



**Subject Code:** - MAT070

**Subject Name:** - Engineering Mathematics – I

**Semester:** I

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>

**Course Objective:**

The objective of this course is to fulfill the needs of students to understand the applications of mathematics in the field of Engineering. It covers Algebra, Permutation, Binomial theorem, Concept & Principles of Determinants, types of Matrices, Trigonometry and Statistical techniques in order to acquire Mathematical knowledge and to solving a wide range of practical problems.

**Algebra:** Arithmetic Progression, its  $n^{\text{th}}$  term and the sum of  $n$  terms with their applications to engineering problems. Geometrical Progression, its  $n^{\text{th}}$  term and sum of  $n$  terms and to infinity with application to engineering problems. Partial fractions. Complex Numbers. Permutation: Meaning of factorial  $n$ . Permutation of ' $n$ ' dissimilar thing taken ' $r$ ' at a time Combination: Combination of  $n$  dissimilar things taken ' $r$ ' at a time.

**Binomial Theorem:** Statement of the theorem for positive integer General Term, Middle term, Constant term. Binomial theorem for any index (expansion without proof only). First and second binomial approximation with application to engineering problems. Determinant: Concept & principles of Determinants Properties of determinant Simple examples.

**Matrix:** Definition of Matrix. Types of Matrix. Row, Column, Square, Unit, Upper and lower triangular, Symmetric & Skew Symmetric, Singular and non Singular Matrices. Adjoint of a Matrix. The inverse of a Matrix.

**Statistics:** Measures of Central tendency (Mean, Mode, Median) Measures of Dispersion (Mean deviation, standard deviation).

**Trigonometry:** Allied angles. Trigonometrical ratios of sum and difference of angles, (Only statement). Sum and difference of trigonometric ratios (C- D formula). Multiple angles (Only double angle and half angle). Properties of the triangle (without proof).

**Course Outcomes:**

The curriculum is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concept of applications of mathematics in the field of Engineering.

**References:**

1. Engineering Mathematics (M.P. Hindi Granth Akadami) Dr. S.K. Chouksey & Manoj Singh.
2. Mathematical Statistics, Ray and Sharma.
3. Higher Engineering Mathematics, B.S. Grewal Khanna Publication.



**Subject Code:** - CVE060

**Subject Name:** - Environmental Engineering & Safety

**Semester:** I

L	T	P	C
4	-	-	4

**Course Objectives:**

- To create the awareness about environmental problems in the world.
- To motivating students to participate in environment protection and environment improvement.
- To aware students with quality of waste water and its treatment.

**Unit I**

**Introduction to Environment:** The Biosphere, biotic and abiotic - An aquatic ecosystem - Types of pollution - Impact of a human being on the environment. - The impact of environment on a human being - Basic approach to improving environmental qualities - Role of an environmental engineer.

**Air Pollution Sources & Effects** Standard definition of air pollution - Composition of natural air - Names of air pollutants - Classification of air pollutants, primary and secondary pollutants - Classification of the source of air pollutants on different bases - Definition of different types of aerosols. - Effect of air pollution on: human health, material properties, vegetation. - Major toxic metals and their effects - Major environmental phenomenon e.g. acid rain, global warming, green house effect, ozone layer depletion. - Air quality standards - Brief description of air pollution laws.

**Unit II**

**Air Pollution Control, Methods & Equipment:** Natural purification processes of air - Artificial purification methods of air - Brief description of following control equipments along with sketch e. g, gravitation settling chamber, cyclone, scrubber, bag house filter, electrostatic precipitator. - A brief description of following processes for the control of gaseous pollutants e. g., absorption, adsorption, condensation, combustion etc.

**Water Pollution Sources And Classification** Water resources - Uses of water - Classification of water - Origin, composition and characteristics of domestic waste water as well as industrial waste water - Biochemical oxygen demand - Water pollution laws and standards - Uses of waste water - Classification of waste water - Chemical oxygen demand.

**Waste Water Treatment Method** - basic processes of water treatment.

**Unit III**

**Waste Water Treatment Methods meaning:** of primary, secondary and tertiary treatment - Flow chart of a simple effluent treatment plant - Theory of industrial waste treatment - Volume reduction, neutralization and proportioning.

**Solid Waste Management.** Sources and classification of solid waste - Public health aspects - Disposal methods – open dumping , sanitary , land fill - Incineration , compositing - Potential methods of disposal - Recovery and recycling of paper, glass, metal and plastic.

