



**DR. A P J ABDUL KALAM UNIVERSITY,
INDORE**

SYLLABUS

For

**DIPLOMA MECHANICAL ENGINEERING
(SECOND YEAR, IVth SEM)**

Dr. A P J Abdul Kalam University, Indore

DR. A P J ABDUL KALAM UNIVERSITY, INDORE

Syllabus for Diploma Mechanical Engineering

List of Subject (Second Year, IVth Sem)

S. No.	Subject Code	Subject name	Page No.
1	MED 401	FLUID MECHANICS & HYDRAULIC MACHINES	3
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Unit 1. Fundamentals of Fluid Flow : Definition of fluid, ideal and practical, compressible and incompressible fluids, fluid properties- density, specific weight, specific gravity, dynamic and kinetic viscosity, types of flow- laminar and turbulent, steady and unsteady, uniform and non-uniform. Continuity equation, Simple numerical problems on continuity equation.

Unit 2. Pressure and Its Measurement: Concept of pressure, intensity of pressure, Pascal's law, pressure head, gauge pressure, vacuum pressure, absolute pressure, manometers- Piezometer, U-tube manometer inclined manometer, differential manometer ,inverted U-tube manometer Pressure gauges, Bourdon tube pressure gauge. Simple numerical problems on differential manometers.

Unit 3. Basic Equation of Fluid Flow: Various form of energies applicable to fluid flow, potential energy, kinetic energy, pressure energy, total energy of fluid flow, Concept of datum pressure, velocity and total head of a fluid particle in motion. General steady flow energy equation, Bernaulli's theorem, assumptions made in deriving Bernaulli's theorem and derivation of Bernaulli's theorem, practical applications of Bernaulli's equation: venturimeter, orifice- meter, pitot tube, flow nozzle- Their construction, working and limitation. Simple problems on venturimeter, orifice meter, pitot tube.

Unit 4. Flow Through Orifices and Mouth Pieces and flow measurement: Definition and types of orifices, Vena contracta, coefficient of contraction., velocity, discharge and resistance . Torricell's theorem experimental determination of C_c , C_v and C_d . Head loss due to sudden enlargement, contraction and obstruction in pipe. Mouth pieces, Time of emptying vessel by orifice (cylindrical, conical) Flow from one vessel to another large orifices. Flow measurement by Rota meter, Volume flow meter

Unit 5. Flow Through Notches and Weirs : Weirs and notches definition, Classification, flow over rectangular weir with and without velocity of approach, calibration of rectangular weir, different formula for large rectangular weir. Time required to empty a reservoir with rectangular weir, V-notch. Advantages of triangular notch over rectangular notch. Trapezoidal notch. Broad crested and submerged weirs. Practical application of weirs. Spillway and Siphon spillway, guage weir.

Unit 6. Flow Through Pipes : Laminar and turbulent flow, Raynold's number, differentiation of laminar and turbulent flow on the basis of Reynold's number, loss of head due to friction in pipes, Darcy's formula and Chezy's equation. Hydraulic gradient and total energy line. Flow through long pipes, pipes in series and parallel simple problems based on above formulae water hammer and its effect surge tank.

Unit 7. Impact of Jets : Impact of Jet on flat and curved plates stationary and moving, work done by Pelton wheel, velocity triangle, simple numerical problems on axial, radial flow.

Unit 8. Water Turbines : Meaning Classification Impulse and reaction turbine, Comparison description and working of Pelton, Francis and Kaplan turbines, Fanlaws specific speed & Selection of turbines.

Unit 9. Water Pumps : Centrifugal and reciprocating- principle construction, working classification and layout. Comparison of centrifugal and reciprocating pumps. Specific speed, selection of pumps. Use of air vessels in reciprocating pump, indicator diagram, horse power calculation in case of reciprocating pump. Horse power calculation in case of centrifugal pump. Operating characteristics.

Unit 10. Model Analysis : Geometric, Kinetic and dynamic similarity. Simple Problems.

Unit 11. Hydel Power Station : Schematic diagram, function of various elements, advantage over other power stations.

REFERENCE BOOKS

- 1 A text Book of Hydraulics, Fluid Mechanics and Hydraulic Machines. by Khurmi (S. Chand &Co.)
- 2 Fluid Machines by M. Manohar
- 3 Hydraulics & Hydraulic Machines by Dr. Jagdish lal (Metropolitan)
- 4 Hydraulics & Hydraulic Machines by Priyani.
- 5 Fluid Machines With Engineering Applications by R.L. Draught lery & A.C. Jugersoll. (Mc-Graw Hills)
- 6 Journal of experiments in Hydraulic Laboratory by V. N. Rao & Husan New Heights.
- 7 Fluid Mechanics by Dr. M.L. Mathur (Std. Publications).
- 8 Taral Yantriki Avum Machinery (Hindi) by G.B. Bamanker. (Deepak Prakashan, Gwalior).

