

Sr. No.	Subject Code	Subject Name	Effective Teaching			Credits	Evaluation Scheme		
			L	T	P		Internal Assessment	External Assessment	Total Marks
			Hours/week						
THEORY									
1	MUPME601N	Entrepreneurship Development and Management	3	-	-	3	25	75	100
2	MUPME602N	Non-Conventional Energy Resources.	4	-	-	4	25	75	100
3	MUPME603N	Refrigeration and Air Conditioning	4	-	-	4	25	75	100
4	MUPME604N	Power Plant Engineering	4	-	-	4	25	75	100
5	MUPME605N	Employability Skills	2	-	-	4	25	75	100
PRACTICAL/PROJECT									
6	MUPME 653N	Refrigeration and Air Conditioning	-	-	3	5	25	100	125
7	MUPME 656N	Major Project Work	-	-	6	5	25	175	200
8	MUPME657N	Computer Application in Mechanical drafting Design and Analysis	-	-	6	5	25	100	125
	MUPGP 651N	General Proficiency #	-	-	2	1	25	-	25
9	MUPGP 652N	Industrial Exposure (Assessment at University level)+	-	-	2	1	25	-	25
TOTAL			17	-	19	36	250	750	1000



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**SIXTH SEMESTER
MECHANICAL ENGINEERING**



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MUPME601N	Entrepreneurship Development and Management	3L:0T:P	3 Credits
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Course Objectives

The objectives of the course are:

- To explain concepts of Entrepreneurship and build an understanding about business situations in which entrepreneurs act
- To qualify students to analyse the various aspects, scope and challenges under an entrepreneurial venture
- To explain classification and types of entrepreneurs and the process of entrepreneurial project development.
- To discuss the steps in venture development and new trends in entrepreneurship.

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Introduction to entrepreneurship, concept of Market Survey	K1
CO2	Acquire knowledge on entrepreneurship development, its Pro's and con's.	K2
CO3	Acquire basic knowledge on how to become an Entrepreneur.	K2
CO4	Project report preparation	K3
CO5	Understand various steps involved in starting a venture and to explore marketing methods & new trends in entrepreneurship.	K2

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



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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

- Concept /Meaning and its need
- Qualities and functions of entrepreneur and barriers in entrepreneurship
- Sole proprietorship and partnership forms of business organizations

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

- 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

- 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

- Definitions and importance of management
- Functions of management: Importance and Process of planning, organizing, staffing, directing and controlling



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- Principles of management (Henri Fayol, F.W. Taylor)
- Concept and structure of an organization
- Types of industrial organizations
 - a) Line organization
 - b) in and staff organization
 - c) Functional Organization

5. Leadership and Motivation

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

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



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d) Financial Management

Introductions, importance and its functions

Elementary knowledge of income tax, sales tax, excise duty, custom duty and VA

7. Miscellaneous Topics

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 lectures by outside experts, interaction sessions with entrepreneurs and industrial visits may also be organized.

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 Purnima 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.



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MUPME602N	NON CONVENTIONAL ENERGY RESOURCES	4L:0T:P	4 Credits
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Course Objectives

The objectives of the course is:

- Create awareness about sources of energy and able to estimate how long the available conventional fuel reserves will last.
- Learn the fundamental concepts about solar energy systems and devices.
- Design wind turbine blades and know about applications of wind energy for water pumping and electricity generation.

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Understand of renewable and non-renewable sources of energy	K2
CO2	Develop capability to do basic design of bio gas plant.	K3
CO3	Gain knowledge about working principle of various solar energy systems	K2
CO4	Understand the application of wind energy and wind energy conversion system.	K2
CO5	Understand the energy conversion from wind energy, geothermal energy, Biomass, biogas, fuel cells and hydrogen.	K2

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



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RATIONALE

Conventional energy sources are depleting day by day. Before we face the alarming deterioration, renewable energy sources should be harnessed. Non-conventional energy sources like solar, wind, bio- gas etc. should be used to the maximum extent possible. A diploma holder in Mechanical Engineering must know various types of renewable energy sources based gadgets and their use and maintenance.

DETAILED CONTENTS

1. Introduction to Non-Conventional/renewable energy Sources

Conventional and Non-conventional sources of energy. Need, importance and scope of non-conventional and alternate energy resources.

2. Biogas Technology

Bio-gas: Importance of bio- gas. Principles of biogas generation. Main parts of biogas plants: Digester, gas holder, pressure gauge, gas controlling cocks and meter. Selection of biogas plant model and size. Site selection of biogas plants.

3. Wind Energy Technology

3.1 Introduction, scope and significance of wind mill.

3.2 Type and constructional details of windmill - vertical and horizontal axis type wind mill. Site selection for installation of windmill. Care and maintenance of windmill.

4. Solar Energy Technology

Introduction, significance of solar energy, solar spectral and greenhouse effect. Principles of thermal collection and storage. Comparison of flat type collector and concentration or focusing type collectors. Introduction to SPV module, its principle and applications.

5. Solar Thermal Systems

Operation, constructional details and maintenance of solar cooker, solar water heater, solar still, solar water pump, SPV system etc.

