power devices and transducers.

Unit I: **AC Circuits** **(08)**
Behavior of pure R,L,C in ac circuits,Series and parallel RL, RC and RLC circuits, concept of Impedance and admittance, power triangle and power factor.Resonance in series and parallel RLC circuit, Three phase voltage generationand waveform, star and delta balanced systems. Relationship between phase and line quantities, phaser diagram, power in a three phase circuit.

Unit II : Single phase Transformers **(07)**
1 Φ transformer: concept, types, working, ideal transformer, practical transformer, equivalent circuit, phasor diagram, efficiency and regulation calculations. Introduction to three phase transformer.

Unit III: Digital Electronics **(07)**
Binary number systems and binary arithmetic, basic gates, implementation of basic gates using universal gates, Boolean algebra, standard representation of logic functions (SOP and POS forms), Introduction of Combinational logic circuits like multiplexer ,demultiplexer ,half adder and full adder, Introduction of Sequential logic circuits like flip- flops (SR, D), counters and shift registers.

Unit IV: OPAMP **(07)**
Introduction to operational amplifiers, opamp configurations, modes and parameters, Negative feedback concept and applications like comparators, summing amplifiers, integrators and differentiators.

Unit V: POWER DEVICES **(07)**

Construction, characteristics and turn on mechanism of SCR, two transistor analogy of SCR, concept of line and forced commutation. Introduction to phase control concept. Construction, characteristics of IGBT and MOSFET.

Unit VI: Transducers **(06)**

Introduction to Transducers, selection of transducers, classification of transducers. Types of transducers such as LVDT, RTD, Thermistor and strain gauge.

Text Books:-

Hughes,"Electrical & Electronic Technology", *Pearson Education, 9th Edition*

Reference Books:-

1. AP Malvino & Donald Leach,"Digital Principles and Applications", *McGraw Hill Education, 4th edition*

2. Floyd ,"Electronic Devices and Circuits", *Pearson Education India, 8th edition*

3. H.S. Kalsi "Electronic Instrumentation",*TMH publication,2nd edition*

4. Jacob Millman & C C Halkais, Chetan parikh,"Integrated Electronics", *TMH, 2nd edition*

5. D.P. Kothari and I.J. Nagrath, "Basic Electrical Engineering", *Tata McGraw- Hill, 3rd Edition.*

ES 1202 Fundamentals of Programming Languages - II

Teaching Scheme:
Lectures: 1 Hr/Week
Credits: 1

Examination Scheme:
In-Semester: 25 Marks

Course Objectives:
Familiarize students with

1. Understand role of functions and it's utility in programming.
2. Understand the use of pointers in memory management.
3. Understand the utility of need and utility of user defined data types.
4. Learn and explore mobile application development environment.

Course Outcomes:
Students will be able to

1. Write program using functions
2. Write code for effective memory management
3. Write code using appropriate user defined data types for various applications
4. Write code with user defined functions similar to inbuilt functions

Unit – I: Functions in C (03)
Concept of Function, Function declaration, Function definition, Function Call, Return statement, Passing parameters: Call by value, Recursion

Unit – II: Strings (02)
Introduction, Reading Strings, Writing Strings, Strings Operations: Counting characters in String, Converting into upper case and lower case, Concatenation, Appending, Comparing, Reverse

Unit – III: Introduction to Pointers in C (02)
Understanding Computer memory, Introduction to Pointers, Declaring pointer variable, Function Call by reference, Pointer and Arrays, Role of Pointers in Passing an Array to a Function, Pointers and Strings

Unit – IV: Structures (02)
Introduction to Structures: Declaring Structure and Structure Variables, Initializing Structure, Accessing members of Structure

Unit – V: Unions, Enumeration Data types (02)
Declaring Union and its members, Accessing members of Union, Enumeration Types

Unit – VI: Mobile application Development (02)
Introduction, Web apps vs. Native apps, Introduction to mobile operating System like Android / IOS / Windows, Features and architecture of Mobile Operating System, Generating GUI and views, Layouts and Application Components, Creating simple mobile application.