**Unit IV**

**Noise Pollution & Control:** Sources of noise pollution - Units of Noise pollution measurement - Allowable limits for different areas - Problems of noise pollution and measures to control it - Noise pollution control devices brief discussion.

## **Unit V**

**Safety Practices:** Responsibility of employees and employers regarding health and safety - Fire hazards, prevention and precautions - Industrial hazards prevention and protection - Protection from air and noise pollution.

### **Course Outcomes:**

Students are expected to be able to:

- Articulate the interdisciplinary context of environmental issues.
- Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.
- Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives

### **References:**

1. Environmental pollution control Engineering by C.S. Rao.
2. Air pollution and control by Seth.
3. Air pollution by M.N Rao.
4. Industrial waste and its treatment by Seth.
5. Paryavaran Yantriki Hindi granth akadami.



**Subject Code:** - PHY010

**Subject Name:** - Engineering Physics-I

**Semester:** I

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

**Course Objectives:**

The main focus of the subject is to impart basic knowledge of principles of Physics such as fundamentals of units and measurement which is need of modern industry. Properties of matter, Heat energy and its propagation are the part of the subject to make a technical student versatile and competent.

**Units & Measurement :** Fundamental and derived units, Scalar and vector, basic requirements to represent vector Symbols, abbreviation, and percolation, linear measurement by vernier calipers, screw gauge and spherometer, angular measurement by angular vernier.

**Motion :** Motion and its type, Linear motion (laws and equation), Circular motion, Angular velocity and relation with linear velocity, Centripetal acceleration, Centripetal and Centrifugal forces, Rotatory motion, Axis of rotation Moment of Inertia, Radius of gyration, the Kinetic energy of rotation.

**Molecular Phenomenon of Solids, Liquids and Gases:** Postulates of Molecular Kinetic Theory of Structure of matter, Brownian motion, Kinetic and Potential energy of molecules, Kinetic theory of gases, calculation of pressure by Kinetic theory, prove of different gases law by Kinetic theory.

**Properties of Matter :** Elasticity: Meaning & definition, Stress, strain, Hook’s law and elastic limit, Surface Tension, molecular forces cohesive and adhesive forces, surface energy, capillary rise, capillary rise method, Viscosity : meaning & definition, stream line and turbulent flow critical velocity, Stock’s law.

**Heat :** Heat and temperature, concept of heat as molecular motion, transmission of heat, study state and variable state, concept of heat capacity, specific heat and latent heat, Calorimeter and its uses, Thermodynamics relation between heat and work and mechanical equivalent of heat, first law of thermo dynamics and its application, second law of thermodynamics and its application, Carnot cycle.

**Course Outcomes:**

Studying this subject will develop an understanding of units and measurement, heat energy transfer, various properties of matter and applications of the concepts in engineering.

**References:**

1. Applied Physics Vol. 1 & 2 - Saxena and Prabhakar.
2. Physics - Ttti Publication.
3. Physics Vol. 1 & 2 - Halliday and Resnic R.
4. Engineering Physics- Gaur and Gupta.
5. Principle of Physics- Brij Lal & Subramanyan.
6. Physics for Technical Education- Ls Zednov.

7. Bhautiki- Deepshri Gupta.
8. Physics- Deepshri Gupta.

**Suggested List of Experiment:**

1. Verification of Ohm's law.
2. Study of series circuit.
3. Study of parallel circuit.
4. To find out internal radius of hollow tube by vernier calipers.
5. To find out volume of given cylinder by screw gauge.
6. To find out radius of curvature of a curved surface by Spherometer.
7. Focal length of a convex lens by displacement method.



**Subject Code:** - CVE070

**Subject Name:** - Applied Mechanics

**Semester:** I

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

**Course Objectives:**

To familiarize with different branches of mechanics, Static equilibrium of particles, Properties of surfaces and volumes and fundamental concepts of dynamics and lifting machines.

**Force and It's application** Definition, Effect, characteristics of force, Principle of Transmissibility of Forces, Concept of Resultant Force, Law of, Parallelogram of Forces, Triangle of Forces - Polygon of Forces - Determination of Resultant of two or more concurrent forces, Classification of Parallel Forces, Methods of finding resultant Force of parallel forces- analytically & graphically, Position of resultant force of parallel forces, Definition, Classification and characteristics of a force Couple, moment of couple, Moment and application, Varignon's Theorem, Beams and support reaction.