S.No.	EXPERIMENT
1	To measure the pressure of water in pipe by (a) Piezometer (b) different types of monometers
2	To verify Bernaulli's equation.
3	To determine discharge through a given venturimeter.
4	To determine discharge through a given orifice meter.
5	To determine discharge through a Pitot tube.
6	To determine Cc, Cv and Cd for different types of orifices and mouth pieces.
7	To determine loss of head due to : (a) Sudden enlargement. (b) Friction in pipes.
8	To determine discharge through different types of notches.
9	Study of Pelton wheel, Francis turbine, and Kaplan turbines.
10	To determine performance characteristics.
11	Study of reciprocating pump.
12	To determine h.p. of reciprocating pump.
13	Study of centrifugal pump.
14	To determine operating characteristics of centrifugal pump.

Unit 1. Dimensions and systems of units: Basic and Derived units for common engineering variables and properties like mass, length, time, temperature, area, volume, velocity, acceleration, force, pressure, work, heat, energy, power etc.

Unit 2. Sources of energy: Brief description of energy sources Classification of energy sources, Renewable, Non-Renewable, Fossil fuels, including CNG, LPG; Solar Energy- Its nature, merits and demerits, potential; Flat plate and concentrating collectors & their application. Solar Water Heater, Solar Air Heater, Photovoltaic Cell, Solar Distillation; Wind, Tidal, Geothermal, Biogas, Biomass, Bio-diesel, Hydraulic, Nuclear, Fuel cell – list of fuel cells

Unit 3. Basic Concepts of thermodynamics: Definition and importance of thermodynamics, thermodynamic system open, closed and Isolated system, boundary and surrounding forms of energy. Point and path functions, properties of system intensive and extensive properties thermodynamic state, thermodynamic process, cycles thermodynamic definition of work, heat and thermodynamic equilibrium, Zeroth law of thermodynamics, Quasi-static process, work done during Quasi Static process.

Unit 4. First Law of Thermodynamics: Concept of heat reservoir, heat source and heat sink, Statement of first law, Mathematical representation, applications of first law to open and closed system. Concept of internal energy and its calculation, relationship between heat transfer, work transfer and change in internal energy. Differentiation between shaft work, flow work and displacement work; Steady flow energy equation and its application to various units such as boiler, nozzle, turbine compressor enthalpy.

Unit 5. Second Law of Thermodynamics: Limitation of first law. Statements of second law Kelvin, Planck and Clausius statements, Concept of heat pump, refrigerator and heat engine thermal efficiency. Parameters affecting thermal efficiency, means of increasing efficiency, COP. Equivalence and irreversible processes. Factors which make a process irreversible. Reversible cycle. Carnot cycle its efficiency and limitation ; Carnot theorem Clausius Inequality, concept of entropy, Principle of increase of entropy, determination of increase of entropy, principle of increase of entropy, determination of increase of entropy, Statement of third law of thermodynamics.

Unit 6. Ideal Gases and Gas Processes: Definition of an ideal gas, gas law, characteristics gas equation, specific and universal gas constants specific heat constant pressure and specific heat, constant volume. Ideal gas processes- isobaric isothermal, isentropic, polytropic and throttling process as applied to open and closed systems. Representation of these processes on P-V, T-S and H-S diagrams. Computation of change in enthalpy, entropy and internal energy. Net heat transfer and work done.

Unit 7. Thermodynamic Cycles: Air Standard cycles- definition and purpose standard efficiency, Carnot, Otto Diesel dual and Brayton cycles, their representation on P.V. & T.S. Diagrams. Derivation of air Standard efficiency and their comparison and limitation of each cycle. Vapour power cycle - Carnot cycle its limitation, Rankine cycle modified

Rankine cycle- their representation on P.V.T.S. and H.S. Planes, derivation of expression for thermal efficiency.

Unit 8. Two Phase System: Pure substance phase, phase changes steam as a two phase system steam formation and its representation on temp- enthalpy plane. Properties changes, representation of wet dry and saturated and superheated steam on P.V., T.S. and H.S. planes. Dryness fraction of steam, methods of determination of dryness fraction separation and throttling calorimeter. Use of steam tables and Mollier's diagram . Determination of change in properties such as entropy enthalpy internal energy and work and heat transfer in the following processes- isobaric, isochoric, isothermal, isentropic, polytropic, throttling, and representation of various processes on P.V. and H.S. planes.

Unit 9. Steam Generators: Definition, classification, working of Babcock and Wilcox Boiler and Lancashire, Boiler Mountings and accessories.