Text Books:

1. Reema Thareja, **'Introduction to C programming',** *Oxford University Press* (2nd edition), (2015)
2. Pradeep Day, '**Computer Fundamentals and programming in C'**, *Oxford University Press*, (2nd edition) (2013)

Reference Books:

1. B Kernighan, D Ritchie, '**C programming Language'**, *Prentice Hall Software Series*, (2nd edition) (1988)

ES1203 Basic Mechanical Engineering

Teaching Scheme:

Lectures: 3Hrs/Week

Credits: 3

ExaminatioScheme:

In-Semester: 50 Marks

End-Semester: 50 Marks

Course Objectives:

a) To provide an overview of mechanical engineering systems (Power plant, Manufacturing plant, Maintenance systems, transmission systems).

b) To enable students to understand terminology used in Mechanical engineering with its significance.

c) To make student understand concept of Mechatronics System.

Course Outcomes:

a) The student will be able to differentiate between major areas like Design, Manufacturing and Thermal in mechanical industries while addressing a problem.

b) The student will be able to select an appropriate sector while finding solution to a problem.

c) The student will be aware of avenues available while choosing career opportunities in mechanical engineering Industry.

d) Understand the underlying principle of energy conversion systems and power plants, power producing and Power absorbing devices.

e) Students will be able to identify Mechatronics System and its components.

Unit – I: Introduction to basic mechanical engineering (06)

Industry overview-Comparison between process, product and service industry. Work environment for Mechanical industries, role of a mechanical engineer, ethics, professional hazards and safety concerns in mechanical industry. Typical manufacturing method of a product.

Unit – II: Introduction to thermal engineering (08)

Thermodynamic system, properties, states, process, cycle, first law of thermodynamics, application of first law to open and closed systems,second law of thermodynamics, conceptual difference between heat engine, heat pump and refrigerator, significance of efficiency and co-efficient of performance. Numerical on appropriate topics.

Unit – III: Power producing devices and power absorbing devices (08)

Power producing devices-Internal combustion engines and turbines, power plants.

Power absorbing devices-Centrifugal pumps, reciprocating units, vapour compression refrigeration, air conditioning systems.

Energy management system-fluctuations in demand-supply of energy,need of power grid, concept of energy audit.

Unit – IV: Introduction to design engineering

Introduction to engineering materials, elements and principles of engineering design, basic procedure, Basic requirement, standards in design, aesthetic and ergonomic considerations in design.

Basic machine elements, shaft, key, coupling, bearing, clutch and brake.

Mechanical drives, belt, chain and gear.

Unit – V: Introduction to manufacturing (08)

Operation on different machine tools, lathe, Milling, Drilling.

Joining of metals, welding-gas and arc, TIG, MIG, Soldering, brazing.

Hot and cold working-Forging, rolling, extrusion.

Unit – VI: Introduction to Mechatronics (06)

Definition(S) of Mechatronics, Mechatronics system Components, Levels of Mechatronics system, Examples of Mechatronics (products and systems in manufacturing), Advantages of Mechatronics with Traditional Systems.

Text Books:

a) C.P. Aurora, '**Thermodynamics'**, *Tata McGraw Hill education*, (2001).

b) BasantAgarwal, C.M Agarwal, '**Basic Mechanical Engineering'**, *Wiley Ind. Pvt. Ltd*.

c) V B Bhandari, **'Design of Machine Elements'**, *Tata McGraw Hill*, (2nd edition), (2007).

d) S. K.HajraChoudhury, S.K.Bose, A.K.HajraChoudhury, **'Elements of workshop technology, volume I and II',** *Media promoters and publishers pvt. Ltd*(7th edition).

e) W.Bolton, '**Mechatronic-a multidisciplinary approach',** *Prentice Hall*, (4th edition), (2009).

f) Class room notes.

Reference Books:

a) Moran, Shapiro, Boettner, Bailey, '**Principles of engineering thermodynamics'**, *Wiley*, (7^{th} edition).

b) Rayner Joel, '**Basic engineering thermodynamics'**, *Addison-Wesley*, (5^{th} edition).

c) Y. A. Cengel and M. A. Boles, '**Thermodynamics, an Engineering Approach**', (4th edition).

d) S.S. Rattan, '**Theory of Machine'**, *McGraw Hill*, (4^{th} edition).

e) B.S. Raghuwanshi, '**A course in workshop technology'**, *DhanpatRai&co*.

f) Kalpakjian, Schmid, **'Manufacturing engineering and technology**', *Pearson*, (4^{th} edition).

7. Nptel course112105127/1, 112105127/2

ES 1204 Engineering Mechanics

Teaching Scheme:

Lectures: 2Hrs/Week

Tutorial: 1Hr/Week

Credits: 3

Examination Scheme:

In-Semester: **50** Marks

End-Semester: **50** Marks

Course Objectives:

1. To develop the ability of students to analyze any problem in a simple and logical manner.
2. To make the students understand the fundamental principles of mechanics which are the foundation of much of today's engineering.
3. To develop logical thinking of the students for application in engineering.
4. To provide an introduction to the basic quantities of mechanics.

