Mandsaur University, Mandsaur (M.P.)

Department of Mechanical Engineering

Syllabus of

JAVA Programming CSE 240

B.Tech III-Semester (CBCS Scheme) (04YDC)

W.e.f. (session 2017-18)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
JAVA Programming CSE 240	-	-	**50**	**50**	2	-	4	4	**100**

Objective:

- To learn Object-Oriented programming concepts and techniques using the Java programming language.
- To learn to write, test and debug Object-Oriented programs using Java.

UNIT-I

Why Java, Basic features of JAVA, C++ vs. JAVA Flavors of Java, Java Designing Goal, Role of Java programmer in Industry, Java Development Kit (JDK), Java programming environment, Java Applications Programming Interface. The Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. Variables, arithmetic operators, constants, strings, statements, input and output, Control statements (if, if/else, switch), relational operators, boolean expressions, comparing Strings. Repetition statements (while, do/while, for), nesting One dimensional arrays of primitives, two dimensional arrays, arrays of objects.

UNIT-II

Java as an object oriented language: objects, classes, encapsulation, inheritance, Types of inheritance, polymorphism, abstract classes and abstract methods, Packages, scope and lifetime, Access specifies; this pointer, Memory allocation and garbage collection. Creating and operating Objects. Constructor & initialization code block. Access Control, Modifiers, methods Nested,

Inner class & Anonymous classes, concept of interfacing in JAVA, Argument Passing Mechanism Method Overloading, Method overriding and Recursion.

UNIT-III

Concept of static keyword in JAVA, static Member, static functions, Finalize () Method. Use of Modifiers with Classes & Methods. Exceptions and handling exception, Compile time errors, Run time errors, try...catch: Using Multiple catch Blocks, finally Block, Throwing an Exception, Using the throw Statement, Using the throws Statement.

UNIT-IV

Introduction of Multithreading: What? ,Life Cycle of a Thread Creating Thread Thread Schedular Sleeping a thread Joining a thread Thread Priority Daemon Thread Thread Pooling Thread Group ShutdownHook Performing multiple task by multiple thread Garbage Collection Runnable class Introduction Synchronization : What and Why? Synchronized method synchronized block static synchronization Deadlock Inter-thread Communication Interrupting Thread Stream.

UNIT-V

Introduction of Applet, Applet's Life Cycle, Applets vs. applications, Security and applet, The Applet class and its parent classes, AWT Controls, basic of event handling , Basic of Input and output stream . Basic of JDBC and its connectivity.

Outcome:

- By the end of the course students will be able to apply principles of Object Oriented Programming and Java programming in problem solving
- Students will be able to extend his/her knowledge of Java programming further on his/her own.

REFERENCE BOOKS:

1."JAVA, How to Program" by Deitel & Deitel, PHI, Pearson.
2. "Programming in Java" by E. Balaguruswamy, TMH Publications.
3." The Complete Reference" by Herbert Schildt, TMH.
4. "Peter Norton Guide to Java Programming" by Peter Norton, Techmedia.
5. "Java Network Programming" by Merlin Hughes, et al, Manning Publications/Prentice Hall.

LIST OF EXPERIEMENTS:

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 Programs to show Inheritance and Polymorphism.
5. Write a program to illustrate concept of constructor and copy constructor.
6. Write a program to show Interfacing between two classes.
7. Write a program to show How Exception Handling is in JAVA
8. Write a program to demonstrate multithreading using Java.
9. Write a program to add a Class to a Package.
10. Write a program to demonstrate applet life cycle.
11. Write a program to demonstrate AWT.
12. Write a Program to show Data Base Connectivity Using JAVA.

Mandsaur University, Mandsaur(M.P.)
Department of Mechanical Engineering
Syllabus of
Introduction to Engineering Mathematics with Applications – III (MAT030)
B.Tech.(III -Semester) (CBCS Scheme)(04YDC)
W.e.f. (session2017-18)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
Introduction to Engineering Mathematics with Applications – III (MAT030)	60	30	10	------	3	0	0	3	100

Objectives: To fulfill the needs of Engineers to understand the Applications of Fourier Series and Fourier Transform. To understand the basics of Laplace Transform, Inverse Laplace Transform and their methods. Revise basic knowledge of Functions and Differentiation with application. Revise basic knowledge of Functions and Differentiation with application.

