

6.1 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

L T P
Periods per week 5 - -

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

DETAILED CONTENTS

SECTION – A ENTREPRENEURSHIP

1. Introduction

23 periods

- Concept /Meaning and its need
- Qualities and functions of entrepreneur and barriers in entrepreneurship
- Sole proprietorship and partnership forms of business organisations
- Schemes of assistance by entrepreneurial support agencies at National, State, District level: NSIC, NRDC, DC: MSME, SIDBI, NABARD, Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI) and Science and Technology Entrepreneur Parks (STEP)

2. Market Survey and Opportunity Identification

17 periods

- Scanning of business environment
- Salient features of National and State industrial policies and resultant business opportunities
- Types and conduct of market survey
- Assessment of demand and supply in potential areas of growth
- Identifying business opportunity
- Considerations in product selection

3. Project report Preparation

14 periods

- Preliminary project report
- Detailed project report including technical, economic and market feasibility
- Common errors in project report preparations
- Exercises on preparation of project report

SECTION –B MANAGEMENT

4. Introduction to Management

06 periods

- Definitions and importance of management
- Functions of management: Importance and Process of planning, organising, staffing, directing and controlling
- Principles of management (Henri Fayol, F.W. Taylor)
- Concept and structure of an organization

- Types of industrial organisations
 - a) Line organisation
 - b) Line and staff organisation
 - c) Functional Organisation

5. Leadership and Motivation

05 periods

- a) Leadership
 - Definition and Need
 - Qualities and functions of a leader
 - Manager Vs leader
 - Types of leadership
- b) Motivation
 - Definitions and characteristics
 - Factors affecting motivation
 - Theories of motivation (Maslow, Herzberg, McGregor)

6. Management Scope in Different Areas

10 periods

- a) Human Resource Management
 - Introduction and objective
 - Introduction to Man power planning, recruitment and selection
 - Introduction to performance appraisal methods
- b) Material and Store Management
 - Introduction functions, and objectives
 - ABC Analysis and EOQ
- c) Marketing and sales
 - Introduction, importance, and its functions
 - Physical distribution
 - Introduction to promotion mix
 - Sales promotion
- d) Financial Management
 - Introductions, importance and its functions
 - Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT

7. Miscellaneous Topics

05 periods

- a) Customer Relation Management (CRM)
 - Definition and need
 - Types of CRM
- c) Total Quality Management (TQM)
 - Statistical process control
 - Total employees Involvement
 - Just in time (JIT)
- d) Intellectual Property Right (IPR)
 - Introductions, definition and its importance
 - Infringement related to patents, copy right, trade mark

Note: In addition, different activities like conduct of entrepreneurship awareness camp extension lecturers by outside experts, interactions sessions with entrepreneurs and industrial visits may also be organised.

INSTRUCTIONAL STRATEGY

Some of the topics may be taught using question/answer, assignment or seminar method. The teacher will discuss stories and case studies with students, which in turn will develop appropriate managerial and entrepreneurial qualities in the students. In addition, expert lecturers may also be arranged from outside experts and students may be taken to nearby industrial organisations on visit. Approach extracted reading and handouts may be provided.

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development published by Tata McGraw Hill Publishing Company Ltd., New Delhi
3. Entrepreneurship Development in India by CB Gupta and P Srinivasan; Sultan Chand and Sons, New Delhi
4. Entrepreneurship Development - Small Business Enterprises by Poornima M Charantimath; Pearson Education, New Delhi
5. Entrepreneurship : New Venture Creation by David H Holt; Prentice Hall of India Pvt. Ltd., New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Principles and Practice of Management by L M Prasad; Sultan Chand & Sons, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	23	30
2.	17	20
3.	14	15
4.	06	10
5.	05	05
6.	10	15
7.	05	05
Total	80	100

6.2 MECHANICS OF VEHICLE

	L	T	P
Periods/week	4	-	2

RATIONALE

Various types of motions, power transmission, forces acting on moving vehicle, vehicle braking, balancing and vibration in rotating body are some of the concepts which are essential for diploma holders in Automobile Engineering. Hence the subject is introduced in the syllabus.