6. Energy Conservation

6.1 Principles of energy conservation. Familiarization with different energy conservation appliances and practices. Scope of energy conservation in the domestic, commercial and agricultural sectors.



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LIST OF PRACTICALS

- Demonstration/study of solar cooker
- Demonstration/study of solar water distillation
- Demonstration/study of solar water heater
- Demonstration/study of solar photovoltaic lighting system
- Demonstration/study of water pumping system
- Visit to biogas plants, domestic community/institution for study and demonstration of biogas plants
- Demonstration/study of the working of a windmill
- Study of energy saving appliances and their applications

RECOMMENDED BOOKS

1. Advance in Biogas Technology by O.P. Chawla; Publications & Information Div. 1 CAR, New Delhi.
2. Solar Energy by S.P. Sukhumi; Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
3. Solar Energy Utilization by G.D. Rai; Khanna Publishers, New Delhi.
4. Bio Gas Technology by K.C. Khandelwal & S.S. Mahdi; Tata McGraw- hill Publishing Co. Ltd., New Delhi.
5. Biomass Energy by OECD; Oxford & IBH Publication Co.
6. Wind Energy for water Pumping by Srivastava; Oxford & IBH Publication Co.
7. Cook Stoves for Masses by N.S. Grewal; PAU Ludhiana.
8. Energy in Agricultural Engineering by ISAE; Jain Brothers, Delhi.
9. Non-Conventional Energy Sources by G.D. Rai; Khanna Publishers, New Delhi.
10. Renewable & Conventional Energy by S. Rao.



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MUPME603N	REFRIGERATION AND AIR CONDITIONING	4L:0T:3P	4 Credits
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Course Objectives

The objectives of the course is:

- To understand the fundamentals of refrigeration and air conditioning.
- To calculate the cooling/heating load for different applications.
- To select the appropriate equipment for various RAC applications.
- To design and implement refrigeration and air conditioning systems as per the recommended standards

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Illustrate the basic concepts of refrigeration system and analyze the vapour compression cycle	K2
CO2	Explain properties of refrigerants	K2
CO3	Explain vapour absorption refrigeration system	K2
CO4	Explain the components of different refrigeration equipment	K2
CO5	Use psychrometric principles for air-conditioning systems	K3

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

RATIONALE

For specific applications, efficiencies of both living and non-living beings depend to a great extent on the physical environment. Temperature, humidity, pressure and air motion are some of the important environment variables that at any location keep changing throughout the year. A diploma holder in Mechanical Engineering must know about Refrigeration and air-conditioning, which deals with the techniques to control the environments of the living and non-living subjects.



DETAILED CONTENTS

1. Fundamentals of Refrigeration

Introduction to refrigeration and air conditioning, units of refrigeration, meaning of refrigerating effect, compressor work, condenser work and COP, difference between COP and efficiency, methods of refrigeration, natural system and artificial system of refrigeration (Simple numerical problems)

2. Vapor Compression System

Principle, function, parts and necessity of vapor compression system, T- ϕ and p-H charts, dry, wet and superheated compression. Sub cooling, super heating (No numerical problems)

3. Refrigerants

Functions, various classification of refrigerants, properties of R-717, R-22, R-134 (a), CO₂, R-11, R-12, R - 502, Properties of ideal refrigerant, selection of refrigerant

4. Vapour Absorption System

Introduction, principle, NH₃ absorption system, lithium bromide absorption system, advantages and disadvantages of Vapour absorption system over vapour compression refrigeration system (No numerical problems)

5. Refrigeration Equipment

5.1 Compressors: Function, various types of compressors

5.2 Condensers: Function, various types of condensers, essential requirements of a condenser

5.3 Evaporators: Function, DX and flooded evaporator, advantages and disadvantages, other types of evaporators

6. Psychrometry

Definition, importance, specific humidity, relative humidity, degree of saturation, DBT, WBT, DPT, humid heat, latent heat, relationship amongst them. Psychrometric chart, various lines, psychrometric process, by pass factor, room sensible heat factor, effective room sensible heat factor, ADP, room DPT, supply air condition. (Simple numerical problems)



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LIST OF PRACTICALS

1. To plot ph. diagram for vapour compression refrigeration system using refrigeration test rig
2. To plot ph. diagram for vapour compression refrigeration system using air conditioner test rig
3. Study of vapour absorption refrigeration
4. To study rotary compressor
5. To find relative humidity using psychrometer

INSTRUCTIONAL STRATEGY

- a) Models of various components/ parts should be demonstrated to develop comprehension amongst students
- b) Industrial visit to thermal power plant and roadways/ private automobile workshop should be arranged
- c) Video films for demonstration of working of IC engines, jet propulsion and gas turbine should be shown.

