6.1 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

L	T	P
3	-	-

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 (14 hrs)

- 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 (10 hrs)

- 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 (8 hrs)

- 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 (04 hrs)

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

5. Leadership and Motivation (03 hrs)

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 (6 hrs)

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 (03 hrs)

a) Customer Relation Management (CRM)

- Definition and need
- Types of CRM

b) Total Quality Management (TQM)

- Statistical process control
- Total employees Involvement
- Just in time (JIT)

c) 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 (Hrs)	Marks Allotted (%)
1	14	28
2	10	20
3	08	16
4	04	10
5	03	06
6	06	14
7	03	06
Total	**48**	**100**

6.2 MOTOR VEHICLE ACT AND TRANSPORT MANAGEMENT

L	T	P
3	-	-

RATIONALE

A diploma holder in Automobile Engineering is supposed to have knowledge about significance of vehicle accident, accidental vehicle claim procedure from insurance company and about Motor Vehicle Act. Therefore, it is essential to teach Motor Vehicle Act features and appropriate practices covering Motor Vehicle Act. Further, knowledge of transport management systems and techniques would also be an asset to him.

DETAILED CONTENTS

1. Garage location, layout and types, and change work procedure and records (06 hrs)

- Location of garage/selection of site of garage
- Layout of garage
- Types of garage
- Inspection of faulty vehicle
- Estimation of repair
- Job control system
- Work – order or job card
- Testing and test reports
- Costing and billing

2. Garage stores (08 hrs)

- Definition
- Purpose of store keeping
- Function of store keeping
- Location of store
- Layout of store
- Advantage of good store – keeping and recording
- Procurement of store
- Prevention of pip ferage of store
- Bin card
- Store organisation

3. Insurance of vehicle (08 hrs)

- Meaning and necessity of vehicle insurance
- Types of vehicle insurance
- Duties of surveyor
- Duties of driver in case of accident and injury to a person
- Relation between surveyor and insurance cooperation
- Procedure to get accidental claim and compensation

4. Driving And Highway Code (06 hrs)

- Principle of driving
- Driving procedure
- Driving precautions
- Driving in abnormal conditions, like hilly area, night, fog, heavy traffic and rain
- Emergency Driving situations
- Driving License - purpose, importance and requirements
- Different types of driving license
- Procedure to get driving license
- Highway code – types with sketches with colour code

5. Transport Management (10 hrs)

- History of transport with special reference to road transport in India
- Modes of Road transport
- Organization- Service station and its functions, General layout of modern service station, Spare parts section and dealership service section, Accounts and books, Different types of cards and their use in maintaining service station records
- Structure of fleet organization
- State transport - optimum utilization of fleet
- Roadworthiness requirement
- Maintenance of logbook, History sheet, Causes, and prevention of Road Accident, Analysis of Accident, Economy of replacement

6. Motor Vehicle Act (10 hrs)

- Definitions
- Salient features of motor vehicle act
- Licensing of drivers and conductors of motor vehicles
- Registration of old and new vehicles
- Transfer of vehicle – local and state to state
- Traffic offences, penalties procedure
- Fitness of vehicle – meaning and purpose, provision in the act
- Vehicle permit – different types
- Imposition of penalties of violation of rules
- Different documents required for registration of vehicle, for driving license, and for transfer of vehicle

INSTRUCTIONAL STRATEGY

Teacher should lay emphasis on basic principles and practices covering Motor Vehicle Act and fleet management. Visits should be organized to service stations for understanding of topics.

RECOMMENDED BOOKS

1. Automobile Engineering Vol.I by Dr. Kirpal Singh, Standard Publisher Distributors, Delhi.
2. Transport Management Vol. III & IV by Central Institute of Road Transport, Pune.
3. Motor Vehicle Act of India (with Latest Amendment).
4. Motor Vehicle Act with Rules by B.S. Kohli.
5. Motor Transportation: Principles and Practices by WJ Hudson and James; Ronald Press Company, New York.
6. Transport in Modern India by KP Bhatnagar, Satish Bahadur, DN Aggarwal and SC Gupta.
7. Central Motor Vehicle Rules.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	06	14
2	08	16
3	08	18
4	06	12
5	10	20
6	10	20
Total	**48**	**100**