Unit 10. Steam Nozzle, Condensers and Turbines: Steam nozzle and its use, Condenser-Classification, construction and working of surface condenser, Classification, working principle of steam turbines, difference between impulse and reaction turbine, compounding of steam turbine, velocity diagram (introductory and its use) Governing of steam turbine.

Unit 11. Internal Combustion Engines: Introduction, classification I.C. Engine Components and their function, working of two stroke and four- stroke cycle engines and their comparison. Indicator diagram, Calculation of IHP, BHP thermal efficiency, Mechanical efficiency and relative efficiency, Governing, Cooling and lubrication of I.C. Engines.

Unit 12. Heat Transfer: Modes of heat transfer; Conduction convection and Radiation. Fourier's law of heat conduction, temperature gradient, expression for determination of heat transfer across a flat plate, thermal conductivity and thermal resistance. Newton's law for heat transfer by convection, free and forced convection. Heat transfer by radiation Stefan-Boltzmann Law of thermal radiation. Define the terms- absorptivity, reflectivity and transmissivity; black body, emissive power, grey body. Heat exchanger; Shell and tube, Plate type and their applications.

REFERENCE BOOK

- 1 Engineering Thermodynamics by P. K. Nag, Tata McGraw Hill Ltd.
- 2 Engineering Thermodynamics, C. P. Gupta, Rajendra Prakash
- 3 Thermal Engineering by P.L. Ballani. (Khanna Publisher's N. Delhi)
- 4 A Course in thermodynamics And Heat Engines by Kothanandran, Khajuria and Arora (Dhanpat Rai & Sons Delhi)
- 5 Treatise On Heat Engineering by Vasandani & Kumar (Metropocitan Book Co. Ltd, New Delhi)
- 6 Thermodynamics by G.T. Van Wylen (john Wiley & Sons)
- 7 Thermodynamic And Heat Engines Vol . I & II by R. Yadav. (Central Book Depot, Allahabad)

8 Heat Power by Kashitish Chandra Pal (Orient Longman Hyderabad)

9 I.S. 2986- 1966.

10 Tapiya Abhyantriki (Hindi) by G.B. Bamankar (Deepak Prakashan, Morar Gwalior)

S.No.	EXPERIMENT
1	Study and trial on solar water heating system
2	Report on visit to wind power generation plant / biogas plant / hydraulic power plant.
3	Trace the flue gas path and water-steam circuit with the help of boiler model and write a report.
4	Study or Report on visit to sugar factory / Dairy / steam power plant with specifications of boiler and list of mountings and accessories..
5	Study of separating and throttling calorimeter.
6	Study of steam turbine.
7	Study of different types of I.C. engines (four stroke and two stroke C.I. and S.I.)
8	Study of various systems of I.C. engines. (a) Fuel supply system (b) Cooling system (c) Ignition system (d) Government system. (e) Lubrication system
9	Study of (a) Fuel pump (b) Fuel injector (c) Carburetor.
10	Study and compare various heat exchangers such as radiators, evaporators, condensers, plate heat exchangers etc.
11	Numerical on vapour processes and ideal gas processes (minimum two problems on each)
12	Two phase systems equilibrium diagram on p-v , T-s, h-s plane
13	Study of flow of heat in natural environment at least 10 cases and relation to second law of thermodynamics

Unit 1. Simple Mechanism: Introduction of theory of machines, definitions- statics, dynamics, kinematics, kinetics, kinematic pair, kinematic chain, mechanism, machine inversions, relation between number of links, number of joints and number of pairs, Four bar chain and its inversion, Slider crank chain and its inversions.

Unit 2. Velocity and Acceleration of Points and Links : Angular and linear velocity, relative and absolute velocity, velocity in links. Instantaneous centre, locating instantaneous centre of rotation, velocity determination of four bar mechanism by relative velocity method, Acceleration of link centripetal and tangential, total relative and absolute acceleration. Velocity and acceleration diagrams for four bar and other mechanisms. Klein's construction for single slider crank mechanism. Analytical method of calculating the velocity and acceleration of piston in a reciprocating engine mechanism.

Unit 3. Dynamic force analysis, Crank Effort Diagrams and Flywheel : Dynamics of reciprocating engine mechanism. Inertia force due to reciprocating mass, piston effort crank effort, turning moment on crank shaft, Analytical and graphical methods of construction of turning moment diagrams for steam and I.C. engines. Fluctuation of energy and speed. Coefficient of fluctuation of energy and speed. Flywheel and its function . Calculation of moment of inertia. weight of flywheel for steam and I.C. engines.

