

## Apparel Engineering Level-1, Term-1

Sl. No.	Subject Code	Name of subject	Contact Hour/Week	Credit	Mark Distribution*		
					C	F	Total
1	MS 101	Mathematics-I	3	3	28	72	100
2	PHY 101	Physics - I	3	3	28	72	100
3	PHY 102	Physics - I (Practical)	2	1	80	20	100
4	CHEM 101	Chemistry - I	3	3	28	72	100
5	CHEM 102	Chemistry - I (Practical)	2	1	80	20	100
6	WPE 101	Polymer Science & Engineering	3	3	28	72	100
7	IPE 102	Machine Shop Practice (Practical)	2	1	80	20	100
8	MDM 101	Computer Programming	3	3	28	72	100
9	MDM 102	Computer Programming (Practical)	2	1	80	20	100
<b>Total :</b>			<b>23</b>	<b>19</b>	<b>460</b>	<b>440</b>	<b>900</b>

## ~~MS~~ 101 : Mathematics - I

Credit	Hour / Week	Total Hour
3	3	45

### Course Outline :

- Differential Calculus:** Functions, Limit, Continuity, Differentiability, Derivatives, Tangent and normal, Expansion of function ; Rolle's theorem, Mean value theorem, Taylor's series, Maclaurin's series, L'Hospital's rule, Convergence and divergence, Extrrema of functions of single variable, Functions of several variables, Partial Derivatives, Chain rule, Euler's theorem.
- Integral Calculus :** Indefinite integrals, Different methods of integration ( substitution, Integration by parts, Partial fraction), Standard integrals, Integration by successive reduction, Definite integrals and its properties, Walli's formula, improper integrals, Gamma and Beta functions, Arc length of plane curves, Area enclosed by plane curves, volume of solids of revolution.
- Linear Algebra :** Matrix, Determinant, Inverse matrix, System of linear equations, Consistent and inconsistent system, Elementary operations, Solution of a system of linear equations, Gaussian elimination method, Cramer's rule, Matrix inversion method, Triangular Echelon and canonical form of matrix, Rank of matrix, Test of consistency of a system of linear equation using rank of matrix.
- Coordinate Geometry :** Two dimensional coordinate system, Transformation of coordinates, General equation of second

degree in two variables , Conic Section, Identification of conics.

Three dimensional coordinate system , Direction cosines and ratios , Straight lines, Planes, Conicoids ( paraboloid, Ellipsoid, Hyperboloid).

## PHY 101: Physics - I

Credit	Hour / Week	Total Hour
3	3	45

### A. Mechanics:

**Fluid Mechanics:** Fluid, Rate of flow, Uniform motion, Non uniform motions, Steady motion, Unsteady motion, Streamline motion, Turbulent motion, Equation of continuity, Bernoulli's equation, Speed of efflux : Torricelli's theorem, Venturimeter.

**Viscosity:** Viscosity, Newton's law of viscous flow - coefficient of viscosity, Critical velocity, Poiseuille's equation, Corrections of Poiseuille's equation, Determination of coefficient of viscosity of a liquid by the capillary flow method.

**Surface tension:** Molecular forces of cohesion & adhesion, Molecular range : sphere of influence, Surface tension, Surface tension & free energy of a surface, Excess pressure across a curved film or membrane, Capillarity & the angle of contact, Capillary rise: determination of surface tension, Determination of surface tension of water.

**Elasticity:** Elasticity, Hooke's law, Rigid body, Perfect elastic body, Plastic body, Elastic limit, Breaking weight and breaking stress, Different types of elasticity, Poisson's ratio, Shear is equivalent to compression and extension, Equivalence of a shearing stress to an equal tensile & an equal compressive stress at right angles to one another, Relations among the elastic constants, Work done in a strain, Deformation by bending, Bending moment.

**Dynamics of circular motion:** Moment of Inertia, Radius of Gyration, Theorem of perpendicular axes, Theorem of parallel axes,

Moment of Inertia of a uniform circular disc, Moment of Inertia of a hollow cylinder, Moment of Inertia of a solid sphere, Moment of Inertia of a Flywheel.

## B. Optics:

**Interference:** Wave front, Huygen's principle, Interpretation of law reflection and refraction by Huygen's principle, Interference, Young's experiment, Determination of wave length of light by Fresnel's Biprism, Newton's ring, Colours of thin films.

**Diffraction:** Diffraction, Fresnel & Fraunhofer diffraction, Diffraction grating and its use, Resolving power of a grating, Dispersive power of a grating, Half period zone, Zone plate, Difference between zone plate & convex lens, X-ray diffraction, Bragg's law.

**Polarization:** Polarization, Polarization by reflection, Brewster's law; Double refraction, Nicol prism, Malus law, Specific rotation, Laurent's half shade polarimeter.

## AS 102: Physics - I (Practical)

Credit	Hour / Week	Total Hour
1	2	30

### A. General Physics:

Determination of "g" by compound pendulum.

Determination of moment of inertia of a flywheel.

Determination of Young's modulus of the material of a wire by Vernier method.