UNIT I: Fourier series and Fourier Transform
Introduction of Fourier series, Fourier series for Discontinuous functions, Euler's formula, Dirichlet's conditions, Fourier series for even and odd function, Half range series, Paresevel's formula, Complex form of Fourier series. Introduction of Fourier Transform, Properties of Fourier Transform, Sine and Cosine Transform, Convolution and Paresevel's formula for Fourier Transform.

UNIT II: Laplace Transform
Introduction of Laplace Transform, Laplace Transform of elementary functions, properties of Laplace Transform, Change of scale property, Second shifting property, Laplace Transform of the derivative, Inverse Laplace Transform & its properties, Convolution Theorem, Applications of L.T. to solve the ordinary differential equations.

UNIT III: Complex Variables

Analytic function, Harmonic Conjugate function, Cauchy-Riemann Equation, Line Integral, Cauchy's Theorem, Cauchy's Integral formula, Singular points, Poles & Residues, Residue Theorem, Application of Residues theorem for evaluation of real integrals.

UNIT IV: Vector Calculus

Differentiation of Vectors, Scalar and Vector point function, Geometrical meaning of Gradient, Unit normal vector and Directional derivative, Physical interpretation of Divergence and Curl. Line integral, Surface integral and Volume integral, Green's Theorem, Stoke's Theorem and Gauss divergence Theorem.

UNIT V: Numerical Solution of Algebraic, Transcendental & Ordinary Differential Equations

Solution of Algebraic & Transcendental equations: Regula Falsi, Newton-Raphson, Iterative and Secant Method. Solution of simultaneous linear equations: Gauss Elimination, Gauss Jordan, Jacobi's and Gauss-Siedel Iterative methods.Solution of Ordinary Differential Equations: Taylor's Series, Picard's Method, Modified Euler's Method, Runge-Kutta Method, Milne's Predictor & Corrector method.

Outcomes: Useful for the field of Analog and Digital Communication, Signal Analysis. Useful for the field of Control Systems, Circuit Analysis, Signal Processing. Useful for the field of Control system, Network analysis, Transmission Lines. Applicable in the field of Physics, EMT and Transmission Line. Applied in the field of instrumentation in order to check accuracy, precision and error.

References

- Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India
- Advance Engineering Mathematics by D.G.Guffy
- Mathematics for Engineers by S. Arumungam, SCITECH Publuication
- Engineering Mathematics by S S Sastri P.H.I.
- Numerical Methods for Scientific and Engg. Computation by MKJain, Iyengar and RK Jain, New Age International Publication

Mandsaur University, Mandsaur(M.P.)
Department of Mechanical Engineering
Syllabus of
Production Technology- I (MEC 220)
B.Tech. (III-Semester) (CBCS Scheme)(04YDC)
W.e.f. (session2017-18)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
Production Technology-I (MEC220)	**60**	**30**	**10**	**------**	3	-	-	3	**100**

Course Objective: Production Technology-I is the study standard of measurement, powder metallurgy, metal casting, metal joining process, forming process. At the end of class, students will be able to understand concepts and fundamentals of measurement, powder metallurgy, metal casting, metal joining process, forming process.

Unit1:
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.

Unit 2:
Powder Metallurgy: Properties of Powder processed materials, Powder manufacturing, mechanical pulverization, sintering, Electrolytic Process, chemical reduction, atomization, properties of metal powders, compacting of powders sintering, advantages and applications of Powder metallurgy.

Unit 3:
Metal Casting: Introduction: Brief History, Advantages and Limitations, Applications Patterns: Pattern materials, allowances, types of pattern, color code scheme Sand Casting: Green and dry sand casting process, types of sand, molding sand and its properties, molding sand composition. Cores: Use, core material, types of cores, advantages and limitations, core prints, chaplets Gating and Risering System: Element of gating systems, types of gates, Riser design considerations Special Molding Processes: Investment casting process, Die casting process, shell molding process, Vacuum-Sealed casting process Casting defects: Causes and remedies of defects such as blowholes, pinholes, blisters, hot tears, cold shut, metal penetration, Melting Practices: cupola: charge calculations, construction.

Unit 4:

Metal Joining Processes: Welding, Brazing and soldering, classification of welding process, Principle, characteristics and applications of gas welding, thermit welding, electrical arc welding; Submerged arc welding; TIG and MIG welding; Resistance welding; Spot welding; Butt welding; Seam welding; Projection welding. Friction welding; Diffusion welding; Ultrasonic welding. Explosive welding. Welding defects; Types, causes, effects and remedy. Electrodes and Electrode Coatings.