Course Outcomes:

A student should be able to obtain/develop:

1. An ability to apply knowledge of mathematics, science and engineering

2. A recognition of the need for, and an ability to engage in, life-long learning.

3. Application of Newton's laws of motion

4. Knowledge of kinematic & kinetic analysis.

Unit – I: Introduction to Statics (06)

1. Fundamental concepts and principle (The parallelogram law of addition of forces, the principle of transmissibility, Newton's laws of motion**,** Newton's law of gravitation). Introduction to a force in a plane, Types of force system, resolution & composition of forces, Methods of composition to find resultant, moment of force, Varignon's theorem, couple, equivalent force couple system.
2. Introduction to force in a space, problems on resultant of concurrent force system
3. Equilibrium- Introduction to concept of equilibrium, Conditions of equilibrium, Free body diagram, equilibrium under different forces, equilibrium of concurrent parallel & general forces in a plane.

Unit – II: Introduction to type of Supports and Beam (05)

1. Types of supports (Fixed, roller, hinged support)

   Types of loads on a beam (point load, uniformly distributed load, uniformly varying load)
   Types of beams (simple beam, cantilever beam, compound beam)

2. Problems on Reactions & analysis of beams
3. Centroid- Definitions (Center of gravity of two dimensional body, center of mass, centroid), procedure to find centroid of regular plane lamina.

Unit – III: Introduction to Friction (03)

Definition and classification of friction, coefficient of static and kinetic friction ,angle of friction, angle of repose, problems on block friction and ladder friction

Unit – IV: Rectilinear Motion (05)

2) Variables in Rectilinear motion- Time, Position, Displacement, Distance travelled, Velocity, Acceleration

   Equations of motion for constant acceleration & motion under gravity, variable acceleration, relative motion based on kinematic equations.

3) Application of Newton's second law of motion for rectangular co-ordinate system (D' Alembert's principle)

Unit – V: Curvilinear Motion (05)

1) Equation of motion in rectangular components, Normal & Tangential components, Radial & Transverse components.

2) Projectile motion- Definition and derivation (time of flight, horizontal range, angle of projection, maximum height, trajectory),Projectile on horizontal plane only

Unit – VI: Work Energy Principle (04)

1. Introduction and definition of Work, power, energy, conservative & non- conservative forces, Conservation of energy, work-energy principle.

2. Problems on Work done by different forces (External force, Frictional force, Gravitational force, Spring force).

Text books:

1. A Nelson, '**Engineering Mechanics Statics and Dynamics**', *Mc Graw Hill Education.*

2. R.S. Khurmi, '**A Textbook of Engineering Mechanics**', *S. Chand & Company Ltd.*

Reference books:

- Beer & Johnson, '**Vector mechanics for engineers**', *Mc Graw hill publication.*
- I. H. Shames & G.K.M. Rao, '**Engg. Mechanics'**, *Pearson.*
- R. C. Hibbler, '**Engg. Mechanics statics & dynamics**', *Pearson publication*
- **S. Timosenko, DPT.young & J.V.Rao, 'Engineering mechanics',** ***Tata Mc Graw hill education pvt. Ltd. New delhi.***

BS 1204 Physics Chemistry Lab – II

Teaching Scheme:

Lectures: 2Hrs/Week

Tutorial: 1Hr/Week

Practical: 2 Hrs/Week

Credits: 1

Examination Scheme:

In-Semester: **25** Marks

1: **Record** the observations as per the least counts of measuring instruments and carry out plotting and necessary calculations pertaining to solid state physics, atomic and molecular system.
2: Analyze the plotted data and experimental findings with the corresponding theoretical physical models pertaining to solid state physics, atomic and molecular system.
3: Analyze the sources of error and arrive at conclusions pertaining to the behavior of solid state physics, atomic and molecular system.
4: Determine the molecular weight of a given polymer by viscometry.
5: Evaluate a solid fuel sample for its quality by proximate analysis.
6: Implement spectral analysis for a given chemical compound.