Determination of Young's modulus of the material of a wire by Searle's method.

Determination of the rigidity modulus of the material of a wire by oscillation or dynamical method.

Determination of surface tension of water by capillary tube.

Determination of the density of water of various temperatures by specific gravity-bottle.

Determination of the co-efficient of viscosity of a liquid by its flow through a capillary tube.

Determination of surface tension of mercury and the angle of contact by Quincke's method.

Determination of Young's modulus, rigidity modulus and Poisson's ratio of a short wire by Searle's dynamic method.

## **B. Optics:**

Determination of the focal length of a convex lens by conjugate foci method with the help of an optical bench.

Determination of the focal length of a convex lens by displacement method.

Determination of the refractive index of a liquid by using plane mirror and convex lens.

Determination of the refractive index of the material of a prism by spectrometer.

Determination of radius of curvature of a lens by Newton's rings.

Determination of wavelength of sodium light by means of Fresnel's bi-prism.

Determination of wavelength of light from a discharge tube by diffraction grating.

Determination of specific rotation of the plane of polarization in sugar solution using a polarimeter.

## **CHEM 101 : Chemistry - I**

Credit	Hour / Week	Total Hour
3	3	45

**Periodicity of the elements:** Mendeleev's periodic law and periodic table, Distribution of electron in the atoms of elements. Pauli exclusion principle, Aufbau principle, Heisenberg uncertainty principle, Hund's rule, writing electron configuration using the periodic table. Some periodic properties - such as Atomic and Ionic radii, Ionization potential, Electron affinity.

**Chemical bonding:** Electronic theory of chemical bond, Nature of covalent bond. Fajan's rule, Valence bond theory (VBT), Molecular Orbital theory (MOT), Bond order or bond multiplicity.

**Complex Compounds:** Types of ligands, Sidgwick theory, Werner theory, Crystal field theory, structure, isomerism and applications.

**Acid and Bases:** Various concept of acid and bases, Neutralization, Reaction, Strength of acid and bases, Hard and soft acid and bases. Acid bases properties of oxides, hydroxide and salt. Effect of structure on acid bases properties.

**Analytical analysis:** Instrumental methods and their classification, Advantage of Instrumental method & Chemical method, Limitations of instrumental and chemical method, Sampling. Precision and accuracy, mean and median, types of errors, Significant figure convention.

### **Physical Chemistry**

**Theory of dilute solution:- Collegative properties**

- i) Lowering of vapor pressure
- ii) Elevation of boiling point
- iii) Depression of Freezing point
- iv) Osmosis and osmotic Pressure, Deduction of their formulae and mol. wt. from Raoult's law and their experimental determination.

**Chemical Equilibrium:** Law of mass action, Equilibrium constant, Application of law of mass action to some chemical reaction, Heterogeneous equilibrium, Le-chatelier principle and its application to industrial reactions.

**Chemical Kinetics:** Rate of reaction, order and molecularity, Zero order reaction, 1st and 2nd order reaction with its mathematical formulation, Determination of order of reaction, Effect of temperature on rate of reaction. Theories of chemical reaction rate, Activation Energy, Activation complex etc. Homogeneous and heterogeneous catalysis, Acid-base catalysis, Enzyme catalysis, catalysis retardation and poisoning.

**Colloids and Colloidal solution:** Classification, Preparation and purification, Properties, Protective action and application of colloids. Emulsion, Types of emulsion, Role of emulsion.

**Photochemistry:** Laws of photochemistry, Quantum yield, Decomposition of hydrogen halide, photosensitized reaction, Fluorescence and phosphorescence, Luminescence and Chemiluminescence's.

### **CHEM 102: Chemistry - I (Practical)**

Credit	Hour / Week	Total Hour
1	2	30

Qualitative analysis of inorganic mixtures containing not less than three radicals including insoluble and interfering radicals. Analysis include the following:

Dry test for acid radicals ( $\text{CO}_3^{-2}$ ,  $\text{SO}_4^{-2}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$  etc).

Dry test for basic radical.

Preparation of stock solution & wet test for acid radicals ( $\text{CO}_3^{-2}$ ,  $\text{SO}_4^{-2}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$  )

Separation of group I, II, IIIA, IIIB, IV, V.

Analysis of group I (Pb, Ag, Hg).

Analysis of group II (Pb, Cu, Cd, Hg, Sb, Sn).

Analysis of group IIIA (Al, Fe, Cr).

Analysis of group IIIB (Co, Ni, Zn, Mn).

Analysis of group IV (Ca, Ba, Sr).

Analysis of group V (Mg, Na, K,  $\text{NH}_4^+$ ).

### **Volumetric Analysis:**

Preparation of 1M. HCl and standardization.

Preparation of 1M. NaOH and standardization.

Conversion of 98%  $\text{H}_2\text{SO}_4$  or 37% HCl into suitable concentration.

Preparation of 1M.  $\text{H}_2\text{SO}_4$  & standardization.

Preparation of 1M.  $\text{CH}_3\text{COOH}$  & standardization.

Preparation of 1M. KOH & standardization.