Unit 5:

Forming Processes: Classification; Hot working and cold working; principle, advantages, disadvantages and applications. Forging: Classification, drop forging and press forging methods and use; Forging dies; types, materials.

Rolling: Characteristics and applications of hot rolling and cold rolling; Extrusion; Work materials and products; Press tool works; Basic principles, system, operations and applications. Shearing; Parting, notching, trimming, nibbling, blanking and piercing, drawing: wire drawing, tube drawing and deep drawing.

References:

1. Rao.P.N., Manufacturing Technology, Vol. 1,2 and 3, Tata McGraw Hill
2 Kalpakjian, S. & Schmid S.R, Manufacturing Engineering and Technology, Addison Wesley Longman
3. Jain R.K. Production Technology
4. Ghosh, A., & Mallik, A. K. 1986. Manufacturing Science: Ellis Horwood

Course Outcome:

Students have learned concepts and fundamentals of mechanical measurement, powder metallurgy, metal casting, metal joining process, different types of welding, forming process, metal rolling process.

Mandsaur University, Mandsaur(M.P.)
Department of Mechanical Engineering
Syllabus of
Strength of Materials (MEC230)
B. Tech. (III -Semester) (CBCS Scheme)(04YDC)
w.e.f. (session2017-18)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
Strength of Materials (MEC230)	40	20	10	30	2	1	2	4	100

Course Objective: Strength of Materials is the study of stresses and strains on rigid bodies understatic loads. At the end of this class, students will be able to analyze stress and deflection in rigidbodies due to axial, shear, torsional, and bending loads, as well as combined loads.

UNIT 1. MECHANICAL PROPERTIES OF MATERIALS: Ductility, malleability, hardness, toughness, fatigue, creep; behavior of materials under tension, compression, bending, shear; ductile and brittle materials, failure of MS and CI in tension and torsion.

SIMPLE STRESSES & STRAINS: Concept & types of Stresses and Strains, Poison's ratio, stresses and strains in simple and compound bars under axial loading, stress strain diagrams, Hooks law, elastic constants & their relationships, temperature stresses & strains in simple & compound bars under axial loading, Numericals.

UNIT 2: COMPOUND STRESSES & STRAINS: Concept of surface and volumetric strains, two dimensional stress system, conjugate shear stress at a point on a plane, principle stresses & strains and principal- planes, Mohr's circle of stresses, Numerical.

UNIT 3. SLOPE & DEFLECTION: Relationship between bending moment, slope & deflection, Mohr's theorem, moment area method, method of integration, Macaulay's method, calculations for slope and deflection of (i) cantilevers and (ii) simply supported beams with or without overhang under concentrated load, Uniformly distributed loads or combination of concentrated and uniformly distributed loads, Numericals.

UNIT 4. BENDING & SHEAR STRESSES IN BEAMS: Bending stresses in beams with derivation & application to beams of circular, rectangular, I,T and channel sections, composite beams, shear stresses in beams with combined bending, torsion & axial loading of beams.

UNIT 5. THEORIES OF FAILURE: maximum normal stress & shear stress theory; maximum normal and shear strain energy theory; maximum distortion energy theory; application of theories to different materials and loading conditions
COLUMNS & STRUT: stability of structures, Euler's formula for columns with different end conditions, Rankin's formula.

Outcome:

This subject is about the performance of deformable solids in various materials under the action of different kinds of loads. Thus the main objective of the course will be to show how to determine the stress, strain, and deflection suffered by bi-dimensional (and simple tridimensional) structural elements when subjected to different loads (e.g. normal, shear, torsion, bending and combined loads).

References:

- Rattan; Strength of materials; TMH
- Sadhu Singh; Strength of Materials; Khanna Pub.
- Dr. B.c.Punamia, A.K. Jain, Mechanics of materials, Laxmi publication (P) Ltd.
- R.K. Bansal, strength of materials, Laxmi publication (P) Ltd.
- RK. Rajput, Strength of materials, S. Chand Publication.
- Laboratory Experiments In Strength of Materials by B.D. Sharma

List of experiments:
1. To perform Standard tensile test on MS and CI test specimen.
2. To perform Direct/ cross Shear test on MS and CI specimen.
3. To study transverse bending on wooden beams for modulus of rupture.
5. To perform Brinell Hardness tests.
6. To perform Vicker hardness tes.t
7. To perform Izod impact test.
8. To perform Charpy impact test

Mandsaur University, Mandsaur(M.P.)