6.3 TRACTOR AND SPECIAL PURPOSE VEHICLES

L	T	P
3	-	-

RATIONALE

Diploma holders in Automobile Engineering may have to deal with repair and maintenance of tractors and earth moving machinery. This subject provides knowledge about such vehicles and equipment

DETAILED CONTENTS

1. Tractor (08 hrs)

   Classification of tractors, main tractor assemblies, types of engine used, human factor in tractor design, applications of tractors, Basics trends in tractor design, forces acting on a tractor on move, parallel pull and rolling resistance, tractor stability, weight performance

2. Tractor Chassis (06 hrs)

   Types of clutch used in tractors, transmission system buyout, final drive, reduction gear, tractor brake system, operator seat design

3. Supplementary System (08 hrs)

   Power take off shaft, draw bar working, double clutch system traction control unit, belt pulley three point linkages

4. Tractor Wheels and Tyres (06 hrs)

   Salient features of wheels, tyres, and wheel base/wheel tracks. Specifications of wheels and tyres, dual versus tendum tyres, tread design, effect of tyre inflation. differential lock

5. Hydraulic system (08 hrs)

   Functions of hydraulic system, hydraulic system layout, various components of hydraulic system and their functions. Methods of attaching implements, various control systems – depth control, position control, draft control, combination control. Working of hydraulic control levers, other uses of hydraulic control system

6. Special purpose vehicle (08 hrs)

   Description and working principles of:

   - Bull Dozer
   - Fire station vehicle
   - Front end loader
   - Cranes

7. Repair and Maintenance (04 hrs)

- Faults and their rectification in tractor and maintenance of tractor
- Prominent makes of Indian tractors, selection criteria of a tractor

INSTRUCTIONAL STATREGY

The students may be taken to workshops dealing in Repair of Tractors and Heavy Earth Moving Machinery and given practical demonstration, expert lectures will also be beneficial.

RECOMMENDED BOOKS

1. Farm Machines and Equipment by CP Nakra; Dhapat Rai and Sons, New Delhi.
2. Manual of Tractors by J Konard, Asia Publishing House.
3. Tractors and Agriculture Equipment by Jain and Roy.
4. Agriculture Engineering by Michael and Ojha.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	08	16
2	06	12
3	08	18
4	06	12
5	08	18
6	08	16
7	04	08
Total	**48**	**100**

6.4 INDUSTRIAL ENGINEERING

L	T	P
4	-	-

RATIONALE

A diploma holder in this course will have to conduct time and motion study to improve the methods/system. For this, knowledge and related skills in method study and work measurement are essential. In addition, knowledge of production planning and control and estimating and costing is required. Hence this subject.

DETALIED CONTENTS

1. Productivity (06 hrs)

   Introduction to productivity, factors affecting productivity, Measurement of productivity, causes of low productivity and methods to improve productivity.

2. Work Study (14 hrs)

   Definition and scope of work study; Inter-relation between method study and work measurement; Human aspects of work study; Role of work study in improving productivity.

3. Method Study (08 hrs)

   Objectives and procedure for Method analysis; Information collection and recording techniques.

4. Motion Analysis (06 hrs)

   Principles of Motion analysis; Therbligs and SIMO charts; Normal work area and design of work places. ergonomics

5. Work Measurement (10 hrs)

   Objectives; work measurement techniques, stop watch time study; principle, equipment used and procedure; systems of performance rating; calculation of basic times; various allowances; calculation of standard time, work sampling, standard data and its usage.

6. Wages and Incentive Schemes (04 hrs)

   Introduction to wages, Wage payment for direct and indirect labour, wage payment plans and incentives, various incentive plans, incentives for indirect labour.

7. Production Planning and Control (10 hrs)

   Introduction, objectives and components (functions) of P.P.C, Advantages of production planning and Production Control, stages of P.P.C, process planning, routing, scheduling, dispatching and follow up, routing purpose, route sheets,

scheduling – purpose, machine loading chart, Gantt chart, dispatching – purpose, and procedure, follow up – purpose and procedure. CPM/PERT technique, drawing of simple networks and critical time calculation. Production Control in job order, batch type and continuous type of productions. Difference between these controls.

8. Estimating and Costing (6 hrs)

Introduction, purpose/functions of estimating, costing concept, ladder and elements of cost, difference between estimation and costing. Overheads and their types, estimation of material cost, estimation of cost for machining processes, numerical problems.