**Equilibrium of Forces**

Equilibrium of a system of concurrent forces, Conditions and types of Equilibrium, Lami's Theorem and its applications, Lever.

**Center of gravity and centroid** Difference between Centroid and Center of Gravity (CG), Centroid of standard plane figures and CG of simple solid bodies, Method of finding out Centroid of composite plane laminas and cut sections - Method of finding out CG of Composite solid bodies.

**Friction** Concept and types of friction, Limiting Friction, coefficient of friction, angle of friction, angle of repose, Laws of friction ( Static and Kinetic) - Analysis of equilibrium of Bodies resting on Horizontal and inclined Plane, Numerical problems.

**Lifting Machines** Concept of lifting Machines, Definition of Mechanical Advantage, Velocity Ratio and Efficiency of Machines and their relation, Reversibility of Machines and condition for self locking machine, Law of Machines, Maximum mechanical advantage and maximum efficiency of machine, Friction in machine (In terms of Load and effort), Calculation of M.A., V.R. and efficiency of Simple wheel and axle , Differential wheel and axle, Single purchase crab, Double purchase crab, Simple screw jack, Different System of simple pulley blocks.

**Work, Power and Energy** Definition unit and graphical representation of work, Definition and unit of power and types of engine power and efficiency of an engine, Definition and concept of Impulse, Definition, unit and types of energies, Total energy of a body falling under gravity

**Course Outcomes:**

- Students would be able to understand the effect of force on various structure,
- Students would be able to understand fundamental concept of force and applications of force.
- Students will learn concept of lifting machines and energies.

**References:**

1. A text book of Applied Mechanics – R.S. Khurmi , S.C. Chand & amp; Co. , New Delhi
2. Applied Mechanics – I.B. Prasad, Khanna Publishers, New Delhi
3. Applied Mechanics ( Hindi) – R.S. Jog, Anand Publishers, Gwalior
4. Applied Mechanics ( Hindi) – A.R. Page, Deepak Prakashan, Gwali

**Suggested List of Experiment:**

1. Verification of laws of parallelogram of forces.
2. Verification of laws of polygon of forces.
3. Verification of laws of moments.
4. Determination of forces in the members of Jib Crane.
5. Determination of coefficient of friction for surfaces of different materials on horizontal plane.
6. Determination of coefficient of friction for surfaces of different materials on an inclined plane.
7. Determination of mechanical advantage, velocity ratio and efficiency of the Simple wheel and axle.
8. Determination of mechanical advantage, velocity ratio and efficiency of the Differential wheel and axle.
9. Determination of mechanical advantage, velocity ratio and efficiency of the Single purchase winch crab.
10. Determination of mechanical advantage, velocity ratio and efficiency of the Double purchase winch crab.
11. Determination of mechanical advantage, velocity ratio and efficiency of the Simple pulley block Simple.
12. Determination of mechanical advantage, velocity ratio and efficiency of the screw jack.



**Subject Code:** -CSE080

**Subject Name:** - Fundamentals of Computer Science

**Semester:** I

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>2</b>	<b>5</b>

**Course Objectives:**

This course is designed to demonstrate knowledge of the main computer applications used in business and be able to choose the appropriate applications for a given task.

**Unit I**

**Introduction to Computer:** History of development of computers , Computer system concepts, characteristics , capabilities and limitations, Generations of computers, Basic components of a computer system – Control Unit, ALU, I/ O Devices, memory – RAM, ROM, EPROM, PROM, Flash Memory and other types of memory.

Information concepts & processing: definition of information, data V/S information, introduction to information system, information representation, digital media, images, graphics, animation, audio, video etc.

**Unit II**

**Data communication & networks:** Computer networks, networking of computers, introduction to LAN, WAN, MAN, network topologies, basic concepts in computer networks, ISO/OSI Model Introduction to internet technologies: HTML, DHTML, WWW, FTP, TELENET, web browser, Internet browsing, search engines, email.

**Unit III**

**Concepts in operating System:** Elementary concepts in operating system, GUI, introduction to DOS, MS windows, Unix/Linux.

Storage devices: storage fundamentals – primary V/S secondary, data storage and retrieval methods – sequential, direct and index sequential. Various storage devices – magnetic tape, magnetic disks, cartridge tape, data drives, hard disk drives, floppy (Winchester disk), disks, optical disks, CD, VCD, CD-R, CD-RW, zip drive, DVD, SVCD.

**Unit IV**

**Types of Software:** System software, Application software, Utility Software, Demo ware, Shareware, Freeware, Firmware and Free Software.