Unit 4. Brakes and Dynamometers: Brakes - need, types, braking force, braking torque. band brakes, block brakes, internally expanded brakes, dynamometer- meaning, need and types . Simple numerical calculation on above items

Unit 5. Power Transmission : Drives : meaning, Classification, belt, chain, rope and gear drives. Flat and ' V ' belt, ratio of tensions . Slip length of belt calculation for open and cross belt drive. H.P. transmitted. Effect of centrifugal force, centrifugal tension, total tension maximum stress in belt. Maximum Power transmitted. Velocity for maximum H.P. condition. V-Belt drives, advantages and disadvantages of V-Belt drives. Rope Drives : Types, ratio of tensions, Designation of ropes as per B.I.S. **Chain Drive :** Classification, designation of chain drives as per B.I.S.

Unit 6. Governors : Functional difference with flywheel. Classification : Watt, porter, proell and hartnell- their construction and working. Sensitivity, stability, power and effort, hunting phenomenon and isochorism of governor.

Unit 7. Cams and Followers : Need, Classification. motion of follower Displacement, velocity and acceleration diagrams uniform velocity, uniform acceleration and retardation. Simple harmonic motion. Cam profile for radial. offset knife edged follower.

Unit 8. Balancing of Machine Parts: Concept Static and dynamic balancing of rotating parts. Simple numerical problems on static balancing of several masses in single plane graphical and analytical method.

Unit 9. Vibrations: Introduction elements of vibration. System classification and explanation of the types of vibration according to the actuating force on the body like undamped vibration. Free damped vibration and forced damped vibration. Classification and explanation of the types of vibration according to the number of degrees of critical speed of shaft.

Unit 10. Gear and Gear Train: Introduction , classification of gears , gear terminology , law of gearing ,velocity of sliding , forms of teeth –cycloid profile teeth , involutes profile teeth, path of contact, arc of contact. Interference in involutes gear , minimum no of teeth in gear and pinion classification of gear train . Function of idler. Calculation of velocity ratio, train value of gear train- simple, compound epicyclic and reverted gear train, motor car gear box.

REFERENCE BOOKS

- 1 Theory of Machines by J.M. Shah & H.M. Jadhvani.
- 2 Theory of Machines by Abdulla Shariff
- 3 Theory of Machines by M.R. Malhotra & H.C. Gupta. (Technical India Pub.)
- 4 Theory of machines by P.L. Ballani .
- 5 Theory of Machines by Thomas Bevan .
- 6 Theory of Machines by S. S. Ratan.
- 7 Theory of Machines By R.S.Khurmi
- 8 Theory of Mechanism and Machine By Jagdish Lal

S.No.	EXPERIMENT
1	Study of inversions of four bar chain mechanism
2	Study of inversions of single slider crank chain mechanism (a) crank slotted lever mechanism (b) Whitworth quick return motion mechanism
3	Dynamic force analysis of single cylinder four stroke engine.
4	Study of flywheel
5	Study of governor
6	Study of different cam and follower
7	Study of different gear trains
8	Study of power transmission methods
9	Study of different types of break and dynamometer
10	Study of types of vibration and their measurement methods
11	Study of dynamic balancing procedure of rotating parts

Unit 1. INTRODUCTION : Definition and functions of management. Management theories - Decision, Quantitative, Mathematical and Behavioral Science.

Unit 2. SYSTEM THINKING : System definition and parameters. Different production and non-production systems, system design, different types of models under system thinking.

Unit 3. MATERIALS MANAGEMENT: Introduction, function, purchase systems, stock turn-over, ordered quantity. Inventory, need of inventory control, EOQ and simple numerical problems on EOQ. Safety stock, different techniques of inventory control, ABC analysis (simple treatment only).

Stores management - storing procedure and store records.

Unit 4. PRODUCTION PLANNING AND CONTROL : Production systems, characteristics of each type, production and consumption rate. PPC functions, Gantt chart, advantages and preparation of Gantt chart (simple cases only), Critical ratio scheduling.

Unit 5. VALUE ANALYSIS: Concept of cost and value, types of value, objectives and procedure of value analysis, VA test, DARSIRI method of VA.

Unit 6. PROJECT PLANNING BY NETWORK : Network definition, objectives. CPM and PERT, activity, event, network formation, Fulkerson's rule, dependency of activities, dummy activity, duration, EST, EFT, LST, LFT, EPO, LPO, Total float and Free float. Network analysis in tabular form.

Unit 7. INDUSTRIAL RELATIONS : Need, objectives and functions of personnel management, job analysis and job description, recruitment procedure, selection, difference between recruitment and selection, training and its advantages. Communication in industry - its need and importance, techniques and barriers of communication. Grievances - its meaning and factors responsible for grievances, procedure for handling grievances. Strikes and Lock-out. Motivation - meaning and its benefits, techniques of motivation. Morale - definition and importance, factors responsible for high morale. Job satisfaction - factors influencing job satisfaction.

Unit 8. SUPERVISION AND LEADERSHIP: Meaning and role of Supervisor in an industry. Older workers and their supervision. Concept of Leadership, qualities of good leader, leadership styles.