DETAILED CONTENTS

- 1. Simple Mechanism** 12 periods
 - Definition of link, kinematic pair, kinematic chain, Mechanism, inversions and machines
 - Simple examples of mechanism with:-
 - Lower pairs, Four bar chain, Slider crank chain, Double slider crank chain, Higher pairs
- 2. Power Transmission** 14 periods
 - Flat belt, V-belt and chain drives.
 - Ratio of tension of two sides of the belt with and without centrifugal tension.
 - Horse power transmitted and condition for maximum horse power transmitted.
 - Simple, compound and epicyclic gear box
- 3. Vehicle in Motion** 14 periods
 - Air, grade, and rolling resistances
 - Tractive effort, traction, Inertia load, Draw bar pull and power required to proper a vehicle
 - Calculations of acceleration and tractive effort required in case of front wheel drive, rear wheel drive and four wheel drive
 - Centrifugal force and its effect on vehicle stability on banked and unbanked road
- 4. Vehicle Control** 12 periods
 - Braking friction and limits of braking
 - Retardation and Braking force, calculations in case of front wheel, rear wheel and all wheel braking
 - Weight transfer during braking
 - Stopping distance and stopping time
 - Davis and Ackermann Steering Mechanism, Correct Steering angle
- 5. Balancing** 12 periods
 - Concepts of static and dynamic balancing, working of static and dynamic machine
 - Balancing of rotating masses-single rotating mass by a single mass rotating in the same plane and by two masses rotating in different planes, balancing of several masses rotating in the same plane. Balancing of several masses rotating in different planes

LIST OF PRACTICALS

1. To study various types of Links, Pairs, Chain and Mechanism
2. To study inversion of Four Bar Mechanism, Single Slider Crank Chain Mechanism and Double Slider Crank Chain Mechanism.
3. To study various kinds of belts drives.
4. To study Different types of Gears.
5. To study Different types of Gear Trains.

INSTRUCTIONAL STATREGY

1. Models should be shown
2. Practical demonstrations should be organized

RECOMMENDED BOOKS

1. Theory of Machines by R.S. Khurmi
2. Automobile Engineering Vol-I, II, Dr. Kirpal Singh, Standard Publishers and Distributor.
3. Theory of Machines by D.R. Malhotra; Satya Parkashan
4. Theory of Machines by PL Balaney; Khanna Publishers, Delhi
5. Mechanics of Vehicles by W. Steed; Kafe books Limited, London

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	12	20
2.	14	25
3.	14	25
4.	12	15
5.	12	15
Total	64	100

6.3 VEHICLE AIR CONDITIONING

	L	T	P
Periods/week	4	-	2

RATIONALE

In teaching fundamentals of air conditioning, vehicle air conditioning is essential topic. The student will learn about car air conditioning which nowadays implemented in vehicles excessively. The subject is modified in its name to make it more appropriate to automobile field.

DETAILED CONTENTS

- 1. Concept of Refrigeration** 08 periods
Refrigeration, Schematic layout of a refrigeration system, concept of heat pump and heat engine, C.O.P., second law of thermodynamics applicable to refrigeration, reversed Carnot cycle, Bell Coleman cycle, calculation of work done required, net refrigeration effect, C.O.P
- 2. Vapour Compression Refrigeration System** 10 periods
Basic components of vapour compression refrigeration system and their function: compressor, condenser, expansion device and evaporator.
- 3. Vapour Absorption Refrigeration System** 10 periods
Basic components of vapour absorption refrigeration system and their function: generator, Pump, condenser, expansion device and evaporator.
- 4. Commonly Used Refrigerants** 08 periods
Definition, primary and secondary refrigerants, designation of refrigerant, examples of each type. Desirable properties of good refrigerant, Azeotropic mixtures.
- 5. Air Conditioning** 11 periods
Air conditioning, its meaning, need for air conditioning, types of air conditioning, Properties of air to be regulated during air conditioning. Basic Car air conditioning system: Location of air conditioning components in a car.
- 6. Psychometry** 11 periods
Psychometric - definition, terminology, psychometric charts and tables, use psychometric charts for solving simple problems.
- 7. Maintenance of Vehicle Air-Conditioning System(VACS)** 06 periods
Various types of common troubles in VACS, Possible causes for each trouble & possible remedies.