### **Inorganic preparation:**

Preparation of Chrome Alum.

Preparation of Ferrous Ammonium Sulphate.

Preparation of Potassium dichromate.

Preparation of Potassium Permanganate.

Variation of PH of different solution (Acidic, Basic, Neutral)

## **WPE 101: Polymer Science and Engineering**

Credit	Hour / Week	Total Hour
3	3	45

Introduction and historical development of polymer chemistry; Basic concept of polymer science (Terms, definitions and scope); Classification of polymers and their description (Linear, branched, cross-linked, homo-polymers, co-polymers etc.); Raw materials (sources and their derivatives).

Synthesis of Polymers (Mechanism of polymerization, Methods of polymerization); Examples of commonly used fiber forming polymers, etc.

Types of molecular weights (number average molecular weight, weight average molecular weight), distribution and measurements of molecular weights and study of molecular weight dependent properties (end-groups, viscosity etc.).

Chemical and geometrical structure of polymer molecule (crystallization and melting of polymers, amorphous state-rheology, glass transition temperature, crosslinking, stereochemistry, transition, entropy elasticity etc.).

Properties of polymers (mechanical, thermal, chemical, electrical, degradability, etc.).

Study of commonly used fiber forming polymeric materials (Nylon, PET etc.)

Bio Polymer, Liquid Crystalline Polymer, Depolymerization, Polymer recycling.

## IPE 102: Machine Shop Practice (Practical)

Credit	Hour / Week	Total Hour
1	2	30

Identification and use of hand tools and measuring instruments, reamers, taps and dies, bench vice and carpentry tools, makings of models.

Identification, use and practices on Lathe, Drill, Grinder, Shaper, Planner, Circular saw and milling machine.

Sheet metal work-Cutting of sheet material to make some useful objects.

Metal joining processes-soldering, brazing, riveting, gas welding and electric arc welding.

Heat treatment of steel such as annealing, normalizing, quenching, tempering and surface hardening, sand moulds, core molding, pattern for casting, sand casting

Gear Cutting, Thread Cutting

## **MDM 101: Computer Programming**

Credit	Hour / Week	Total Hour
3	3	45

Basic programming concepts and notations; Problem analysis, algorithm, flow chart, debugging, coding and documentation; Overview of C, variables, data types, constants, operators, expressions, control structures; Functions and program structures: parameter passing conventions, scope rules and storage classes, recursion; Header files; Preprocessor; Pointers and arrays; Strings; Multidimensional array; User defined data types: structures, unions, enumerations; Input and Output: standard input and output, formatted input and output, file access; Variable length argument list; Command line parameters; Error Handling; Graphics; Linking; Library functions.

Introduction to Object Oriented Programming (OOP); Advantages of OOP over structured programming; Concepts and Techniques of OOP

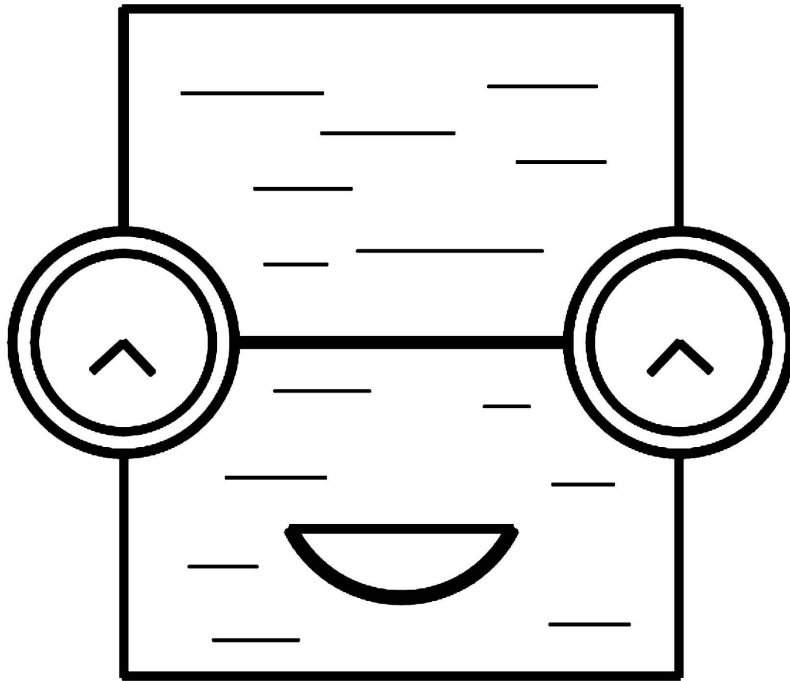
## **MDM 102: Computer Programming (Practical)**

Credit	Hour / Week	Total Hour
1	2	30

Writing of simple C programs; Usage of C variables, data types and constants; Write C program using different operators; Usage of C decision control statements and conditional operators; Usage of C loop control statements; Writing C programs using library functions

and user-defined functions; Usage of recursion to call a function itself; Basic usages of pointers and arrays; Writing C programs using user-defined data types; Exception handling of C programs; Usages of C graphics to develop a game software.

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