

4.1 GENERIC SKILLS AND ENTREPRENEURSHIP DEVELOPMENT

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RATIONALE

Generic Skills and Entrepreneurship Development is one of the courses from “Human Science” subject area. Generic skills have emerged as an important component of employability skills, which enable an individual to become and remain employable over lifetime and to lead happy and prosperous life. Entrepreneurship development aim at developing conceptual understanding for setting-up one’s own business venture/enterprise. This aspect of Human Resource Development has become equally important in the era, when wage employment prospects have become meager.

Both the subject areas are supplementary to each other and soft skills are required to be developed in diploma passouts for enhancing their employability and self confidence.

DETAILED CONTENTS

1. Introduction to Generic Skills (4 hrs)
 - 1.1 Importance of Generic Skill Development (GSD)
 - 1.2 Global and Local Scenario of GSD
 - 1.3 Life Long Learning (LLL) and associated importance of GSD.
2. Managing Self (8 hrs)
 - 2.1 Knowing Self for Self Development
 - Self-concept, personality, traits, multiple intelligence such as language intelligence, numerical intelligence, psychological intelligence etc.
 - 2.2 Managing Self - Physical
 - Personal grooming, Health, Hygiene, Time Management
 - 2.3 Managing Self – Intellectual development
 - Information Search: Sources of information
 - Listening: Effective Listening
 - Speaking: Effective Oral Communication
 - Reading: Purpose of reading, different styles of reading, techniques of systematic reading; Note Taking: Importance and techniques of note taking
 - Writing: Correspondence - personal and business

Note: Practical sessions should be coupled with teaching of effective listening, speaking, reading and writing.

- 2.4 Managing Self – Psychological
- Stress, Emotions, Anxiety-concepts and significance (Exercises related to stress management)
 - Techniques to manage the above
3. Managing in Team (6 hrs)
- 3.1 Team - definition, hierarchy, team dynamics
- 3.2 Team related skills- sympathy, empathy, co-operation, concern, lead and negotiate, work well with people from culturally diverse background
- 3.3 Communication in group - conversation and listening skills
4. Task Management (3 hrs)
- 4.1 Task Initiation, Task Planning, Task execution, Task close out
- 4.2 Exercises/case studies on task planning towards development of skills for task management
5. Problem Solving (5 hrs)
- 5.1 Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving
- 5.2 Different approaches for problem solving.
- 5.3 Steps followed in problem solving.
- 5.4 Exercises/case studies on problem solving.
6. Entrepreneurship
- 6.1 Introduction (22 hrs)
- Concept/Meaning and its need
 - Competencies/qualities of an entrepreneur
 - Entrepreneurial Support System e.g., District Industry Centres (DICs), Commercial Banks, State Financial Corporations, Small Industries Service Institute (SISIs), Small Industries Development Bank of India (SIDBI), National Bank of Agriculture and Rural Development (NABARD), National Small Industries Corporation (NSIC) and other relevant institutions/organizations at State/National level.

- 6.2 Market Survey and Opportunity Identification (Business Planning)
- How to start a small scale industry
 - Procedures for registration of small-scale industry
 - List of items reserved for exclusive manufacture in small-scale industry
 - Assessment of demand and supply in potential areas of growth.
 - Understanding business opportunity
 - Considerations in product selection
 - Data collection for setting up small ventures.
- 6.3 Project Report Preparation
- Preliminary Project Report
 - Techno-Economic Feasibility Report
 - Exercises on Preparation of Project Report in a group of 3-4 students

INSTRUCTIONAL STRATEGY

This subject will require a blend of different teaching and learning methods beginning with lecture method. Some of the topics may be taught using question answer, assignment, case studies or seminar. In addition, expert lectures may be arranged from within the institution or from management organizations. Conceptual understanding of Entrepreneurship, inputs by teachers and outside experts will expose the students so as to facilitate in starting ones own business venture/enterprise. The teacher will discuss success stories and case studies with students, which in turn, will develop managerial qualities in the students. There may be guest lectures by successful diploma holding entrepreneurs and field visits also. The students may also be provided relevant text material and handouts.

