APPLIED SCIENCE

	L	T	P
HRS/Week	5	-	-

RATIONALE

The Subject deals with basic concepts. Principles and application of physics and chemistry as applied to Aeronautical and Aircraft Maintenance. These principles will be helpful in understanding technology subjects.

DETAILED CONTENTS

1. **Units and dimensions**   8Hrs.

    Fundamentals and derived units in S.I.System. Dimensions of physical quantities. Principle of homogeneity. Dimensional equations. Application of dimensional analysis:
    a) Checking the correctness of physical equations.
    b) Derivation of simple physical relations, and
    c) Conversion of units. Limitations of dimensional analysis

2. **Force and motions**   10Hrs.

    Scalar and vector quantities, force and its unit, composition and resolution of forces (composition by parallelogram law and by the method of components). Newton's law of motion under the action of forces, motion on horizontal plane and inclined plance.Parabolic motion, horizontal projection and projection at an angle (problems on time of flight. Horizontal range and maximum horizontal range) Central forces, circular motion of bodies. Angular velocity, Uniform angular acceleration. Relationship between linear and angular velocity. Centripetal and centrifugal forces, Centripetal acceleration and centrifugal forces, centripetal acceleration. Bend of a cyclist. Law of conservation of momentum and its applications.

3. **Work, Power and Energy**   8Hrs.

    Work and its units. Work done on bodies moving on horizontal and inclined planes(consider frictional forces also) concept of power and its unit. Calculation of power (Simple cases). Concept of kinetic energy and potential energy. Expressions of freely falling bodies. Principle of conservation of energy.

4. **Rotational Motion**   8 Hrs.

    Concept of rotational inertia(mass moment of inertia) Analogy between the parameters in rotational and translational motion (such as displacement, velocity, acceleration, mass force, work, K.E., Power and momentum). Torque and angular momentum and their inter relationship. Rolling as a combination of rotational and translational motion.

5. **Heat**   12 Hrs.

    5.I Temperature and its measurement

    Concept of heat and temperature on the basis of K.E., of molecules. Units of heat. Basic principles of measurements of temperature, (Thermo couple, thermometer, bimetallic and resistance) Ranges of these thermometers. Criteria for the selection of a thermometer.

5.2 Expansion of solids and fluids

Coefficient of linear, surface and cubical expansions and relations amongst them. Thermal stresses (Qualitative only)

5.3 Heat Transfer

Three modes of transfer of heat. Coefficient of thermal conductivity. Conduction through compound media (Series and parallel for two material only) Radiation. Characteristics of heat radiation. Prevost's theory of heat exchange. Black body radiations. Emissivity and abosorptivity. Kirchhoff's law. Stefan's law of radiation.

6. **Metallurgy**

General principles of extracting metals from their ores. Metallurgy of copper, aluminum and iron with their properties and uses. Manufacture of steel by

a) Bessemer's process and

b) Open hearth process ferrous and non ferrous alloys

7. **Corrosion**   8 Hrs.

Its meaning, theories of corrosion, prevention of corrosion by various methods.

8. **Fuels and their classification**   7 Hrs.

Proximate and ultimate analysis. Estimation of moisture. Volatile, ash, fixed carbon and calorific value determination of calorific value. Determination of calorific value by Bomb calorimeter.

9. **Lubrication**   8 Hrs.

Principles to lubrication. Characteristics of lubrication such as viscosity, oiliness, acid value and emulsification flash point and fire point, pour point, saponification, types of lubricants, their properties and uses, liquid (mobile oil), semi solid (grease) and solid types (Graphite)

10. **Paints and varnishes**   3 Hrs.

Drying oil, pigment, drier, thinner, painting technique, defects in painting.

COMMUNICATION SKILLS

	L	T	P
Hrs/Week	1	-	2

RATIONALE

Diploma holders are supposed to communicate verbally and in writer forms. Further technical report writing forms another essential requirement of these people. Keeping in view above requirements. This subject has been added to develop necessary competencies in written and oral communication. Efforts should be made to give practice of communication to the students.

DETAILED CONTENTS

Sr. No.	Theory	Time (Hrs.)	Practical	Time (Hrs.)
1.	One way and two way communication	1		
2.	Essentials of good Communication	1		
3.	Methods of Communication oral, Written and non-verbal	1	Practical session Oral communication by Means of seminars, debates And context.	
4.	Barriers to Communication	1		
5.	Techniques of Overcoming barriers	1		
6.	Concept of effective Communication	1		
7.	All form of written Communication including drafting Of reports, notices, agenda notes, Business correspondence, Preparation of summaries and précis, Telegrams, circular, representations, Press release and advertisements	3	Practice of writing Official business and personnel letters on each of the items give in section 7	8
8.	Telephonic communications	1	Practice of handling Telephone Communication	3

9.	Essentials of Technical Report writing. Defect Reporting. Analysis and how to Make suggestions	2	Practice of Technical report writing	5
10.	Writing personnel resume And application for a job	2	Practice of writing personal bio-data and Writing application for a job	4
11.	Techniques of conducting Group discussions		Practice session on group discussion	6
12.	International phonetics Of alphabets and numerals	1		

ENGINNERING DRAWING-I

	L	T	P
Hrs/week	-	-	8

RATIONALE

Engineering drawing known as the language of engineers is a widely used means of communication among the designers, engineers, technicians, draftsmen and craftmen in the industry. The translation of ideas into practice without the use of this graphic language is really beyond imagination. The diploma holder is required to read and interpret the designs and drawings, provided to him for actual execution of the job. This courses and other allied subjects.

