

B.E. (PTDC) Mechanical Engineering
SEMESTER – III

BRANCH	SUBJECT TITLE	SUBJECT CODE	Period per week			
			L	T	P	C
B.E. PART TIME MECHANICAL	Material Science & Engg. Materials	PTME-301	3	1	--	4

Crystal Atoms of Solid: Structure of atom binding in solids metallic, space lattice and crystal system arrangement of atoms in BCC, FCC and HCP crystal. Mechanical, Electrical , thermal , Magnetic & optical Properties of materials Types of materials.

Plastic deformations of metals: Point and line defects in crystals, their relation to mechanical properties, deformation of metal by slip and twinning, stress strain curves of polycrystalline materials ,Cold and hot working of metals and their effect on mechanical properties .

Alloy Formation and Binary diagram: Phase in metal system solution and inter-metallic compounds. Hume-Rottery's rules, solidification of pure metals and alloy equilibrium diagrams of iso-morphous, eutectic, peritectic and eutectoid system Iron carbon equilibrium diagram.

Heat treatment of Alloys: Principles of heat treatment of steel TTT curves Heat treating processes, normalizing, annealing and spheroidizing, hardening, tempering, Case hardening austempering, mar-tempering, precipitation hardening process with reference to Al, Cu alloys.

Engineering Materials & their applications : Ferrous & Non ferrous metals , base alloys, bronze brasses and Duralumin. Study of Advanced materials: Shape memory alloys, Carbon nano tubes, composite materials, Smart materials Powder Metallurgy: Property and application of powder metallurgy, various processes and methods of making products by powder metallurgy techniques. Polymers & Plastics, their properties & applications in engineering .Refractory materials.

References:

1. Narula GK, KS and Gupta VK; Material science; Mc Graw Hill Education
2. Askeland , Essentials of Materials Science & Engineering CENGAGE Learning .
3. R Balasubramaniam , Callister's Material Science ,Wiley Students edition
4. James F Shackelford ;Introduction to Material Science for Engineers PEARSON, Sixth edition.
5. Raghavan V; Material science and Engineering, PHI Publication.
6. Srinivasan R; Engineering materials and Metallurgy;
7. Agarwal BK Introduction to Engineering Materials , Mc Graw Hills

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BRANCH	SUBJECT TITLE	SUBJECT CODE	Period per week			
			L	T	P	C
B.E. PART TIME MECHANICAL	Energy Conversion System- I(STEAM)	PTME-302	3	1	2	6

UNIT– I

Boilers: Classification of boilers, Boiler Mountings & Accessories, Draught & its classification, chimney height & diameter calculation, efficiency of a chimney, Draught Losses. Modification of boilers, High Pressure Boilers – La-Mont, Benson, Velox and Super Critical Boiler, Fluidized Bed Boiler.

UNIT – II

Steam Condensers: Function & Various types of condenser, their efficiency, vacuum efficiency and measurement. Source of air leakage, Effect of air leakage & removal, Thermodynamic analysis.

UNIT – III

Direct Energy Conversions: Tidal Energy conversion, OTEC, MHD Power System, Geothermal Energy Conversion Technique, Thermo-electric effects, Thermo-electric & thermionic converters

UNIT – IV

Air compressors: working of reciprocating compressor, work input for single stage compression different, compression processes, effect of clearance, volumetric efficiency real indicator diagram, isentropic & isothermal and mechanical efficiency, multi stage compression, inter - cooling, condition for minimum work done, classification and working of rotary compressors.

References:

1. Fundamentals of Compressible Flow with Aircraft and Rocket Propulsion – S.M. Yahya – New Age International Publishers
2. Thermal Engineering – R.K. Rajput.
3. Thermodynamics & Heat Engines – R. Yadav – CPH. Reference Books:
4. Fundamental of Compressible Fluid Dynamics – P. Balachandran – PHI
5. Gas Turbine Theory & Jet Propulsion – J.K. Jain – Khanna Publishers
6. Fundamentals of Engineering Thermodynamic – R. Yadav – CPH.

List of Experiments (Please Expand it) :

1. Study of working of some of the high pressure boilers like Lamont or Benson
2. Study of Induced draft/forced and balanced draft by chimney
3. Determination of Calorific value of a fuel
4. Study of different types of steam turbines
5. Determination of efficiencies of condenser
6. Boiler trail to chalk out heat balance sheet
7. Determination of thermal efficiency of steam power plant
8. Study of Air compressors.

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B.E. PART TIME MECHANICAL	Production Process-I	PTME-303	3	1	-	4

Unit I

Metrology: Standards of Measurements, Linear and angular instruments; slip gauges, comparators, sine bar, angle gauges, clinometers, tape gauge, screw thread measurements limit gauging, Gauge design; fits and tolerance. Rolling: General description of machines and process; Rolling of structural sections plates and sheets; construction of mills; hot and cold rolling techniques

Unit II

Metal cutting : Principles of metal cutting, tool geometry ,Tool life plots , Mach inability, Tool wear , Cutting force analysis ,Cutting tool materials & Cutting fluids ,Economics of metal machining .