Unit 9. ORGANISATIONAL DYNAMICS : Characteristics and principles of Organisation, Modern organisational approach, types of organisation, meaning and significance of various types of organisation, resistance to change, factors for reducing the resistance to change.

Unit 10. OPERATIONS RESEARCH: Definition and concept of OR, methods of OR, simple Linear Programming problem formulation and solution by Graphical method.

Unit 11. NEW TRENDS IN MANAGEMENT: Role of computers in management, Introduction to Management Information System (MIS). Total Quality Management (TQM) - Introduction, stages of development - Inspection, Quality Control, Quality Assurance, Total Quality Control, TQM. Introduction to ISO-9000. Deming's PDCA Cycle (Plan, Do, Check and Action). Japanese Quality Management, culture, Kaizen Strategy (continuous improvement), Quality Circle, Just In Time (JIT) - concept and application.

REFERENCE BOOKS

1. Learning Package on Industrial Management Publisher : TTTI, Bhopal.
2. CPM and PERT - Principles and Applications By L.S.Shrinath
3. Industrial Engg. and Management By O.P.Khanna. Khanna Publisher.
4. Industrial Organisation and Management By K.K.Ahuja
5. Modern Production Operation Management By Buffa Willey Eastern Ltd. (latest edition)
6. Production Operation Management By Goel B.S. Pragati Prakashan.

Unit 1.

INTRODUCTION TO ENTREPRENEURSHIP

- Definition of Entrepreneur / Entrepreneur
- Difference between Entrepreneurship / Entrepreneurship
- Need for Entrepreneurship
- qualities of successful entrepreneur
- Myths about Entrepreneurship
- Classification of entrepreneurs on the basis of different criteria
- Reasons for the failure of entrepreneurs

Unit 2.

INDUSTRIES AND BUSINESS ORGANIZATIONS

- Concept of Industry or Enterprise
- Classification of Industries
- (a) On the basis of capital investment
 - Tiny (Micro) Industry
 - Small Scale
 - Medium Scale
 - Large Scale
- (b) Others
 - Rural Industry
 - Cottage Industry
- (c) Forms of Business Organization
 - Proprietorship
 - Board & Co-operative
 - Partnership
 - Public Ltd.
 - Private Ltd.
 - IT Sector
 - Government Co-operative / Undertakings
- (d) Tiny small scale Industry
 - Definition
 - Its significance in National Development.
 - Govt. policies for SSI promotions
 - Sector / Product for SSI.

Unit 3.

INSTITUTIONAL ASSISTANCE

- (a) Types of Institutional assistance
 - Infra - structural assistance
 - Technical Assistance
 - Financial assistance
 - Marketing Assistance
 - (b) Information / guidance & Training
 - SISI - ASK
 - MPCON - CSIR
 - CED- MA - NRDC
 - (c) Infrastructure
 - D/C - AVN/AKVN
 - (e) Finance
 - SIDBI - KVIB MPFC
 - NABARD - MPWDC NSIC
- M.P.A.V.V.N.

(d) Marketing

- MP- AGRO
- NSIC
- PM.LUN
- EXPORT COPPORATION
- KVIP
- MPHSVN MPLDC

(e) Quality Control

- BIS - FPO - MPLUN F.D.A.

Unit 4.

INCENTIVES / CONCESSION / FACITLITIES AVAILABLE

- Seed money
- Incentive / subsidies
- Others (Phones, Lands etc)

Unit 5.

PLANNING OF AN INDUSTRIAL UNIT (SSI)

- Pre- Planning Stage
- Scanning the environment
- Market survey
- Seeking information
- product / project selection
- Implementation Stage
- PPR Preparation
- DIC registration
- Arrangement of Land
- Arrangement of Power
- Obtaining NOC / Licenses from various departments
- DPR Preparation
- Seeking financial assistance
- Commercial Production
- Post Implementation stage
- Permanent registration from D.I.C.
- Availing Subsidies
- Diversification / Modification
- Setting up of marketing channel / Distribution.

Unit 6.

ACHIVEMENT MOTIVATION

- Historical perspective
- Concept of achievement motivation
- Significance of achievement motivation
- Development of achievement motivation

Unit 7.