RECOMMENDED BOOKS

1. Elements of heat engines by Pandey and Shah; Charotar Publishing house, Anand
2. Thermal Engineering by PL. Ballaney; Khanna Publishers, New Delhi.
3. Engineering Thermodynamics by Francis F Huang; McMillan Publishing company, Delhi.
4. Engineering Thermodynamics by CP Arora; Tata Mc Graw Hill Publishers, New Delhi.
5. Thermal engineering by RK Purohit; Standard publishers Distributors, New Delhi.
6. Refrigeration and air conditioning by Domkundwar; Dhanpat Rai & sons, Delhi.
7. Refrigeration and air conditioning by CP Arora, Tata McGraw Hill, New Delhi.
8. Refrigeration and air conditioning by R.S Khurmi and J.K Gupta; S Chand and Company Limited, New Delhi



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MUPME604N	POWER PLANT ENGINEERING	4L:0T:P	4 Credits
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Course Objectives

The objectives of the course are:

- To give basic knowledge of Different types of Power Plants, site selection criteria of each one of them.
- To expose the students to the principles of safety and environmental issues.
- To give basic knowledge of Different types of Nuclear power plants including Pressurized water reactor, boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Explain the economics involved in Power Plant and identify the factors related to selection of plant.	K2
CO2	Discuss various components of steam power plant and the factors influencing the site selection for the plant.	K2
CO3	Describe the working of various components of diesel power plant and compare it with steam power plant.	K2
CO4	Illustrate the working of gas turbine power plant and its components.	K2
CO5	Describe the electrical, instrumentation & pollution control systems used in power plants	K2

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



RATIONALE

A diploma holder in mechanical engineering is supposed to manage the power generating plant. In Uttaranchal state, hydropower potential is 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

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

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 – FUNCTIONS, 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, vacuum pump, air ejector, circulating pump, atmospheric relief valve Requirement of a good condensing system Cooling towers-purpose and types



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3. Nuclear Power Plant

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

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

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

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



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MUPME605N	EMPLOYABILITY SKILLS	2L:0T:P	2 Credits
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Course Objectives

The objectives of the course are:

- To assist students in becoming well-versed, responsible, creative communicators
- Develop advanced knowledge of leadership skills in business and management linked to their career ambitions.
- To Reflect critically upon own professional skills and employability prospects.

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Review and evaluate your personal attributes and employability skills which are necessary for successful employment and career development	K5
CO2	Investigate employment opportunities, complete a job application including a CV for a specific job opportunity.	K2
CO3	Demonstrate an understanding of employability skills and personal attributes in relation to job selection methods.	K3
CO4	Demonstrate an understanding of the skills and attributes required to maintain and successfully develop in employment.	K3
CO5	Build team and lead it for problem solving.	K3

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



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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:

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

Unit II:

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

Unit III:

Effective Communication

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

Unit IV:

Managing project

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

Unit V:

Preparing for Employment

- Searching for job/job hunting
- Resume & CV Writing
- Interview technique in personal interview telephonic interview, panel
- Interview, group interview, video conferencing



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Unit VI:

Self-Management

- Self-awareness
- Stress Management
- Conflict resolution

Unit VII:

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

Unit VIII:

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



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MUPME656N	PROJECT WORK	L:0T:6P	6 Credits
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Course Objectives

The objectives of the course are:

- To make them understand the concepts of Project Management for planning to execution of projects.
- Make them capable to analyze, apply and appreciate contemporary project management tools and methodologies in Indian context.
- To enable them to comprehend the fundamentals of Contract Administration, Costing and Budgeting

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Demonstrate a sound technical knowledge of their selected project topic.	K3
CO2	Understand concepts of Project and Production Management	K2
CO3	Get capable of self-education and clearly understand the value of achieving perfection in project implementation & completion	K2
CO4	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach	K3
CO5	Enable the students to implement project planning in their Industrial In-Plant training work	K3

K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create



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1. 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 criterion 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						
2	Planning and Execution of considerations						
3	Quality of performance						
4	Providing solution of the problems or production of final product						
5	Sense of responsibility						
6	Self-expression/communication skills						
7	Interpersonal skills/human relations						
8	Report writing skills						
9	Viva voce						
	Total marks						
10	Total marks						



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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 criterion 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.



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MUPME657N	COMUTER APPLICATION IN MECHANICAL DRAFTING,DESIGN AND ANALYSIS	L:0T:6P	6 Credits
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Course Objectives

The objectives of the course are:

- Exposure to CAD tools for use in mechanical engineering design conceptualization, geometric modelling, communication, analysis and optimization, further use in CAD, CAM and CAE.
- Impart knowledge related to principles, methods and techniques of 3D modelling in parametric CAD software.
- To provide an experiential learning environment, while applying CAD, CAE tools to design of simple parts, assemblies, mechanisms and structures.

Course Outcomes

At the end of the course, students will be able to:		Blooms Level
CO1	Analyze technical drawings using both CAD and basic manual tools.	K4
CO2	Prepare data using MS-word & Excel to visualize graphs, charts in MS-Excel	K3
CO3	Apply Multi-View Projection, Sectional Views, Auxiliary Views and dimensioning to create pictorial drawings.	K3
CO4	Create mechanical parts for different applications	K6
CO5	Apply the stages of the design process from scratch using engineering graphics techniques such as sectional projections, dimensioning and computer generated drawings (2D and 3D) using AUTOCAD	K3



K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5-Evaluate, K6- Create

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 software 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



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