UTTARAKHAND BOARD OF TECHNICAL EDUCATION
JOINT ENTRANCE EXAMINATION AND TRAINING, RESEARCH DEVELOPMENT CELL, DEHRADUN
STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME

BRANCH NAME – MECHANICAL ENGINEERING (PRODUCTION) **SEMESTER – VI**

Subject Code	Subject	L	T	P	TOT	EVALUATION SCHEME						Total Marks	Credit Point
						Internal		External					
		Period/Weeks				Theory	Practical	Theory		Practical			
						Max Marks	Max Marks	Max Marks	Hrs.	Max Marks	Hrs.		
136001	Entrepreneurship Development and Management*	5	-	-	5	20	-	80	2.5	-	-	100	5
146001	Computer Application in Mechanical drafting Design and Analysis**	-	-	6	6	-	50	-	-	50	3.0	100	3
336001	Advance Production Process	6	-	-	6	50	-	80	2.5	-	-	130	5
336004	Inspection & Quality Cantrol	6	-	3	9	50	25	80	2.5	25	3.0	180	7
146002	Power Plant Engineering**	6	-	-	6	50	-	80	2.5	-	-	130	5
336005	Project Work	-	-	8	8	-	100	-	-	135	3.0	235	7
336052	Industrial Exposure	-	-	-	-	-	25	-	-	-	-	25	1
016054	General Proficiency	-	-	4	4	-	25	-	-	-	-	25	1
016055	Employability Skills	4	-	-	4	25	-	50	2.5	-	-	75	1
Total		**27**	-	**21**	**48**	**195**	**225**	**370**	-	**210**	-	**1000**	**35**

* Common with diploma course in 6th sem Mechanical engg., Production engg., Mech(auto.),Automobile

** Common with diploma course in 6th sem Mechanical engg., Production engg.

*** Common with diploma course in 6th sem Production Engg.

\# General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

\+ Industrial visit compulsory at minimum 2 industry or department.

Note: 1- Each period will be 50 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 12.5 week

Branch Code - 33

SIXTH SEMESTER
MECHANICAL ENGINEERING (PRODUCTION)

ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

Subject Code : 136001

L	T	P
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 organisation

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, VAT

7. Miscellaneous Topics (05 periods)

a) Customer Relation Management (CRM) Definition and need

Types of CRM

b) Total Quality Management (TQM) Statistical process control

Just in time (JIT)

c) Intellectual Property Right (IPR)

Introductions, definition and its importance

Infringement related to patents, copy right, trade mark

d) GST

- Introduction, Its importance

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	23	30
2	17	20
3	14	15
4	6	10
5	5	05
6	10	15
7	5	05
Total	**80**	**100**

COMPUTER APPLICATIONS IN MECHANICAL DRAFTING, DESIGN AND ANALYSIS

Subject Code : 146001

L	T	P
-	-	6

RATIONALE

Today age is computer age. Most of our daily activities are being influenced by the use of computers. It has become necessary for diploma students to have a basic knowledge of computer applications related to their branch. This subject is being offered to provide further practice to students on MS Power Point and MS Access and acquaint them to Computer Aided Design software for modelling, assembling and drafting.

DETAILED CONTENTS

1. MS Word:

Introduction to MS word for preparing technical report. Use of different fonts, size, tables, and equations should be considered.

2. MS Excel

Creation of graphs such as bar chart, PI chart, line diagram using technical data, Examples: Load deformation data of any material may be given to the students and ask to convert these data to stress strain form and plot of stress strain curve. Determination of modulus of elasticity, yield strength, percentage elongation, ultimate strength, etc from the above curve. With given x-y data, plotting of the data and fitting various regression equations using Excel program.

3. MS Power Point:

Templates, wizard, views, colour schemes, Introduction to various Power Point toolbars, Presentations using Power Point:-

Slide Views

Slide Formatting

Animation

Graphs

4. Computer Aided Design using any sotware such as AUTO CAD/ IDEAS/ etc

4.1 Concept of Auto CAD, Tool bars in Auto CAD, coordinate system, snap, grid, and ortho mode

4.2 Drawing commands – point, line, arc, circle, ellipse,

4.3 Editing commands – scale, erase, copy, stretch, lengthen and explode.

4.4 Dimensioning and placing text in drawing area

4.5 Sectioning and hatching

4.6 Inquiry for different parameters of drawing entity

5. Assembly and detail drawings of the following using AUTOCAD

5.1 Tool post

5.2 Tail stock

5.3 Screw jack

5.4 Safety valve

5.5 Stuffing Box

5.6 Bench vice

a) Isometric Drawings by CAD

Drawings of following on computer:

Cone

Cylinder

Isometric view of objects

b) 3D Modelling

3D modelling, Transformations, scaling, rotation, translation

c) Project work

Technical report writing where all such chapters are to be used.