LIST OF PRACTICALS

1. Study of Heat Pump, Heat Engine & Refrigerator
2. Study of Carnot Cycle
3. Study of Vapour compression refrigeration system
4. Study of Vapour absorption refrigeration system
5. Study of Vehicle Air Conditioning system
6. Various types of common troubles in VACS, Possible causes for each trouble & possible remedies

INSTRUCTIONAL STRATEGY

1. Use computer based learning aids for teaching learning
2. Demonstrations should be made to explain the concepts

RECOMMENDED BOOKS

1. Refrigeration and air conditioning by Sarrao and Gabbi
2. Refrigeration & air conditioning by C. P. Arora.
3. Automotive air conditioning by William H. Crouse & D.L . Anglin, McGraw-Hill Inc.
4. Automotive air conditioning, Paul Weisler, Reston Publishers
5. Refrigeration and air conditioning by R S Khurmi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Periods allotted (Period)	Marks Allotted (%)
1	08	10
2	10	20
3	10	20
4	08	10
5	11	15
6	11	15
7	06	10
Total	64	100

6.4 AUTOMOTIVE POLLUTION AND CONTROL

L T P

Periods per week 5 - -

RATIONALE

This subject gives knowledge to the students with regards to many kinds of emissions emitted by automotive vehicle. These emissions cause the air pollution & have adverse effect on human beings. This subject deals with study that how we can measure & minimize these emissions.

DETAILED CONTENTS

- 1. Introduction** 15 periods
Environment, Atmosphere, Clean air, Pollution, different types of air pollution. Effect of pollution on human health. Role of vehicles in air pollution, types of vehicle emissions: unburned hydrocarbons and exhaust emissions. Brief history of automobile emission control. Emission norms: EURO and BHARAT. Role of state administration to control vehicle emissions.
- 2. Pollutant Formation In SI & CI Engines** 15 periods
Pollutant formation in SI & CI Engines, mechanism of HC, CO and NO_x formation in engines, effects of design and operating variables on engine emission.
- 3. Unburned Hydrocarbon Emission Control** 20 periods
Evaporative Emission Control
Sources of vapor leakages, Need of vapor recovery systems, Charcoal Canister
Crankcase Blowby
Need of removing blowby gases, Open & Closed crankcase ventilation system, function of PCV valve, Construction & working of PCV valve.
- 4. Exhaust Emission Control** 15 periods
Composition of exhaust gases, Pollutants in exhaust. Exhaust emission control methods – Air injection, catalytic converter - two way & three way converter, catalysts, Exhaust gas recirculation, function of EGR valve.
- 5. Exhaust Measurement** 15 periods
Concept of exhaust measurement for S.I and C.I engines, smoke testing for SI and CI engines. Measurement of CO, HC and NO_x. Smoke meters – Hartridge & Bosch type, Flame ionization detector (FID), Spectroscopic gas analysers – Non dispersive infrared gas analysers (NDIR).

LIST OF PRACTICALS

1. Study of Exhaust Gas Analyzer regarding its working principles construction, components and operation.
2. Measurement of Exhaust gases viz. CO, NO_x and HC by gas analyzer.
3. Study of E G R system.
4. Study of P C V system
5. Study of Catalytic converter

INSTRUCTIONAL STRATEGY

1. Use computer based learning aids for teaching learning
2. Demonstrations should be made to explain the concepts

RECOMMENDED BOOKS

1. Heldt P.M., "High Speed Combustion Engines", Oxford IBH Publishing Co., Calcutta,
2. William H.Crouse, "Automotive Engines", McGraw-Hill Publishers,
3. Ellinger H.E., "Automotive Engines", Prentice Hall Publishers,
4. John B.Heywood, "Internal Combustion Engine Fundamental", McGraw-Hill,
5. Ganesan.V. "Internal Combustion Engines", Tata McGraw-Hill Publishing Co.,
6. M.L.Mathur and R.P.Sharma, "A course in Internal combustion engines", Dhanpat Rai & Sons Publications, New Delhi
7. Automobile Engineering by P.S. Gill
8. Automobile Engineering Vol. 1 & 2 by Dr. Kripal Singh; Standard Publishers Distributors,
9. Automobile Engineering by R.B. Gupta; Satya Prakashan, New Delhi.
10. Automobile Engineering by K.M. Gupta, Umesh Prakashan, Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Periods allotted (Period)	Marks Allotted (%)
1	15	10
2	15	25
3	20	30
4	15	20
5	15	15
Total	80	100

6.5 OVERHAULING PRACTICE LAB

L T P
Periods/week - - 6

RATIONALE

Automobile overhauling and troubleshooting forms the main job of a diploma holder in automobile engineering. The competencies in knowing the faults and reconditioning of various components and accessories of automobile will go a long way in instilling confidence for a diploma holder. The practice in above areas has thus been included in the curriculum.