DETAILED CONTENTS

Note: IS & Joint service specification (JSS) should be followed.

1. Free hand sketching
   a) Introducing drawing by free hand sketching   1 Sheet
   b) Different types of lines and material breaks.   6 Hrs.
2. Lettering technique and practice
   a) Free hand lettering and numerals in   1 Sheet
      3, 5.8 and 12mm series vertical and   12 Hrs.
      Inclined at 75
   b) Instrumental single stroke lettering in 20 mm.
3. Principles of projection (third angle projection)
   a) Principles of orthographic projections.   1 Sheet
   b) Three views of a given object.   12 Hrs.
   c) six views of a given object   1 Sheet
                                                          12 Hrs.
   d) Some shapes of inclined surfaces   1 Sheet
   e) Identification of surfaces from different objects. 12 Hrs.
   f) Introduction to 1st angle projection
4. Dimensioning technique and requirements of views
   a) Necessity of dimensioning   1 Sheet
   b) Methods and principles of dimensioning   8 Hrs.
   c) Requirement of views for complete dimensioning
5. Section
   a) Importance   1 Sheet
   b) Method of representing the section   12 Hrs.
   c) Conventional sections for various materials
   d) Classification of sections
   e) Conventions in sectioning

6. Pictorial/isometric views
    a) Pictorial view from two or three views   3 Sheet
    b) Isometric views of simple objects   36 Hrs.
    c) Exercise on missing views and lines

7. Elementary Working Drawings
    a) Scales   1 Sheet
                                                        8   Hrs.
    b) Working drawing by actual   1 Sheet
        measurement   10 Hrs.

BASIC PRINCIPLES OF APPLIED MECHANICS

	L	**T**	**P**
Hrs. /Week	4	-	2

RATIONALE

The subject "basic principles of applied mechanics " deals with basic concepts of mechinanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required to the students for further understanding of other allied subjects. The subjects enhances the method ability of the students.

DETAILES CONTENTS

1. Laws of forces   15 Hrs.

   Force and its effects, units and measurement of force. Characteristics of force vector representation, Bow's notation.

   Types of forces, action and reaction, tension, thrust and shear force. Force systems: coplanar and space forces. Free body diagrams.

   Resultant and components of forces, concept of equilibrium. Axioms in statics; parallelogram law of forces. Equilibrium of two forces, law of super-position and transmissibility of forces, Newton's third law, triangle of forces, different cases of concurrent, coplanar, two forces systems, extension of parallelogram law and triangle law to many forces acting at one point, polygon law of forces, method of resolution for finding the resultant, graphical methods, special case of three concurrent, coplanar forces lami's theorem.

2. Moments   10 Hrs

   Concepts of moment, varignon's theorem-statement only. Principle of moments-Application of moments to simple mechanism. Like parallel forces and unlike parallel forces, calculation of their resultant concept of couple, properties and effect. Moving a force parallel to its line of action.

   General cases of coplanar force system. General conditions of equilibrium of bodies under coplanar forces.

3. Friction   6 Hrs.

   Concept of friction, law of friction; limiting friction and coefficient of friction. Sliding friction and rolling friction.

4. Centre of Gravity   6 Hrs.

   Concept of gravity, gravitational force, centroid and centre of gravity. Centroid for regular laminas and centre of gravity for regular Solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies with portions removed.

5. Laws of Motion   8 Hrs.

   Concept of momentum, Newton's laws of motion, their application. Derivation of force equation from second law of motion. Numerical problems on second law of motion. Piles, lifts, bodies tied with string

Newton's third law of motion numerical problems, conservation of momentum, impulse and impulsive force (Definition only)

6. Simple Machines   6 Hrs.
    Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine, their relationship laws of machine . Simple machines (Lever, wheel and axle, pulleys, jacks with crabs only)

7. Stress and strains   6 Hrs.
    Concept of load, stresses and strains. Tensile compressive and shear stresses and strains. Tensile compressive and shear stresses and strains. Concept of Elsticity, Elastic limit and limit of proportionality. Hook's law. Young modulus of elasticity. Yield point, plastic stage. Strain hardening. Ultimate strength and breaking stress. Percentage elongation. Proof stress and working stress. Factor of safety shear modulus.

8. Moment of Inertia   8 Hrs.
    Concept of moment of inertia and second moment of area. Radius of gyration. Second moment of area of common geometrical sections: Rectangle, Triangle, Circle (without derivation). Second moment of area L,T and section modulus.