FINANCIAL MANAGEMENT OF AN INDUSTRIAL UNIT (SSI)

- Tools of financial analysis
- Ratio analysis
- Fund Flow / Cash flow analysis
- Working capital and concepts
- Financial accounting

REFERENCES

1. Entrepreneurial Development Vol. I,II,III By Vasant desai Himalaya Publication
2. CEDMAP (Center of Entrepreneurial development Madhya Pradesh)
3. Udyamita Vikas By Anand Prakashan

PROJECT WORK/ASSIGNMENT

1. To prepare chart to showing various factors affecting entrepreneurship.
2. To collect details related to various schemes run by the Govt. for Self-Employment and Entrepreneurship.
3. To identify and select a project and conduct Market-Survey thereof.
4. To collect various formats used in industries & departments/institutions working in the field of entrepreneurship.
5. Visit few small scale industries situated in city, nearby industrial area.
6. Discuss the problems related to SSI (Small Scale Industries) with an entrepreneur.
7. Collect information about market rates quality and quantity of goods for their choice.
8. Develop logical and analytical approach to purchase the raw material / finished goods
9. To prepare case study of successful entrepreneurs.
10. Preparation of Project report for the industry/ Business they are willing to start.

S NO.	DETAILED COURSE CONTENT
Unit 1	MARKETING & CONCEPT
1.1	Evolution of marketing-a historical background
1.1.1	The stage of barter
1.1.2	The stage of money economy
1.1.3	The stage of industrial revolution
1.1.4	The stage of competition
1.1.5	The emergence of marketing
1.2	Selected definitions of marketing
1.3	Different concept of marketing
1.3.1	The exchange concept
1.3.2	The production concept
1.3.3	The product concept
1.3.4	The sales concept
1.3.5	The marketing concept
1.4	Difference between selling & marketing
1.5	Benefits & significance of marketing
1.5.1	Helps to remove causes for under development
1.5.2	Improve productivity & efficiency
1.5.3	Canalize country's economic resources properly
1.5.4	Insure better deal for consumer
1.5.5	Make economic planning meaningful & relevant etc.
Unit 2	Marketing environment
2.1	Internal & external factors
2.1.1	Demographic environment
2.1.2	Economic environment
2.1.3	Political environment
2.1.4	Physical environment
2.1.5	Technological environment
2.1.6	Competitive environment
2.1.7	Social & cultural environment
2.2	Micro & macro environment
Unit 3	Marketing planning & organization
3.1	Scope & importance of planning
3.2	Steps in marketing planning process
3.3	Purpose & principle of organization
3.4	Models of marketing organization
3.4.1	Line & staff type
3.4.2	Product based organization
3.4.3	Territory oriented organization
3.4.4	Complex organization
3.5	Task of chief marketing executive

3.6	Decentralization
Unit 4	Market segmentation
4.1	Types of market
4.2	Definitions & benefits of segmentation
4.3	Methods of segmentation
4.3.1	Geographic segmentation
4.3.2	Demographic segmentation
4.3.3	Psychographic segmentation
4.3.4	Buyer behavior Segmentation
4.3.5	Volume segmentation
4.4	Steps in market segmentation
4.5	Market targeting
Unit 5	Market mix
5.1	Definition of market mix
5.2	Elements of marketing mix (4 P'S)-Product,Place,Price,Promotion
5.3	Environmental variable (uncontrollable variables)
5.3.1	Customer variable
5.3.2	Competition variable
5.3.3	Trade variable
5.3.4	Environmental variable
5.4	Product Management
5.4.1	Components of product <ul style="list-style-type: none"> • The core or basic constituent • The associated features • The brand names, package,label
5.4.2	Types of product <ul style="list-style-type: none"> • The generic product • The branded product • The differentiated product • The customized product • The augmented & potential product
5.4.3	The product line & product mix
5.5	New product development (NPD)
5.5.1	Significance & classification of new product
5.5.2	Stages in NPD
5.5.3	Estimating the demand for new product
5.5.4	Test marketing
5.6	Product life cycle (PLC)
5.6.1	Concepts & benefits of PLC
5.6.2	Different stages in PLC

5.6.3	Strategies used in different stages
5.7	Place management
5.7.1	Physical distribution <ul style="list-style-type: none"> • Definitions & importance of physical distribution • Designing the physical distribution system
5.7.2	The distribution channel <ul style="list-style-type: none"> • The role & importance of distribution channel • Planning & designing of distribution channel • Types of distribution intermediaries
5.8	Price management
5.8.1	The meaning & importance of pricing
5.8.2	Objectives of pricing
5.8.3	Factors affecting pricing –Internal & external
5.8.4	Pricing methods <ul style="list-style-type: none"> • Cost based pricing • Break even pricing • Demand based pricing • Competition based pricing • Product line pricing • Tender pricing • Affordability pricing • Differentiated pricing
5.8.5	Pricing policies & setting the price
5.9	Promotion management
5.9.1	Sales promotion <ul style="list-style-type: none"> • Importance & objectives of sales promotion • Tools & techniques of sales promotion
5.9.2	Advertising <ul style="list-style-type: none"> • Role & importance of advertising • Types of advertising • Deciding on the advertising budget • Evaluating advertising effectiveness
5.9.3	Difference between sales promotion & advertising
Unit 6	Understanding consumer
6.1	Factor influencing buyer behavior <ul style="list-style-type: none"> • Information from variety of sources • Socio-cultural environment of buyer • Group influence