Microsoft office/Excel: MS word, MS excel, MS Office standard tool bars.

**Unit V**

**Programming languages:** Machine, assembly, high Level, 4 GL languages. Introduction to C: C Character Set, constants, variables and key words, decision and control Structure: if, if-else, forms of if-else statement, operators, types of Loops, case and switch Arrays, C functions – Call by values and Call by reference.

**Course Outcomes:**

At the end of the course the Students will be able to:

- Describe the uses of computers and why computers are essential components in business and society.



- Work on Microsoft Office applications.
- Understand basic network terminologies.
- Write basic C programs with variables, arithmetic operators, Control statements, array and function.

**Text Books :**

1. Rajaraman, V, *Fundamental of Computer*, Prentice Hall India
2. Rajoriya, Sheetanshu (2013). *Computer Fundamentals*, Kamal Prakashan.

**References:**

1. Sinha, P.K., *Computer Fundamentals*. BPB Publications.
2. Mukhi, Vijay *Working with UNIX* BPB Publications.
3. Balaguruswami, E. (2008). *Programming with C*. New Delhi : Tata McGraw Hill.

**Suggested List of Experiment:**

1. Study and to understand the operating system overview.
2. Practice creating opening editing and saving the document using notepad.
3. Practice browsing of different websites using search engines.
4. Create a Resume or CV using Microsoft Word/Open Office.
5. Create a simple presentation using Power Point Tool.
6. Create a worksheet with four columns. Enter ten records and use the basic formula in sheet.
7. Introduction to C /C++. Print a hello word in C.
8. Write a program in C for addition of two values
9. Write a program in C/C++ to implement If- Else decision statement.
10. Write a program to print a pyramid using for loop.

**Note: Number of experiments may be extended to make the better understanding of the subject.**



**Subject Code:** -ELE010

**Subject Name:** - Professional Activity-I

**Semester:** I

L	T	P	C
-	-	2	1

**Course Objectives:**

- To allow for the professional development of students as per the demand of engineering profession.
- To allow for the development of abilities in students for leadership and public speaking through the organization of student’s seminar etc.

**Detailed Instructions to Conduct Professional Activities:**

A. Study hours, if possible should be given greater time slot with a minimum of two hrs/week to a maximum of four hrs/week.

B. This course should be evaluated on the basis of mark sheet of students.

C. Assessment of performance in PA is to be done internally by the Institution, twice in a Semester/Term through a simultaneous evaluation of the candidate by a group of three teachers of the department. Concerned Group of teachers will jointly award the marks to a candidate in the assessment. Best of the marks obtained by the student in these two assessments shall be finally taken on the mark sheet of the respective Semester/Term.

D. While awarding the marks for performance in PA, examining teacher should reach the final consensus based on the attendance, punctuality, interest, presentation skills in seminar on the topic assigned (collection of relevant data, observations, analysis, findings/conclusion) and its written report, awareness of latest developments in the chosen programme of study.

E. The institution shall maintain the record of marks awarded to all the students in PA for a period of 1 year.

F. It shall be mandatory for students to submit a compendium for his PA in the form of a Journal.

G. Compendium shall contain the following:

- I. Record of written quiz.
- II. Report/write up of seminar presented
- III. Abstract of the guest lecturers arranged in the Institution.
- IV. Topic and outcome of the group discussion held.
- V. Report on the problems solved through case studies.
- VI. Report on social awareness camps (organized for social and environmental prevention).
- VII. Report on student chapter activities of professional bodies like ISTE, IE (India), CSI etc.

H. PA is not a descriptive course to be taught in the classroom by a particular teacher.

Various activities involved in the achievement of objectives of this course should be distributed to a number of teachers so that the talent and creativity of a group of teacher’s benefit the treatment of the course content.

These activities should preferably be conducted in the English language to maintain continuity and provide reinforcement to skill development.

Small groups shall be formed like in tutorials, group discussion, case studies, seminar, project methods, roll play and simulation to make the development of personality affective.

Treatment of PA demands special efforts, attention, close co-operation and creative instinct on the part of teachers of the department concerned. Since this course is totally learner centered, many of the activities planned for this course shall come out from the useful interaction of student, among themselves and with the teachers. The guide teacher/s shall best act as a facilitator of these creative hunts/ exercises, which unfold many of the hidden talents of the students or bring out a greater amount of confidence in them, to execute the certain activity.