Unit III

Pattern Making: Pattern and pattern making, pattern allowances; pattern design considerations, core, core boxes, types of patterns. Foundry: molding and core sands and their properties molding machines, centrifugal casting, die casting shell molding; cupola description and operation. Lost wax molding; continuous casting.

Unit IV

Forging: Theory and application of forging processes description; principle of toleration of drop and horizontal forging machines; General principle of designs. Press working: Description and operation of processes, process of shearing, punching, piercing, blanking, trimming, perfecting, notching, lancing, embossing, coining, bending, forging and drawing press, tool dies, auxiliary equipment, safety devices, stock feeders, scrap cutters, forces, pressure and power requirements, requirements of stock material.

Unit V

Welding: Gas welding, Electric arc welding, A.C. and D.C. welding machines and their characteristics. Flux, Electrodes, Pressure welding, electric resistance welding spot, seam and built welding, submerged arc welding; thermit and TIG & MIG Welding, Brazing Gas cutting Spinning: Introduction of spinning.

References:

1. Anderson and Tetro; Shop Theory;TMH
2. Kaushik JP; Manufacturing Processes; PHI
3. Bawa; Manufacturing Processes; TMH
4. Rao PN; Manufacturing Tech- Foundry, forming welding; TMH
5. Rao PN; Manufacturing Tech- Metal cutting and machine tools; TMH
6. Chapman; Workshop Technology :
7. Begeman; Manufacturing Process : John Wiley
8. Raghuvanshi; Workshop Technology ;; Dhanpat Rai.
9. Ravi B; Metal Casting- CAD analysis; PHI.
10. Hajra Choudhary; Workshop Technology:, Vol I
11. Pandya & Singh;Production Engineering Science:.

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B.E. PART TIME MECHANICAL	Dynamics of M/Cs	PTME-304	3	1	2	6

Unit 1:

Dynamics of Engine Mechanisms: Displacement, velocity and acceleration of piston; turning moment on crankshaft, turning moment diagram; fluctuation of crankshaft speed, analysis of flywheel.

Unit 2:

Governor Mechanisms: Types of governors, characteristics of centrifugal governors, gravity and spring controlled centrifugal governors, hunting of centrifugal governors, inertia governors.

Unit 3:

Balancing of Inertia Forces and Moments in Machines: Balancing of rotating masses, two plane balancing, determination of balancing masses (graphical and analytical methods), balancing of rotors, balancing of internal combustion engines (single cylinder engines, in-line engines, V-twin engines, radial engines, Lanchester technique of engine balancing).

Unit 4:

Friction: Frictional torque in pivots and collars by uniform pressure and uniform wear rate criteria. Boundary and fluid film lubrication, friction in journal and thrust bearings, concept of friction circle and axis, rolling friction.

Clutches: Single plate and multi plate clutches, Cone clutches.

Unit 5

Belt drives; Velocity ratio, limiting ratio of tension; power transmitted; centrifugal effect on belts, maximum power transmitted by belt, initial tension, creep; chain and rope drives; Brakes: Band brake, block brakes, Internal and external shoe brakes, braking of vehicles. Dynamometer: Different types and their applications. Dynamic Analysis of Cams: Response of un-damped cam mechanism (analytical method), follower response analysis by phase-plane method, jump and cross-over shock.

References:

1. Ambekar, AG; Mechanism and Machine Theory; PHI
2. Rattan SS; Theory of machines; TMH
3. Sharma and Purohit; Design of Machine elements; PHI
4. Bevan; Theory of Machines;
5. Ghosh and Mallik; Theory of Mechanisms and Machines; Affiliated East-West Press, Delhi
6. Norton RL; kinematics and dynamics of machinery; TMH
7. Grover; Mechanical Vibrations
8. Balaney; Theory of Machines by
9. Theory of Vibrations by Thomson

List of Experiment (Pl. expands it):

- 1- Study of various models of governors.
- 2- Study of gyroscopic motion and calculation of value of gyroscopic couple.
- 3- Study of various types of Cams and followers and drawing the cam profile with the help of test kit.
- 4- Study of various first order vibration systems.
- 5- To study working of friction clutches using models

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B.E. PART TIME MECHANICAL	Computer Programming- III-JAVA	PTME-305	-	-	2	2

UNIT-I

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods, Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes.

UNIT-II

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un-modifiable Collections.

UNIT-III

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI, Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions, Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
 2. E. Balaguruswamy, "Programming In Java"; TMH Publications
 3. The Complete Reference: Herbert Schildt, TMH
 4. Peter Norton, "Peter Norton Guide To Java Programming", Techmedia.
 5. Merlin Hughes, et al; Java Network Programming , Manning Publications/Prentice Hall
- List of Program to be made (Expandable)
1. Installation of J2SDK
 2. Write a program to show Concept of CLASS in JAVA
 3. Write a program to show Type Casting in JAVA
 4. Write a program to show How Exception Handling is in JAVA
 5. Write Programs to show Inheritance and Polimorphism.
 6. Write a program to show Interfacing between two classes
 7. Write a program to Add a Class to a Package
 8. Write a program to demonstrate AWT.
 9. Write a Program to show Data Base Connectivity Using JAVA