	<ul style="list-style-type: none"> • Religion & language • Concern about status
6.2	Buying motives –Product & patronage motive
6.3	Buying habits – Convenience, shopping and spatiality goods
Unit 7	Marketing research & sales forecasting
7.1	Definition & importance of marketing research
7.2	Steps in marketing research <ul style="list-style-type: none"> • Defining problem • Problem analysis • Developing research design • Developing research procedure • Data collection –Primary & secondary • Analyzing & interpretation • Summarizing & preparing the research report
7.3	Method of market research
7.4	Necessity & purpose of sales forecasting
7.5	Methods of sales forecasting
Unit 8	Sales management
8.1	Designing the sales force
8.2	Managing the sales force <ul style="list-style-type: none"> • Recruitment & selection • Training, compensation, control • Supervision & direction • Motivation of salesman
8.3	Fixing sales quota
8.4	Duties & responsibilities of sales manager

LIST OF REFERENCE BOOKS

1. Marketing management - Analysis, Planning & Control - Philip Kotler
2. Principles & practice of Marketing in India - C.B.Memoria & R.L.Joshi
3. Contemporary Marketing – Louis & Bone & David L. Kurtz
4. Essential of Management –Koontz
5. Marketing management- S.A. Sherlekar

S.NO	CONTENT
Unit 1	SOCIAL SKILLS SOCIETY, SOCIAL STRUCTURE, DEVELOP SYMPATHY AND EMPATHY
Unit 2	Swot Analysis – Concept , How to make use of SWOT
Unit 3	Inter personal Relation Sources of conflict, Resolution of conflict , Ways to enhance interpersonal relations.
Unit 4	Problem Solving I)STEPS IN PROBLEM SOLVING, 1)IDENTIFY AND CLARIFY THE PROBLEM, 2)INFORMATION GATHERING RELATED TO PROBLEM, 3)EVALUATE THE EVIDENCE, 4)CONSIDER ALTERNATIVE SOLUTIONS AND THEIR IMPLICATIONS, 5)CHOOSE AND IMPLEMENT THE BEST ALTERNATIVE, 6)REVIEW II)Problem solving technique. (any one technique may be considered) 1) Trial and error, 2) Brain storming, 3) Lateral thinking
Unit 5	Presentation Skills Body language -- Dress like the audience Posture, Gestures, Eye contact and facial expression. PRESENTATION SKILL – STAGE FRIGHT, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. Use of aids –OHP,LCD projector, white board
Unit 6	Industrial Visits Structured industrial visits be arranged and report of the same should be submitted by the individual student, to form a part of the term work. TWO industrial visits may be arranged in the following areas / industries : i) Manufacturing organizations for observing various manufacturing processes including heat treatment . ii) Material testing laboratories in industries or reputed organizations iii) Auto workshop / Garage iv) Plastic material processing unit v) ST workshop / City transport workshop
Unit 7	Lectures by Professional / Industrial Expert be organized from ANY THREE of the following areas : i) Use of a plastics in automobiles. ii) Nonferrous Metals and alloys for engineering applications iii) Surface Treatment Processes like electroplating, powder coating etc. iv) Selection of electric motors. v) Computer aided drafting. vi) Industrial hygiene. vii) Composite Materials. viii) Heat treatment processes. ix) Ceramics x) Safety Engineering and Waste elimination