Department of Mechanical Engineering

Syllabus of

Engineering Thermodynamics (MEC 240)

B. Tech. (III -Semester) (CBCS Scheme)(04YDC)

w.e.f. (session2017-18)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
Engineering Thermodynamics (MEC 240)	40	20	10	30	2	1	2	4	100

Course objectives: Understand the nature and role of the following thermodynamic properties of matter, internal energy, enthalpy, entropy, temperature, pressure and specific volume. To enhance the understanding to access thermodynamic property data from appropriate sources. To explore the utility of Mollier chart and thermodynamic processes on appropriate thermodynamic diagrams, such as a temperature-entropy or pressure-volume diagram. Engineering Thermodynamics is the first course on Thermal Science and Engineering. It studies various energy interactions notably heat and work transfer. It is based on certain laws of nature which are never seen to be violated.

Unit-I

Basic concepts: Thermodynamics, Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, statement and significance, concept of an Ideal gas, Gas laws, Avogadro's hypothesis, Heat and work transfer. First law of Thermodynamics: First law for a closed system undergoing a cycle and change of state, energy, PMM1, first law of thermodynamics for steady flow process, steady flow energy equation applied to nozzle, diffuser, boiler, turbine, compressor, pump, heat exchanger and throttling process, filling and emptying process.

Unit-II

Second law of thermodynamics, heat engine, heat reservoir, Refrigerator, heat pump, COP, EPR, Available energy, Carnot's theorem, Carnot's cycle, efficiency of Carnot's cycle, statement of second law Reversible and irreversible processes, consequence of second law, Entropy: Clausius theorem, property of entropy, inequality of Clausius,
entropy change in an irreversible process, principle of increase of entropy, entropy change for non-flow and flow processes, third law of thermodynamics .T-S diagrams, Availability and Irreversibility. Gibbs and Helmholtz functions.

Unit-III

Energy: Energy of a heat input in a cycle, exergy destruction in heat transfer process, exergy of finite heat capacity body, exergy of closed and steady flow system, irreversibility and Gouy-Stodola theorem and its applications, second law efficiency.

Unit IV

Pure Substance, Phase, Phase-transformations, formation of steam, properties of steam, PVT surface, HS,TS,PV,PH,TV diagram, processes of vapor measurement of dryness fraction, Use of steam table and Mollier chart.

Unit V

Vapor Power cycles: Carnot vapor cycle, Rankine cycle, comparison of Carnot and Rankine cycle, calculation of cycle efficiencies, variables affecting efficiency of Rankine cycle, reheat cycle, regenerative cycle, reheat-regenerative cycle, feed water heaters. Gas Power cycles: Recapitulation of Carnot, Otto and Diesel cycle, Dual cycle, Comparison of Otto, Diesel and Dual cycles, air standard efficiency, mean effective pressure, brake thermal efficiency, relative efficiency, Brayton cycle, effect of reheat, regeneration, inter cooling and turbine and compressor efficiency on Brayton cycle.

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OUTCOMES:

A fundamental understanding of the first and second laws of thermodynamics and their application to a wide range of systems. An ability to analyze the work and heat interactions associated with a prescribed process path, and to perform a first law analysis of a flow system. An ability to evaluate entropy changes in a wide range of processes and determine the reversibility or irreversibility of a process from such calculations. Awareness with calculations of the efficiencies of heat engines and other engineering devices.

List of experiments (expandable)

1.To find mechanical equivalent of heat using Joules apparatus
2.To study working of impulse and reaction steam turbine by models.
3.To study working of Gas turbines by models and to identify various processes of Brayton Cycle.
4.To calculate COP of vapour compression refrigeration system and to plot on T-s, p-H diagrams.
5.To plot specific fuel consumption versus rpm diagrams for diesel and petrol engines Theory classes must be supplemented with laboratory classes.

Reference Books:

1. Engineering Thermodynamics by P.K. Nag, McGraw-Hill Education.
2. Fundamentals of Thermodynamics by Borgnakke & Sonntag, 7th Ed. Wiley India (P) Ltd.
3. Thermodynamics – An Engineering Approach by Yunus Cengel & Boles, McGraw-Hill Education.
4. Engineering Thermodynamics by Gordon Rogers and Yon Mayhew, Pearson Education Ltd.
5. Engineering Thermodynamics by Krieth, CRC Press.
6. Engineering Thermodynamics by Jones and Dugan, PHI Learning Pvt. Ltd.
7.Thermodynamics by Arora CP TMH.
8.Thermal Engineering by R Yadav.
9.Engineering Thermodynamics by Omkar Singh New Age International.
10.Engineering Thermodynamics by Ratha Krishanan PHI India Pvt. Ltd.