RECOMMENDED BOOKS

1. Soft Skills for Interpersonal Communication by S. Balasubramanian Published by Orient BlackSwan, New Delhi.
2. Generic skill Development Manual, MSBTE, Mumbai.
3. Lifelong learning, Policy Brief (www.oecd.org)
4. Lifelong learning in Global Knowledge Economy, Challenge for Developing Countries – World Bank Publication
5. Towards Knowledge Society, UNESCO Paris Publication
6. Your Personal Pinnacle of Success by DD Sharma, Sultan Chand and Sons, New Delhi
7. Human Learning, Ormrod
8. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
9. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
10. Handbook of Small Scale Industry by PM Bhandari

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1.	4	5
2.	8	15
3.	6	10
4.	3	10
5.	5	10
6.	22	50
Total	48	100

4.2 AUTO ENGINE - II

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RATIONALE

This subject is in continuation to Auto Engine –I. It covers various fuels for automobiles and testing of engines. It also includes performance of engine. Brief description of emission control has also been included in this subject.

DETAILED CONTENTS

1. Prospective Gaseous Fuels (10 hrs)
 - Compressed natural gas,
 - Liquefied petroleum gas
 - Bio-gas/Bio-diesel,
 - Hydrogen
 - Recommendations to protect the environment in future.

2. Engine Exhaust and sources (10 hrs)
 - Exhaust gas constituents from S.I and C.I. engines
 - Emission norms and regulation in India
 - Factors responsible for exhaust - composition
 - Combustion temperature, spark timing or injection timing
 - CO emission and airfuel ratio
 - HC formation in SI and CI engines
 - Formation of oxides of Nitrogen and causes
 - Other problems

3. Emission Control (10 hrs)
 - Emission Control by Exhaust gas after treatment, Catalytic converters
 - Types of catalytic converters
 - Positive crankcase ventilation
 - Evaporative loss control
 - Particulate traps for diesel engine/soot formation
 - Exhaust gas recirculation
 - Ignition timing
 - Emission control by modifying design

4. Auto engines testing (14 hrs)
- Determination of indicated power, brake power ,mechanical efficiency volumetric efficiency, thermal efficiency, relative efficiency, Mean effective pressure, Specific fuel consumption,
 - Heat balance sheets
 - Morse test
 - Numericals based on engine testing.
5. Performance of engines (10 hrs)
- Effect on engine performance due to atmospheric temperature and pressure, compression ratio, engine speed, dirt, desert, altitude and their remedial measures.
 - Performance curves.
6. Combustion of Fuels (10 hrs.)
- Types of fuels
 - Characteristics of fuels
 - Combustion reactions
 - Amount of oxygen required for complete combustion
 - Stoichimetric ratio
 - Air fuel ratio
 - Analysis of products of combustion
 - Conversion of volumetric analysis into gravimetric analysis

LIST OF PRACTICALS

1. Performance of Morse test
2. Study of exhaust analyzer
3. Study of crankcase ventilation
4. Exhaust gas recirculation test
5. Dismantling and assembly of direct injection diesel engine
6. Dismantling and assembly of indirect injection diesel engine.

INSTRUCTIONAL STRATEGY

The teacher should lay emphasis in making the students conversant with the principles and practices related to testing of engines. Audio visual aids should be used during teaching. Demonstrations should be made in automobile shop to explain the concepts.

RECOMMENDED BOOKS

- 1 Automobile Engineering Vol. II by Dr. Kirpal Singh., Standard Publishers, Delhi
- 2 Automobile Engineering by RB Gupta, Satya Parkashan, New Delhi
- 3 IC Engines by ML Mathur and Sharma, Dhanpat Rai and Sons, Delhi
- 4 Automobile Engineer by Dr. Kirpal Singh.(in Hindi), Standard Publishers, Delhi
- 5 Automotive Engine by Srinivasan, TMH, Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	10	16
2	10	16
3	10	16
4	14	20
5	10	16
6	10	16
Total	64	100

4.3 ELEMENTS OF MECHANICAL ENGINEERING

L T P
4 - 2

RATIONALE

Diploma holders in this course are required to analyze reasons for failure of different components and select the required material for different applications. For this purpose, it is essential to teach them concepts, principles, applications and practices covering stress, strain, bending moment, shearing force, shafts, columns and springs. It is expected that efforts will be made to provide appropriate learning experiences in the use of basic principles in the solution of applied problems to develop the required competencies.