NOTE :- Practical work must be performed on the related contents as described above. Strategy should be made in such a way that at first student should be taught the contents theoretically than related practical works must be performed.

INSTRUCTIONAL STRATEGY

1. Teachers should show model of the component/part whose drawing is to be made.

RECOMMENDED BOOKS

1. AutoCAD 2000 for you by Umesh Shettigar and Abdul Khader; Janatha Publishers, Udupi.

2. Machine Drawing by P.S. Gill; Kataria and Sons, Ludhiana.
3. A Text book of Machine Drawing by R.K. Dhawan, S.Chand and Company Ltd., New Delhi.
4. Engineering Drawing with AutoCAD 2000 by T. Jeyapooran; Vikas Publishing House, Delhi.
5. Auto CAD for Engineering Drawing Made Easy by P. Nageswara Rao; Tata McGraw Hill, New Delhi.

ADVANCE PRODUCTION PROCESSES

L	T	P
6	-	-

Subject Code : 336001

RATIONALE

The importance of modern production processes lies in the fact that conventional processes are though applied in most of the time, modern processes are more accurate , more applicable and user friendly for industries. So students should also have a basic knowledge of these processes.

DETAILED CONTENTS

1. UNCONVENTIONAL MACHINING PROCESSES - Introduction, principle, process and application of Ultrasonic machining (USM), Electro chemical machining (ECM), Electro chemical Grinding (ECG), Electrical Discharge Machining (EDM), Laser beam machining (LBM), Electro beam machining (EBM), Plasma arc machining (PAM). **(20 periods)**

2. Modern welding Process (Modern Welding Methods, Principle of operation, advantages, disadvantages and applications of : Tungsten inert gas (TIG) welding, Metal inert gas (MIG) welding, Thermit welding, Electro slag welding, PUG welding). **(20 periods)**

3. Powder Metallurgy- Introduction to powder metallurgy. Steps in powder metallurgy, making of powder, compaction, secondary operations, sintering, advantages and limitations of powder metallurgy **(20 periods)**

4. Newer Moulding Processes - Introduction to different moulding methods with their advantages and applications -plastic Injection moulding, moulding, fibre glass moulding, and calendering. **(20 periods)**

5. Modern Casting processes - Introduction, advantages and applications of modern casting processes such as vacuum die casting, evaporative pattern casting, hybrid casting and investment casting. **(16 periods)**

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	TIME ALLOTED (Periods)	MARKS ALLOTED (%)
1	20	25
2	20	20
3	20	25
4	20	10
5	16	20
TOTAL	**96**	**100**

INSPECTION AND QUALITY CONTROL

L	T	P
6	-	3

Subject Code : 336004

RATIONALE

Diploma holders in this course required to measure and inspect for ensuring quality ofproduct. For this purpose, knowledge and skills about standards of measurement, limits, fits and tolerances, types of inspection and various measuring instruments, SQC & quality standards are necessary. Hence this subject.

DETAILED CONTENT

1. Inspection (19 hrs)

- Introduction, units of measurement, standards for measurement and interchangeability.
- International, national and company standard, line and wavelength standards.
- Planning of inspection: what to inspect? When to inspect? Who should inspect? Where to inspect?
- Types of inspection: remedial, preventive and operative inspection, incoming, in-process and final inspection.
- Study of factors influencing the quality of manufacture.

2. Measurement and Gauging (19 hrs)

- Basic principles used in measurement and gauging, mechanical, optical, electrical and electronic.
- Study of various measuring instruments like: calipers, micrometers, dial indicators, surface plate, straight edge, try square, protectors, sine bar, clinometer, comparators–mechanical, electrical and pneumatic. Slip gauges, tool room microscope, profile projector. Limit gauges: plug, ring, snap, taper, thread, height, depth, form, feeler, wire and their applications for linear, angular, surface, thread and gear measurements, gauge tolerances.
- Geometrical parameters and errors: Errors & their effect on quality, concept of errors, measurement of geometrical parameter such as straightness, flatness and parallelism.
- Study of procedure for alignment tests on lathes, drilling and milling machines.
- Testing and maintenance of measuring instruments.

3. Statistical Quality Control (19 hrs)

- Basic statistical concepts, empirical distribution and histograms, frequency, mean, mode, standard deviation, normal distribution, binomial and Poisson, Simple- examples.
- Introduction to control charts, namely X, R, P and C charts and their applications.
- Sampling plans, selection of sample size, method of taking samples, frequency of samples.
- Inspection plan format and test reports

4. Modern Quality Concepts (19 hrs)

- Concept of total quality management (TQM)
- National and International Codes.
- ISO-9000, concept and its evolution
- QC tools
- Introduction to Kaizen, 5S

5. Instrumentation (20 hrs)

Measurement of mechanical quantities such as displacement, vibration, frequency, pressure temperature by electro mechanical transducers of resistance, capacitance & inductance type.