Unit 8	<p>Individual Assignments : Any two from the list suggested</p> <p>a) Process sequence of any two machine components. b) Write material specifications for any two composite jobs. c) Collection of samples of different plastic material or cutting tools with properties , specifications and applications. d) Preparing models using development of surfaces. e) Assignments on bending moment , sheer forces , deflection of beams and torsion chapters of strength of material. f) Select different materials with specifications for at least 10 different machine components and list the important material properties desirable. g) Select 5 different carbon steels and alloy steels used in mechanical engineering applications and specify heat treatment processes employed for improving the properties. Also give brief description of the heat treatment processes. h) List the various properties and applications of following materials – a.Ceramics b. fiber reinforcement plastics c. thermo plastic plastics d. thermo setting plastics e. rubbers.</p> <p>OR</p> <p>Conduct ANY ONE of the following activities through active participation of students and write report</p> <p>i) Rally for energy conservation / tree plantation. ii) Survey for local social problems such as mal nutrition, unemployment, cleanliness, illiteracy etc. iii) Conduct aptitude , general knowledge test , IQ test iv) Arrange any one training in the following areas : a) Yoga. B) Use of fire fighting equipment and First aid Maintenance of Domestic appliances.</p>
Unit 9	<p>Group discussion and Interview technique – Introduction to group discussion, Ways to carry out group discussion, Parameters— Contact, body language, analytical and logical thinking, decision making. The students should discuss in a group of six to eight students and write a brief report on the same as a part of term work. Two topics for group discussions may be selected by the faculty members. Some of the suggested topics are -</p> <p>i) Sports ii) Current news items iii) Discipline and House Keeping iv) Current topics related to mechanical engineering field.</p> <p>INTERVIEW TECHNIQUE NECESSITY, TIPS FOR HANDLING COMMON QUESTIONS</p>
Unit 10	<p>Working in Teams UNDERSTAND AND WORK WITHIN THE DYNAMICS OF A GROUPS. TIPS TO WORK EFFECTIVELY IN TEAMS, ESTABLISH GOOD RAPPOR, INTEREST WITH OTHERS AND WORK EFFECTIVELY WITH THEM TO MEET COMMON OBJECTIVES, TIPS TO PROVIDE AND ACCEPT FEEDBACK IN A CONSTRUCTIVE AND CONSIDERATE WAY , LEADERSHIP IN TEAMS, HANDLING FRUSTRATIONS IN GROUP</p>
Unit 11	<p>Task Management INTRODUCTION, TASK IDENTIFICATION, TASK PLANNING ,ORGANIZING AND EXECUTION, CLOSING THE TASK</p>

Assignment: (Any Eight Assignments)

1) SWOT analysis:- Analyse yourself with respect to your strength and weaknesses, opportunities and threats. Following points will be useful for doing SWOT.

a) Your past experiences,

b) Achievements,

c) Failures,

d) Feedback from others etc.

2) Undergo a test on reading skill/memory skill administered by your teacher.

3) Solve the puzzles.

4) Form a group of 5-10 students and do a work for social cause e.g. tree plantation, blood donation, environment protection, camps on awareness like importance of cleanliness in slum area, social activities like giving cloths to poor etc.(One activity per group).

5) Deliver a seminar for 10-12 minutes using presentation aids on the topic given by your teacher.

6) Watch/listen an informative session on social activities. Make a report on topic of your interest using audio/visual aids. Make a report on the programme.

7) Conduct an interview of a personality and write a report on it.

8) Discuss a topic in a group and prepare minutes of discussion. Write thorough description of the topic discussed.

9) Arrange an exhibition, displaying flow-charts, posters, paper cutting, photographs etc on the topic given by your teacher.

Note: - Please note that these are the suggested assignments on given contents/topic. These assignments are the guide lines to the subject teachers. However the subject teachers are free to design any assignment relevant to the topic. The **term work** will consist of any eight assignments.

MINI PROJECT ON TASK MANAGEMENT. DECIDE ANY TASK TO BE COMPLETED IN ASTIPULATED TIME WITH THE HELP OF TEACHER. WRITE A REPORT CONSIDERING VARIOUS STEPS IN TASK MANAGEMENT.

Learning Resources:

Books: Sr. No	Author	Title of the book	Publisher
1	Marshall Cooks Adams	Time management	Viva Books
2	E.H. Mc Grath , S.J.	Basic Managerial Skills for All	Pretice Hall of India, Pvt Ltd
3	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.
4	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
5	by Adair, J	Decision making & Problem Solving	Orient Longman
6	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
7	Marion E Haynes	Make Every Minute Count	Kogan page India
8	Steven L McShane and Mary Ann Glinow	Organizational Behavior	Tata McGraw Hill
9	Stephen P. Robbins	Organizational Behavior	Pretice Hall of India, Pvt Ltd
10	Michael Hatton	Presentation Skills	(Canada – India Project) ISTE New Delhi
11		Stress Management Through Yoga and Meditation	Sterling Publisher Pvt Ltd
12	Richard Hale ,Peter Whilom	Target setting and Goal Achievement	Kogan page India
13	Chakravarty, Ajanta	Time management	Rupa and Company
14	Harding ham	Working in Teams	A Orient Longman

INTERNET ASSISTANCE

1. <http://www.mindtools.com>
2. <http://www.stress.org>
3. <http://www.ethics.com>
4. <http://www.coopcomm.org/workbook.htm>
5. <http://www.mapfornonprofits.org/>
6. <http://www.learningmeditation.com> <http://bbc.co.uk/learning/courses/>
7. <http://eqi.org/>
8. <http://www.abacon.com/commstudies/interpersonal/indisclosure.html>

9. <http://www.mapnp.org/library/ethics/ethxgde.htm>
10. http://www.mapnp.org/library/grp_cnfl/grp_cnfl.htm
11. <http://members.aol.com/nonverbal2/diction1.htm>
12. http://www.thomasarmstron.com/multiple_intelligences.htm
13. <http://snow.utoronto.ca/Learn2/modules.htm>