DETAILED CONTENTS

1. Stresses and Strains (08 hrs)
 - 1.1. Concept of load, stresses and strain
 - 1.2. Tensile compressive and shear stresses and strains
 - 1.3. Concept of Elasticity, Elastic limit and limit of proportionality.
 - 1.3.1. Hook's Law
 - 1.3.2. Young Modulus of elasticity
 - 1.3.3. Nominal stress
 - 1.3.4. Yield point, plastic stage
 - 1.3.5. Ultimate strength and breaking stress
 - 1.3.6. Percentage elongation
 - 1.3.7. Proof stress and working stress
 - 1.3.8. Factor of safety
 - 1.3.9. Shear modulus
 - 1.4. Longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation of these formulae not required)
 - 1.5. Concept of moment of inertia, second moment of area, radius of gyration and section modulus.
2. Bending Moment and Shearing Force (10 hrs)
 - 2.1. Concept of beam and form of loading
 - 2.2. Concept of end supports-Roller, hinged and fixed

- 2.3 Concept of bending moment and shearing force
- 2.4 B.M. and S.F. Diagram for cantilever and simply supported beams with and without overhang subjected to concentrated and U.D.L.

- 3. Bending stresses (06 hrs)
 - 3.1 Concept of Bending stresses
 - 3.2. Theory of simple bending
 - 3.3. Use of the equation $f/y = M/I = E/R$
 - 3.4. Concept of moment of resistance
 - 3.5. Bending stress diagram
 - 3.6. Calculation of maximum bending stress in beams of rectangular, circular, and T section.
 - 3.7 Permissible bending stress Section modulus for rectangular, circular and symmetrical I section.

- 4 Columns (08 hrs)
 - 4.1. Concept of column, modes of failure
 - 4.2. Types of columns
 - 4.3. Buckling load, crushing load
 - 4.4. Slenderness ratio
 - 4.5. Factors effecting strength of a column
 - 4.6 End restraints
 - 4.7 Effective length
 - 4.8 Strength of column by Euler Formula without derivation
 - 4.9. Rankine Gourdan formula (without derivation)

- 5. Miscellaneous (06 hrs)
 - 5.1. Stress concentration, Definition, Factors affecting stress concentration
 - 5.2. Fatigue: -Definition, SN Curve, Factors affecting fatigue
 - 5.3. Creep: - Definition, creep curves; effect of stress and temp. stress relation

- 6 Torsion (06 hrs)
- 6.1. Concept of torsion-difference between torque and torsion
 - 6.2. Use of torque equation for circular shaft
 - 6.3. Comparison between solid and hollow shaft with regard to their strength and Weight
 - 6.4. Power transmitted by shaft
 - 6.5. Concept of mean and maximum torque
7. Springs (08 hrs)
- 7.1. Closed coil helical springs subjected to axial load and impact load
 - 7.2. Stress deformation
 - 7.3. Stiffness and angle of twist and strain energy
 - 7.4. Proof resilience
 - 7.5. Laminated spring (semi elliptical type only)
 - 7.6. Determination of number of plates
8. Hydraulics (04 hrs)
- 8.1. Fluid properties, Definition of Fluids, Properties of fluids with their units
 - 8.2. Static Pressure: Definition and concept, Pascal's law, pressure head
- 9 Hydraulic Pumps (04 hrs)
- 9.1. Introduction to centrifugal, reciprocating and gear pumps
10. Hydraulic Devices (04 hrs)
- 10.1. Description and application of Hydraulic jack and hydraulic coupling

LIST OF PRACTICALS

1. Tensile test on bars of mild steel and aluminium.
2. Bending tests on a steel bar or a wooden beam.
3. Impact test on metals
 - a) Izod test

- b) Charpy test
4. Torsion test on specimens of different metals for determining modulus of rigidity.
 5. To determine the stiffness of a helical spring and to plot a graph between load and extension.
 6. Hardness test on different metals.
 - 7 To conduct study of centrifugal pump
 - 8 To conduct study of a hydraulic screw jack

INSTRUCTIONAL STRATEGY

1. Expose the students to real life problems.
2. Plan assignments so as to promote problem solving abilities and develop continued learning skills.