LIST OF PRACTICALS

1. Use of dial indicator for measuring taper.
2. Use of combination set, bevel protector and sine bar for measuring taper.
3. Measurement of thread characteristic using vernier and gauges.
4. Use of slip gauge in measurement of center distance between two pins.
5. Use of tool maker's microscope and comparator.
6. Plot frequency distribution for 50 turned components.
7. With the help of given data, plot X, R, P and C charts

RECOMMENDED BOOKS

1. Statistical Quality Control by M.Mahajan: Dhanpat Rai and Sons, Delhi
2. Engineering Metrology by RK Jain
3. Engineering Metrology by RK Rajput; SK Kataria and Sons
4. Production Planning Control and Management by KC Jain & Aggarwal; Khanna Publishers, New Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	TIME ALLOTED (Periods)	MARKS ALLOTED (%)
1	19	14
2	19	34
3	19	24
4	19	14
5	20	14
TOTAL	**96**	**100**

POWER PLANT ENGINEERING

L	T	P
6	-	-

Subject Code : 146002

RATIONALE

A diploma holder in mechanical engineering is supposed to manage the power generating plant. In Uttranchal state, hydropower potential in supposed to be very large. Therefore, he must have relevant knowledge and skills about various power plants e.g. steam power plant, nuclear power plant, hydro power plant, diesel engine power plant and gas turbine power plant. Hence this subject is offered.

DETAILED CONTENTS

1. Introduction (12 Periods)

Sources of energy fuels, flowing stream of water, solar rays, wind, terrestrial heat, ocean tides and waves Concept of power station, central and industrial power station, captive power station, classification of power station with respect to prime mover steam, IC engine, gas turbine and hydro power station, scope in Uttarakhand state.

2. Steam Power Plant (20 Periods)

2.1 Parameters of power cycle- Thermal efficiency, work ratio, specific steam Consumption Rankine cycle flow diagram, representation on thermodynamic planes, thermal efficiency, effect on change of condenser pressure, boiler pressure, degree of super heat on thermal efficiency Reheat cycle, simple regenerative cycle, STEAM GENERATOR – FUNTIONS, CLASSIFICATION & SELECTION (No numerical)

2.2 Steam prime movers

Concept of a prime mover, steam turbine- advantages as a prime mover, principle elements of a steam turbine .Governing of steam turbines-classification of steam turbines Starting and stopping procedures for turbines, precautions during running Performance of steam turbine, Thermal efficiency, efficiency ratio, mechanical efficiency, steam rate (No numerical)

2.3 Steam Condensing Equipment

Functions of condensers, classification, surface condenser components and their functions Condenser auxiliaries- hot well, condensate pump, vaccum pump, air ejector, circulating pump, atmospheric relief valve Requirement of a good condensing system Cooling towers-purpose and types

3. NuclearPowerPlant (20 Periods)

Atomic structure of matter, nomenclature ,atomic nuclear reactions- fission, fusion, mass defect, binding energy, chain reaction, types of nuclear materials, fissile and fertile materials Nuclear reactors-elements and functions of different reactors, (DIFFERENT TYPES OF REACTORS VIZ. BWR, PWR, FBR), advantages and disadvantages and Comparison of nuclear power station with a steam power station Health hazards, safety precautions

4. Diesel Engine Power Plant (12 Periods)

Advantages and disadvantages of diesel engine. Essential elements of diesel power plant. Fuel injection system performance, testing of diesel engine power plant

5. Gas Turbine Power Plant (12 Periods)

Brayton cycle- schematic diagram, thermal efficiency. Advantages of gas turbines over diesel engines. Classification of gas turbines, advantages and disadvantages methods of improving thermal efficiency, Important parts and their functions, Essential auxiliaries and controls for gas turbine power point. Fuel for gas turbines

6. Hydro Power (20 Periods)

Advantages, basic elements, dams, head works, water turbines, classification of water turbines, speed and pressure control, plant auxiliaries, plant operation, potential in Uttarakhand state, detailed working

RECOMMENDED BOOKS

1. A course in Power Plant Engineering by S. Domkundwar & Arora; Dhanpat Rai and sons
2. Power Plant Engineering by G.B.S Narang
3. Power plant engineering by G.R. Nagpal; S.K. Khanna Publishers, Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	10
2	20	30
3	20	20
4	12	10
5	12	10
6	20	20
Total	**96**	**100**

PROJECT WORK

L	T	P
-	-	8

Subject Code : 336005

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/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.