DETAILED CONTENTS

1. Diagnosing the engine for overhauling
2. Removal of engine from vehicle
3. Dismantling of engine
4. Overhauling of petrol engine
5. Overhauling of diesel engine
6. Decarbonising of engine blocks, combustion chamber, piston crown and valve parts.
7. Surfacing of cylinder heads, cylinder blocks and manifolds on cylinder head refacing machine
8. Replacing of piston and piston rings – removal and refitting
9. Practice on cylinder boring machine
10. Practice in fitting cylinder liners- sleeving and desleeving
11. Testing and aligning of connecting rod
12. Overhauling of valves and valve mechanism
13. Overhauling of gear box
14. Overhauling of differential and propeller shaft
15. Overhauling of wheels and axles
16. Overhauling of brakes
17. Overhauling of clutch

INSTRUCTIONAL STRATEGY

1. Use computer based learning aids for teaching learning
2. Demonstrations should be made to explain the concepts

RECOMMENDED BOOKS

1. Automobile Engineering by Dr. Kirpal Singh; Standard Publisher, Delhi.
2. Automobile Engineering by Sh. R.B. Gupta; Satya Prakashan, New Delhi.
3. Maintenance and Repair of Motor Vehicle by H.O. Geneva; Dialogue, R-686, New Rajinder Nagar, New Delhi.
4. Automotive Mechanics by William H. Crouse, Tata McGraw Hill, Delhi.
5. Auto Mechanics: Theory & Service by W.J.deKryger et al.

6.6 PROJECT WORK

L T P
Periods/week - - 12

RATIONALE

Project work aims at developing skills in the students whereby they apply the totality of knowledge and skills gained through the course in the solution of particular problem or undertaking a project. The students have various aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments. The project assignment can be individual assignment or a group assignment. There should not be more than 3 students if the project work is given for a group. The students should identify or given project assignment at least two to three months in advance. The project work identified in collaboration with industry may be preferred.

DETAILED CONTENTS

Each teacher is expected to guide the project work of 5-6 students.

- Projects related to repair and maintenance of automobiles
- Projects related to increasing productivity
- Projects related to quality assurance
- Projects related to estimation and economics of production
- Projects connected with repair and maintenance of plant and equipment
- Projects related to identification of raw material thereby reducing the wastage
- Any other related problems of interest of host industry

A suggestive criteria for assessing student performance by the external (personnel from industry) and internal (teacher) examiner is given in table below:

Sr. No.	Performance criteria	Max. marks	Rating Scale				
			Excellent	Very good	Good	Satisfactory	Poor
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2
3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
Total marks		100	100	80	60	40	20

The overall grading of the practical training shall be made as per following table

	Range of maximum marks	Overall grade
i)	More than 80	<i>Excellent</i>
ii)	65-80	Very good
iii)	50-64	Good
iv)	41-49	Fair
v)	Less than 40	Poor

In order to qualify for the diploma, students must get “Overall Good grade” failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented/project work professional training in the same industry and re-evaluated before being disqualified and declared “not eligible to receive diploma

”. It is also important to note that the students must get more than six “goods” or above “good” grade in different performance criteria items in order to get “Overall Good” grade.

Important Notes

1. This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.
2. The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.
3. The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.
4. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.

The teachers are free to evolve another criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations in such an exhibition. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific industries are approached for instituting such awards.

6.8 EMPLOYABLE SKILLS

	L	T	P
Periods/week	-	-	4

RATIONALE

Diploma holders are required to not only possess subject related knowledge but also soft skills to get good jobs and to rise steadily at their workshop. This subject is included to develop employability skills amongst the students

DETAILED CONTENTS

1. Industrial Scenario Engineering Education and expectations of competences from an engineer by employer 04 periods
2. Personality types, characteristic and features for a successful engineer 04 periods
3. Professional Engineer desirable values and ethics and their development. Relation between engineering profession, society and environment 04 periods
4. **Managing project** 16 periods
 - Leadership
 - Motivation
 - Time management
 - Resource management
 - Computer Software
 - Interpersonal relationship
 - Engineer Economics and fundamentals
5. **Effective Communication** 08 periods
 - Listening
 - Speaking
 - Writing
 - Presentation Technique/Seminar
 - Group discussion
6. **Preparing for Employment** 08 periods
 - Searching for job/job hunting
 - Resume Writing
 - Interview technique in personal interview telephonic interview, panel interview, group interview, video conference
7. **Managing Self** 06 periods
 - Managers body, mind, emotion and spirit
 - Stress Management
 - Conflict resolution
8. **Continuing professional development** 04 periods
 - Organising learning and knowledge
 - Use of computer for organising knowledge resource
9. **Creativity, Innovation and Intellectual property right** 06 periods
 - Concept and need in present time for an engineer
10. Basic rules, laws and norms to be adhered by engineers during their working 04 periods