RECOMMENDED BOOKS

1. SOM by Birinder Singh,; Katson Publishing House, New Delhi.
2. SOM by RS Khurmi; S.Chand & Co; New Delhi
3. Elements of SOM by D.R. Malhotra & H.C.Gupta; Satya Prakashan, New Delhi.
4. A textbook of Hydraulics and Hydraulic machines by R.S. Khurmi, S. Chand & Co., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	08	12
2	10	12
3	06	10
4	08	12
5	06	10
6	06	12
7	08	12
8	04	10
9	04	05
10	04	05
Total	64	100

4.4 CHASSIS, BODY AND TRANSMISSION-II

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RATIONALE

Chassis, body and transmission form the core of automobile engineering. The subject aims at imparting knowledge and skills regarding chassis and body viz, clutch system, transmission system, drive system, steering mechanism, suspension system, braking system and safety of vehicles

DETAILED CONTENTS

1. Suspension System (10 hrs)
Function, types- independent, rigid axle. Springs – functions, construction materials and types (coil spring, leaf spring and torsion bar) sprung and unsprung weight, characteristics of springs, spring eye, bushes, variable rate spring, helper leafs, leaf sections, camber grading and nippling spring seats, rubber pads, pressure blocks, spring cover, interleaf inserters. Function and construction of hydraulic dampers (shock absorbers). Pneumatic suspension system – lay out and working. Function and Construction of hydraulic damper (shock absorber). Diagnosis of common faults and their rectifications
2. Wheel and Tyres (08 hrs)
Wheels – types, constructional detail, material used for wheels. Types-classification of tyres. Construction of pneumatic tyres, composition of covers, tread breaker, bead and casing, comparison of cross-ply and radial-ply tyres. Causes of excessive tyre wear. Tyre care and maintenance. Static and dynamic balance. Tubeless tyres, Run flat tyres, retreading of tyers.
3. Braking System (08 hrs)
Purpose of brakes, layout of braking system, components, Types of brakes- mechanical, hydraulic, power. Principle of hydraulic brakes, braking action, master cylinder, wheel cylinder, leading and trailing shoes, self adjusting brakes, self applying and self releasing action, anti-skid devices, pedal travel, brake enclosures, heat generation and opening temperature, Drum brakes-Construction & Working, Disc. Brakes-Construction and Working. Common faults and their rectification.

4. Power Steering (06 hrs)
- Power steering - necessity, types, Construction features and working of hydraulic and electronic power steering system, Four wheel steering, Common steering system troubles and remedies.
- 5 Power Brakes (6 hrs)
- Air, air-hydraulic, hydro-vac brakes-their construction components and working details. Brake fluid and its characteristics, brake liner, hand brake, Antilock brake systems. Brake test, common faults and their rectification.
- 6 Automotive Safety Systems (4 hrs)
- Preventive design, designing for minimum injury in accident, seat belts, air bags, electronic vehicle stability and occupant protection systems, pedestrian protection.
7. Miscellaneous (6 hrs)
- History, leading manufacturers of automobiles, their market share, recent developments in automobile industry and automotive components industry in India. Specifications of various 2-wheelers and 4-wheelers, milestones in the development of automobiles

LIST OF PRACTICALS

1. Study and Sketch of suspension system - coil spring, leaf spring, torsion bar.
2. Servicing of shock absorber.
3. Servicing/Overhauling of mechanical & hydraulic brakes, adjustment and bleeding of brakes.
4. Study and Sketch of Power brakes.
5. Wheel Balancing- Static and Dynamic.
6. Study of preventive designs for automotive safety systems

INSTRUCTIONAL STRATEGY

Teacher should make use of audio visual aids to show features of chassis, body and transmission. Demonstration should be made in the automobile shop to explain various aspects of chassis, body and transmission.