LIST OF PRACTICALS

1. Stop watch time study on any machine like lathe, drilling machine or milling machine
2. Method improvement - Assembly of bolt, nut and 3 washers
3. Determination of standard time for assembly of electrical switch
4. Preparation of flow process chart
5. Preparation of SIMO chart
6. Preparation of flow diagram

INSTRUCTIONAL STRATEGY

1. Teacher should use models and encourage students to develop some other suitable model.
2. The teacher should observe and redress the difficulties faced by students in performing the work while working on ergonomically good and poorly designed workstation.

RECOMMENDED BOOKS

1. Work Study and Ergonomics by S Dalela and Sourabh
2. Industrial Engineering and Management by O.P. Khanna Dhanpat Rai and Sons, Delhi.
3. Industrial Engineering and Management by M. Mahajan; Dhanpat Rai and Sons, New Delhi.
4. Introduction to Work Study, ILO Publication

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	14	20
3	08	12
4	06	10
5	10	16
6	4	6
7	10	16
8	6	10
Total	**64**	**100**

6.5 EMPLOYABILITY SKILLS – II

L	T	P
-	-	2

RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. Our diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject to prepare students for employability in job market and survive in cut throat competition among professionals.

DETAILED CONTENTS

1. Oral Practice

i)	Mock interview	(05 hrs)
ii)	Preparing for meeting	(05 hrs)
iii)	Group discussion	(05 hrs)
iv)	Seminar presentation	(05 hrs)
v)	Making a presentation	(12 hrs)

a) Elements of good presentation
b) Structure and tools of presentation
c) Paper reading
d) Power point presentation

6.6 FAULT DIAGNOSIS AND TESTING LAB

L	T	P
-	-	5

RATIONALE

After learning about the engines, chassis, body, transmission, auto electrical and electronics systems and garage equipment, students should be able to test the various automotive parts and accessories as well as diagnose the various problems relating to them. This subject aims at familiarising and giving practise about fault diagnosis and testing.

DETAILED CONTENTS

1. Basic electrical checks:- Battery connections, electrical bulbs and units, circuit protection devices and wiring connections.
2. Testing of battery:- Specific gravity test, high rate discharge test, open circuit voltage test; charging of battery.
3. Testing and setting of ignition timing, cam angle.
4. Testing of field winding of alternator and armature of starter motor for open circuit, short circuit and earthing.
5. Engine testing and finding out fuel consumption.
6. Diagnosing battery ignition system.
7. Diagnosing and rectifying high oil consumption.
8. Diagnosing and rectifying high fuel consumption.
9. Diagnosing and rectifying engine noises and knocks.
10. Diagnosing and rectifying engine starting troubles.
11. Diagnosing and rectifying engine running faults.
12. Diagnosing and rectifying engine overheating.
13. Measuring of bore for wear, ovality and taperness.
14. Inspection of crankshaft - bearing replacement and setting of journal bearings, crank pin bearings and crank shaft bearings, measuring bearing clearances by gauges.
15. Demonstration of body repair techniques.

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
4. Rajinder Nagar, New Delhi.
5. Automotive Mechanics by William H. Crouse, Tata McGraw Hill, Delhi.
6. Auto Mechanics : Theory & Service by W.J.deKryger et all.

6.7 DRIVING PRACTICE – II

L	T	P
-	-	**5**

RATIONALE

After learning the basics of driving the emphasis should be given to gain proficiency and shift to driving under hard condition such as during fog, rain, steep gradient etc. Suitable practice needs to be given to the students to make them aware of different situation in driving of the vehicle.

DETAILED CONTENTS

1. Driving practice on road to gain proficiency.
2. Maneuver in: Passing, Merging, Diverging,Overtaking, Crossing, Turning, Cornering, Reversing and Emergency stopping.
3. Driving on gradient.
4. Driving during abnormal conditions like rain and fog.

6.8 OVERHAULING LAB

L	T	P
-	-	5

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.

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
4. Rajinder Nagar, New Delhi.
5. Automotive Mechanics by William H. Crouse, Tata McGraw Hill, Delhi.
6. Auto Mechanics: Theory & Service by W.J.deKryger et all.

6.9 PROJECT WORK

L	T	P
-	-	5

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.

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	Satis-factory	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	*Excellent*
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 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.