List of Experiments:

Physics

1. Michelson Interferometer
2. Specific heat of substance
3. Hall Effect
4. Balmer Series and Emission Spectra
5. Zeeman Effect (Demo)

Chemistry

1. Qualitative & quantitative Analysis of alkali /alkaline earth metals using Flame Photometry.
2. Colorimetric verification of Beer-Lambert's law.
3. Determination of molecular weight of polymer using Ostwald Viscometer.
4. Proximate analysis of coal.

ES 1205 Basic Electronics and Electrical Engineering Lab- II

Teaching Scheme: **Examination Scheme:**

Laboratory: 2 Hrs/Week End-Semester:25 Marks

Credits: 1

Pre-requisite : Instruments ,Electronics and electrical components,semiconductor physics.

Course Objectives:

3. To make students familiar with the fundamental concepts of single phase AC circuits
4. To make students familiar with three phase supply
5. To demonstrate working of single phase transformer
6. To explain combinational logic circuits
7. To introduce Basics operational amplifier (IC 741) and its applications

Course Outcome:

Having successfully completed this course, the student will be able to:

3. Apply fundamental concepts of single phase and three phase AC circuits.
4. Test performance parameters of single phase transformers.
5. Implement basic analog and digital circuits.
6. Verify characteristics of SCR and transducer.

List of Practicals:-

1. Performance analysis of L-C-R series circuit .
2. Load test on single phase transformer for determination of voltage regulation.
3. Performance analysis of 3 phase AC circuit.
4. Analysis of summing amplifier and difference amplifier using OPAMP.
5. Design and implementation of half adder and full adder circuits.
6. Illustrate effect of variation of displacement on output voltage of LVDT.
7. Verification of static characteristics of SCR.
8. Soldering Techniques (any small circuit like clippers, clamper, circuits using basic gates).

ES 1206 Fundamentals of Programming Languages Lab - II

Teaching Scheme:
Practical: 2 Hrs/Week
Credits: 1

Examination Scheme:
Practical: 25 Marks

Course Objectives:
Familiarize students with

1. Learn and acquire art of computer programming.
2. Learn advanced C programming features.
3. Learn to write C program for a given logical solution.
4. Learn to apply programming concepts to solve simple problems using arrays, functions and structures.

Course Outcomes:
Students will be able to

1. Write program using functions for given problem statement.
2. Write code using sequential memory management
3. Apply appropriate user defined data types for given statement.
4. Write program with user defined functions similar to library functions.

Section 1 (any 07 assignments)

1. Write a C program to swap 2 integers using user defined functions (call by value, call by reference).
2. Write a program in C to compute the factorial of the given positive integer using recursive function.
3. Write functions to convert feet to inches, convert inches to centimeters, and convert centimeters to meters. Write a program that prompts a user for a measurement in feet and converts and outputs this value in meters. Facts to use: 1 ft = 12 inches, 1 inch = 2.54 cm, 100 cm = 1 meter.
4. Write a menu driven program to perform following operations using Array of integers like (accept, display, print alternate number, sum of all numbers, search a number).
5. Write a program in C to sort n integers using bubble sort.
6. Write a menu driven program to perform string operations using library functions.
7. Write a menu driven program to perform string operations using user defined functions.
8. Define an integer pointer array of 10 integers. Initialize them to any integer values from the keyboard. Find the sum, average, minimum, and maximum of these 10 integers. Sort the 10 integers in descending order.
9. Write a program in C to compute addition / subtraction / multiplication of two matrices. Use functions to read, display and add / subtract / multiply the matrices.
10. For a class an examination is conducted and the results for the students of all the 5 subjects are recorded. Write C program to display the record of students. On the basis of the record compute

11. Write a menu-based program in C that uses a set of functions to perform the following operations:

    i. reading a complex number
    ii. writing a complex number
    iii. addition of two complex numbers
    iv. Iv.subtraction of two complex numbers
    v. multiplication of two complex numbers
    vi. Represent the complex number using a structure.

12. Write a C program to create an employee database using structure and perform operations such as accept, display, search by name, search by number, update a record.

Section 2 (any 02 assignments)

1. A string is provided from the user. Calculate the total number of characters in the string and the total number of vowels in the string with the number of occurrence in the string

2. College library has n books. Write C program to store the cost of books in array in ascending order.
   Books are to be arranged in descending order of their cost

3. Write a recursive function to obtain the first 25 numbers of a Fibonacci sequence. In a Fibonacci sequence the sum of two successive terms gives the third term. Following are the first few terms of the Fibonacci sequence:1 1 2 3 5 8 13 21 34 55 89

4. A factory has 3 division and stocks 4 categories of products. An inventory table is updated for each division and for each product as they are received. There are three independent suppliers of products to the factory:

   (a) Design a data format to represent each transaction

   (b) Write a program to take a transaction and update the inventory

   (c) If the cost per item is also given write a program to calculate the total inventory values.