RECOMMENDED BOOKS

1. Automobile Engineering, Vol. I – II by Dr. Kirpal Singh, Standard Publishers, Delhi
2. Automobile Engineering by GBS Narang, Khanna Publishers, Delhi
3. Chassis, Body and Transmission by Vijay Singh & Raj Kumar, Ishan Publications, Jalandhar.
4. Chassis, Body and Transmission-II by G.S.Aulakh, Eagle Prakashan, Jalandhar.
5. Automobile Engineering by R.B. Gupta, Satya Prakashan, New Delhi.
6. Chassis, Body and Transmission by Ishan's Publications, Jalandhar.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	10	20
2	8	16
3	8	16
4	6	12
5	6	14
6	4	10
7	6	12
Total	48	100

4.5 AUTOMOTIVE MATERIALS

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RATIONALE

Materials play an important role in the manufacturing of automobiles and the equipment/tools used in repair of automobiles. Proper selection of materials adds to the life of machinery. A diploma holder must be conversant with the properties, uses, and availability of materials used in manufacturing of different types of vehicles to enable him to perform his functions confidently. The subject of Automotive Materials has been designed to cover the above aspects.

DETAILED CONTENTS

1. Properties of Materials (08 hrs)
 - Classification: Metals and non-metals, Ferrous and non-ferrous metals and their alloys
 - Names of common metals, their alloys and non-metals used in Automobile Industry
 - Properties of metals and alloys
 - Physical properties - Appearance, luster, colour, density and melting point
 - Mechanical Properties: Strength, stiffness, elasticity, plasticity, toughness, ductility, malleability, brittleness, hardness, fatigue and creep.
 - Thermal and electrical conductivity and corrosion resistance.
2. Ferrous Metals and Alloys (16 hrs)
 - Classification, composition and uses of cast iron and plain carbon steels. IS, BS and SAE Grades
 - Effect of alloying elements such as Aluminium, chromium, Nickel, Cobalt, Manganese, Molybdenum, tungsten, Vanadium, Silicon, Sulphur and Phosphorus.
 - Composition, properties, grades and uses of alloy steels such as High speed steel, Stainless steel, Silicon steel, Heat resistant steel, Spring steel
 - Heat Treatment: Iron-carbon diagram, objectives and practical aspects of heat treatment. Description and uses of principal heat treatment processes Annealing, Normalizing, Tempering, Hardening, Carburising, Nitriding

and Cyaniding and applications. Examples in heat treating automobile engineering components

3. Non-ferrous Metals and Alloys (10 hrs)

- Copper: Properties and uses
- Composition, properties and uses of copper alloys.
- Brass: Cartridge brass, Nickel silver.
- Bronze: Phosphor bronze, Al-bronze, Mn-bronze, and Gun metal.
- Properties and uses of Aluminium and their grades
- Composition, properties and uses of Al-alloys e.g., Duralumin, Yellow metal, Magnalium and Hindalium
- Properties and uses of alloys of lead, tin and magnesium.
- Bearing Metal: Requisite qualities. Composition, properties and uses of white metal bearing. Copper based bearing metals. Aluminium based bearing metals. Use of nylon/PTFE for bushes/bearings, bi-metallic and tri-metallic bushes

4. Identification and Examination of Metals and Alloys (2 hrs)

Identification tests - Appearance, sound, filing, weight, magnetic, spark, bend and microstructure.

5. Other Important Materials (08 hrs)

- Plastics: Definition, classification of plastics, fibre glass, reinforced plastics. Major applications of various plastics with specific mention of their uses and grades
- Heat insulating materials: Properties and uses of asbestos, glass wool, thermocole, cork, mica.
- Sound insulating materials: Cork, fibre boards.
- Fabrication materials: Wood, plywood, Rubber - natural and synthetic, Glasses – plate glass, toughened glass, safety glass.
- Insulating materials: Asbestos, mica
- Electrical insulating materials, properties and uses of china clay, leather bakelite, ebonite, glasswool, rubber felt

- Refractory materials: General characteristics and uses of dolomite, ceramics.
 - Protective coating materials: Auto paints, primers, varnishes, enamels, putti, electroplating materials, rubasil, teflon coating
6. Selection and Specifications of Materials (04 hrs)
- Practical considerations for selection of material for different Automobile Components.