EMPLOYABILITY SKILLS

L	T	P
4	-	-

Subject Code : 016055

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 workplace. This subject is included to develop employability skills amongst the students.

DETAILED CONTENTS

Unit I: **(06 periods)**

- Technical Education & Industrial scenario.
- Competency required of an engineer.

Unit II: **(06 periods)**

- Professional Engineer desirable values and ethics and their development.
- Relation between engineering profession, society and environment

Unit III: **(12 periods)**

Effective Communication

- Reading & Active Listening Skills
- Speaking
- Writing
- Presentation Technique/Seminar
- Group discussion

Unit IV: **(12 periods)**

Managing project

- Leadership
- Motivation
- Time management
- Resource management
- Interpersonal relationship

Unit V: **(10 periods)**

Preparing for Employment

- Searching for job/job hunting

- Resume & CV Writing
- Interview technique in personal interview telephonic interview, panel
- Interview, group interview, video conferencing

Unit VI: **(08 periods)**

Self Management

- Self awareness
- Stress Management
- Conflict resolution

Unit VII: **(06 periods)**

- Creativity, Innovation and Intellectual property right
- Concept and need in present time for an engineer

Unit VIII: **(04 periods)**

Rules & Ethics

- Basic rules, laws and norms to be adhered by engineers during their working

LIST OF PRACTICAS

- Steps how to effectively write different types of Letters.
- Steps to make a Presentation in Power Point.
- Steps to make a Resume more effective.
- Steps to conduct Telephonic/On-line Interview (Through skype/Google Hangout).
- Study of Different Techniques of Stress Management.
- Study of Rules & Ethical practices to be followed at Workplace.

RECOMMENDED BOOKS

- Employability skills by Kapil Dev, Vishnu P. Singh Asian Pub. New Delhi
- Employability skills for Diploma students by Dr. S.K. Singh, Vayu Education, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Unit No.	Time Allotted (Periods)	Marks Allotted(%)
1	06	10
2	06	10
3	12	18
4	12	18
5	10	16
6	08	12
7	06	10
8	04	6
Total	**64**	**100**

IMPLEMENTATION

LEARNING OUTCOMES

ASSESSMENT

IMPACT

LEARNING OUT COMES AND MEANS OF ASSESSMENT

BRANCH NAME – MECHANICAL ENGINEERING (PRODUCTION) **SEMESTER – VI**

S.N0.	Title of Subject/Unit	Learning Outcomes	Means of Assessment
1	Entrepreneurship development and management	After successful completion of this course, students will be able to: 1. Setting up and managing their own small enterprises. 2. Know tools and technique to develop skills. 3. Distinct entrepreneurial traits 4. Assess opportunities and constraints for new business ideas 5. Understand the systematic process to select and screen a business idea 6. Design strategies for successful implementation of ideas 7. Write a business plan	1. Ambassador sharing method 2. Quiz 3. Assignments 4. Mid Term Examination and Semester examination.
2	Computer application in mechanical drafting, design and analysis	After successful completion of this course, students will be able to 1. Understand basics of Computer Graphics for development of CAD models. 2. Know about to develop different types of surfaces with the help of different curves 3. Understand uses of MS OFFICE, POWER POINTS etc.	1. Jobs designing/drafting competition 2. Presentation about software 3. Assignments 4. Mid Term Examination and Semester examination. 5. Practical assessment is done through practical test results, practical files and Viva voce.
3	Advance Production Process	After successful completion of this course, students will be able to 1. Gives light on modern production process,they are more accurate, applicable and user friendly for industries 2. Know about unconventional machining process, modern welding, powder metallurgy, moulding and casting..	1. Question & answer 2. Student's Presentation on related topics 3. Assignments 4. Mid Term Examination and Semester examination.

4	Inspection and quality control	After successful completion of this course, students will be able to 1. Measure & inspect for ensuring quality of product. 2. Enhance brew ledge of standard measurement.	1. Question & answer 2. Riddles 3. Group discussion and applying Ambassador sharing method. 4. Mini project 5. Mid Term Examination and Semester examination. 6. Practical assessment is done through practical test results, practical files and Viva voce.
5	Power plant engineering	After successful completion of this course, students will be able to 1. Understand basic knowledge of Different types of Power Plants, site selection criteria of each one of them and understanding of Power Plant Economics, Energy Storage. 2. Understand Nonconventional Energy sources.	1. Question & answer 2. Practical performance by students. 3. Assignments (Chapterwise) 4. Mini project presentation 5. Mid Term Examination and Semester examination.
6	Project work	1. While working on project technical skill will be developed in students. 2. They will learn practical uses of their study.	1. Internal assessment: Topic selection + working method 2. External examination + viva + project file