5. Write a program that compares two given dates. To store date use structure say date that contains three members namely date, month and year. If the dates are equal then display message as "Equal" otherwise "Unequal".

6. Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 200 customers in the bank.

   (a) Write a function to print the Account number and name of each customer with balance below Rs. 100.

   (b) If a customer request for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal) Write a program to give a message, “The balance is insufficient for the specified withdrawal”

7. An automobile company has serial number for engine parts starting from AA0 to FF9. The other characteristics of parts to be specified in a structure are: Year of manufacture, material and quantity manufactured.

Section 3 (study assignment)

Students should design and develop a small Android application for mobile.

Text Books:

1. Reema Thareja, **'Introduction to C programming',** *Oxford University Press* (2nd edition), (2015)
2. Pradeep Day, '**Computer Fundamentals and programming in C'**, *Oxford University Press*, (2nd edition) (2013)

Reference Books:

1. B Kernighan, D Ritchie, '**C programming Language'**, *Prentice Hall Software Series*, (2nd edition) (1988)

ES1207 Engineering Mechanics Lab

Teaching Scheme:

Lectures: 2 Hrs/Week

Tutorial: 1 Hr/Week

Credits: 1

Examination Scheme:

In-Semester: 25 Marks

No. of Experiments:

Part A-Experiments (any 7 experiments)

1. Verification of law of polygon of forces.
2. Verification of Varignon's theorem.
3. Verification of Lami's theorem.
4. Support reactions of simple beam.
5. To determine forces in space force system.
6. Study of Curvilinear motion.
7. Determination of coefficient of restitution.
8. To compare coefficient of friction of various pair of surfaces in contact.

Part B- Graphical analysis -(Any one)

1. To find resultant of force system.
2. To find support reactions of simple beam.

ES 1208 Workshop Practice I

Teaching Scheme:

Practical: 2 Hr/Week

Credit: 1

Examination Scheme:

Practical/Oral Examination: 25 marks

Course Objectives:

1. To provide knowledge and skill to use tools, machines, equipment, and measuring instruments, which are used in manufacturing industries.
2. To educate students for Safe handling of machines and tools in manufacturing environment

Course Outcomes:

1. The student will be able to apply concept related to workshop safety & use of measuring instruments during process of manufacturing.
2. The student will be able suitably select basic manufacturing practices for making of component.
3. The students will be able to manufacture/produce given product from raw material using different manufacturing methods.

Unit – I: Introduction to Workshop Safety and Measuring Instruments: (05)

- Safety precautions while working in shop, safety equipment's and their use.
- Brief introduction to instruments like – Steel rule, Calipers, VernierCaliper, Micrometer, etc. Least counts, common errors and care while using them, use of marking gauge, 'V'block and surface plate.
- Introduction & working of different tools used in workshop.

Unit – II: Manufacturing Practice:(Any Two Trades) (13)

- Fitting: Preparation of joints, markings, cutting and filling for making joints like V or T for making part of any component.
- Carpentry: Wood working consists of planning, marking, sawing, chiseling and grooving to make joint like lap, T, dovetail.
- Tin smithy: Making of small parts using sheet metal such as Tray, Funnel.
- Welding Joints: Introduction to use of MIG/ TIG, arc welding for making joints like Lap, Butt joint.

Unit – III: Information technology: (06)

- Identify the peripherals of computer components in a CPU and its functions
- Disassemble and assemble the PC back to working condition
- Loading of operating system.

Unit – IV: Plumbing (06)

- Hands on practice on Cutting, bending and external threading of GI pipes using Die
- Plumbing on PVC pipes.
- Different Joint preparation on GI & PVC Pipes

Text Books:

1. Choudhary, Hajara**'Elements of Workshop Technology**', Media Promotors& Publishers, (1997).
2. Raghuvanshi B.S. "Workshop Technology" Vol. I &II,DhanpatRai& Sons, (1998).
3. H.S. Bawa'Workshop Technology' Vol.-I by, TMH Publications, New Delhi, (2009).
4. Gupta and Kaushik "Workshop Technology: Vol. – I by, New Heights,(1999).

Reference Books:

1. Chapman W.A. J and Arnold E. '**Workshop Technology-part I**' Viva low priced Student, (1998).