LIST OF PRACTICALS

1. Classification of about 25 specimen of materials/parts in material lab
2. Identification of various type of materials with respect to their properties
3. To prepare microscopic structure for examination and to examine the micro structure of specimens of following materials (i) Brass (ii) Copper (iii) Grey CI (iv) Malleable CI (v) Low carbon Steel (vi) High carbon steel (vii) HSS
4. To anneal a given specimen
5. To normalize a given specimen
6. To temper a given specimen

INSTRUCTIONAL STRATEGY

Teacher should show various types of automotive components and parts to students while imparting instructions. Visits to industry should be planned to demonstrate the use of various types of materials in the automobile industry. Students should be asked to collect samples of various materials available in the market

RECOMMENDED BOOKS

1. Material Science by GBS Narang; Khanna Publishers, New Delhi
2. Material Science and Metallurgy by RB Choudary; Khanna Publishers, New Delhi
3. Material Science by G. Narula, Tata McGraw Hill, Delhi
4. Material Science by RK Rajput; SK Kataria and Sons, Ludhiana

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	08	16
2	16	32
3	10	20
4	02	06
5	08	16
6	04	10
Total	48	100

4.6 AUTOMOBILE ENGINEERING DRAWING

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RATIONALE

An Automobile Engineering diploma holder, irrespective of his field of operation in an industry or transport undertaking, is expected to possess a thorough understanding of engineering drawing, which includes clear spatial visualization of the subject and the proficiency in reading and interpreting a wide variety of drawings. Besides this, he is also expected to have a certain degree of drafting skills depending upon his job functions to perform his day-to-day activities e.g. communicating and discussing the ideas with his superiors and passing on instructions to his subordinates in an unambiguous way. The teachers are recommended to lay emphasis on showing automobile components to students..

DETAILED CONTENTS

1. Limits and Fits (01 sheet)
Limit, tolerance, deviation, allowance, its: clearance, interference, transition fit,
Hole and shaft basis system.

Assembly Drawings of the following automotive components:

2. Joints and Bearings (04 sheets)
 - Universal joint,
 - Slip joint
 - Bush bearing
 - Plummer block or pedestal bearing
 - Ball bearing
 - Roller bearing- Straight and Needle type
3. Engine Components (06 sheets)
 - Four Stroke Petrol Engine Piston
 - Diesel Engine Piston
 - Connecting rod
 - Fuel injector
 - Fuel Pump –AC mechanical type
 - Overhead and side valve mechanism (free hand)
 - Crank shaft – 4 cylinder Engine
 - Spark Plug

4. Chassis components (06 sheets)
- Leaf Spring suspension
 - Shock absorber
 - Wheel cylinder
 - Master Cylinder
 - Brake drum (assembly)
 - Single plate clutch
5. Gears (02 sheets)
- Nomenclature of gears
 - Profile of spur gear by ‘Approximate method’
 - Profile of spur gear by ‘Unwin’s Method’
6. Cam Profile (03 sheets)
- Different types of cams and followers
 - Drawing of cam profile for following motion of follower
 - (a) Uniform velocity motion
 - (b) Simple harmonic motion (SHM)
 - (c) Uniformly accelerated and retarded motion.
7. Auto Electric Circuits(free hand sketches) (06 sheets)
- Battery ignition system
 - Magneto ignition system
 - Lighting system
 - Wiring diagram of a car
 - Starting system
 - Charging system
8. Sketching of the following Auto Parts: (02 sheets)
- (i) Gear Box - Sliding, constant, synchromesh
 - (ii) Line diagram of petrol/Diesel Fuel system

INSTRUCTIONAL STRATEGY

Teacher should make use of models while explaining the details of drawing of various automobile parts and components. Emphasis should be laid on cleanliness and quality of drawings.

RECOMMENDED BOOKS

1. Auto Engineering Drawing by RB Gupta; Satya Parkashan, New Delhi
2. Automobile Engg. Drawing by Raj Kumar, North Publication, Jalandhar
3. Machine Drawing by PS Gill; BD Kataria and Sons, Ludhiana
4. Machine Drawing by Lakshminarayan; Jain Brothers, New Delhi
5. Automobile Engineerig- Vol. I and II by Dr. Kirpal Singh, Standard Pulishers Distributors, Delhi

ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks, State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business

INDUSTRIAL TRAINING

Industrial training, provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice.

For this purpose, students at the end of fourth semester need to be sent for industrial training for a minimum of 4 weeks duration to be organised during the semester break starting after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A teacher may guide a group of 4-5 students. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behaviour, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry. The components of evaluation will include the following.

a) Punctuality and regularity	15%
b) Initiative in learning new things	15%
c) Relationship with workers	15%
d) Industrial training report	55%