PRACTICAL EXERCISES

1. Tensile test on bars of mild steel and aluminum and finding stress, strain and young's modulus.
                                                                                 12 Hrs.
2. Shear test on specimen of two different metals.   8 Hrs.
3. Hardness test on metal and finding the brinell's,
    Rockwell's hardness.   8 Hrs.

GENERAL WORKSHOP PRACTICE-I

	L	T	P
Hrs./Week	1	-	2

RATIONALE

The Subject is gateway to the technological/industrial processes. The mental and manual abilities will be developed to handle engineering materials with hand tools with quality and safety consciousness. The elementary abilities developed in carpentry. Fitting machine welding sheet metal and electric shop will find applications in other semesters. The emphasis given on practical work will provide the students the primary experience of working in team, details of practical works carpentry shop 40 Hrs 1 introduction to hand tools.

DETAILS OF PRACTICAL WORKS

CARPENTRY SHOP   **40 Hrs.**
1. Introduction to hand tools (2 Hrs.)
2. Marking and sawing practice (8Hrs.)
3. Planning practice (6 Hrs.)
4. Chiseling practice (6 Hrs.)
5. Preparation of half lap joint (3 Hrs.)
6. Preparation of mortise and tenon joint (6 Hrs.)
7. Preparation of miter joint (3 Hrs.)
8. Preparation of dovetail joint and glued joint (3 Hrs.)
9. Practice of handling circular saw (3 Hrs.)

FITTING SHOP   **46 Hrs.**
1. Introduction to fitting tools (2 Hrs.)
2. Filling practice and production of flat surface and checking by straight edge (6 Hrs.)
3. Filling a dimensioned rectangular or square piece to an accuracy of +0.25mm (6Hrs.)
4. Chipping practice (6 Hrs.)
5. Hack sawing practice (6 Hrs.)
6. Drilling practice on soft metals (3Hrs.)
7. Practice of filling on nonferrous metals (4 Hrs.)
8. Tapping practice (6Hrs.)
9. Preparation of some utility job (10 Hrs.)

WELDING SHOP   **42 Hrs.**
1. Introduction of welding and its importance types of welding, materials that can be welded (2Hrs.)
2. Gas welding –theory (2Hrs.)
3. Practice in handling welding equipment (3 Hrs.)
4. Gas welding practice (6Hrs.)
5. Preparation of butt joint by gas welding (6 Hrs.)
6. Electric arc welding- theory (1 Hrs.)
7. Welding practice by arc welding (6 Hrs.)
8. Preparation of various types of joints by using arc welding (^ Hrs.)
9. Preparation of utility job (10 Hrs.)

COMPUTEFR APPLICATION-I

	L	T	P
Hrs./week	1	1	4

RATIONALE

Computers not only represent modern technology application but also are very important from the point of their usefulness to students during and after the course.

The level of knowledge in computers should be such that all students are able to use the machine, calculation, data application and text processing.

The second phase of the course is directed towards computer aided design and manufacturing techniques. Students should be able to carry out computer drafting of technical designs, retrieve old drawings for interpreting. They should also be able to store and retrieve information as regard tools, documents and inventory

Sr. No.	Theory	Time	Practical	Time
1.	Computer construction And connections	1	Connect and disconnect pc	2
2.	Disk operating system (DOS) Basics	1	Practice of commands	4
3.	DOS usage commands	2	Practice of DOS Commands	6
4.	Text processor Theory and commands	2	World star and world practice	10
5.	Use of spread sheet Basics and formula	2	Text processing command practice	10
6.	Statistics and Data base basics Database III	4	Practices Database III	14
7.	Knowledge of peripherals Mouse scanner printer	2	Practice on mouse	4
8.	Programming in Basic	2	Practice in programming Writing	10

ENGINNERING DRAWING-II

L   **T**   **P**

Hrs./Week -   -

DETAILED CONTENTS

1.   Detail and Assembly Drawing
    a)   Principle of detail and assembly drawings.
    b)   Practical exercise on drawing from detail to assembly
          or vice versa using wooden joints as example.

2.   Fasteners I
    a)   Conventional symbols for internal and external threads.
    b)   Nuts, bolts, studs, screws and their application
    c)   Practical Application

3.   Fasteners II (welded joint)
    a)   Various conventions and symbols of welded joint.
    b)   Practical application of welded joints say steel frames, windows, doors and furniture.

4.   Rivets and Riveted joints
    a)   Types of rivet heads
    b)   Types of riveted joints

5.   Keys and cotters
    a)   Various types of keys and cotters and their practical application.

6.   Joints for Rods
    a)   Gib and cotter joint
    b)   Spigot and socket joint

7.   Couplings
    a)   Flange coupling
    b)   Flexible coupling

8.   Symbols and convention in aeronautical industry.

9.   Limits, fits and tolerances;
    a)   Interchangeability
    b)   Tolerance of parts, tolerance zone, grades of tolerances.
    c)   Fits, types of fits-clearance, interference and transition.
    d)   Go, No, Go Limits

10.   Surface finish and symbols.