Mandsaur University, Mandsaur(M.P.)

Department of Mechanical Engineering

Syllabus of

Subject : Machine Design and Drawing(MEC250)

B. Tech. (III -Semester) (CBCS Scheme) (04YDC)

W. e. f. (session 2016-17)

Name of Subject With Code No.	Maximum Marks Allocation				Lectures per week			Credits	Total Marks
	Theory Paper		Continuous Evaluation	Practical Examination	L	T	P		
	End Sem. Test (EST)	Mid Sem. Test (MST)							
Machine Design and Drawing(MEC250)	**40**	**20**	**10**	**30**	2	1	2	4	**100**

Course objective: The Machine Drawing and Design syllabus aims to develop the concept of Industrial Practices of Preparation of Various types of Drawings of Machine components employed in engineering sectors. it enables the capability and creativity of designing and assembling of Various links and elements to develop innovative Machines and Mechanisms.

UNIT 1: Introduction to BIS Specification SP: 46 – 1988 Code of Engineering drawing, orthographic and isometric projection techniques – Dimensioning, Practical significance of dimensioning, Types of dimensioning, Rules of dimensioning, Chain and Progressive Aligned system and Unidirectional system of dimensioning, Sectioning ,Various types of sections : Full section, Half section, Removed and Revolved section, Auxiliary section, Sectioning conventions Orthographic views from isometric views of machine parts and vice versa..

UNIT 2 :. Elements of production drawing, Limits, fits and Tolerance (Dimensional and Geometrical tolerance), Surface finish, Surface roughness: Roughness and Machining symbols, indication on drawings. representation of machine parts such as external and internal threads, slotted heads, square ends, and flat radial ribs, slotted shaft, splined shafts, bearings, springs, gears. Rivet heads and Riveted joints, types of welded joints and representation, allocation of fits for various mating parts, tolerance data sheet, and tolerance table preparation, Geometric tolerance.

UNIT 3 : Assembly Machine Drawing: Basic concept, plotting technique, Assembly drawing with sectioning and bill of materials from given detailed drawings, Assembly drawing Exercises of : Cotter and Knuckle joints, pedestal and footstep bearings, Plummer block, crosshead, stuffing box, IC engines parts - piston and connecting rods; lathe machine parts: Tailstock.

UNIT 4 : Design consideration of Machine Parts: Introduction to Computer Aided Drafting (AutoCAD) software for 2D and 3D Modeling, Basic design concepts, Definition and understanding of various types of design, Design procedure, factors of safety, Design of components subject to static loads: riveted joints design of double and triple riveted butt joints with equal and unequal cover plates, Design of Circumferential joint, Longitudinal Butt Joint, welded joints threaded joints, pin, keys , cotter and knuckle, joints.

Outcome of Course : Acquiring the concepts of this subject the student learns to analyze the stresses and loads an element or link of a Machine sustains during performing a specific task in industrial sectors under different types of service conditions.

References:

1. Narayana and Reddy; Machine Drawing; New age, Delhi.
2. Singh A; Machine Drawing; TMH
3. Bhat, ND; Machine Drawing; Charotar
4. Agarwal and agrawal; Engineering Drawing; TMH
5. Bhandari VB; Design of Machine elements; TMH
6. John KC; Text Book Of Machine Drawing; PHI Learning
7. Kulkarni SG; Machine Design; TMH
8. Sharma PC, Agarwal DK; Machine Design; Katson
9. Shigley JE et al; Mechanical Engineering Design, TMH
10. Mubeen and Mubeen; Machine Design.
11. Machine Design Data Book : R. Mahadevan.
12. Machine Design Data Book : PSG Tech.

List of Experiments :

1. Computer Aided Drafting of simple machine parts
2 3D modeling of simple solid shapes
3 Design and drawing of parts contained in the syllabus

Practical Assignments: To Prepare Videos /3-D Animations/Power Point Presentations/ Graphics for better understanding and practical learning of the Machines : The Faculty should allocate the Units/Chapters/ Contexts to the different groups to cover the entire syllabus. Enclosing all the details : Name of Institute / Name of the Department/ Group No./ Name of Faculty / Session etc. The Best should be uploaded on the MU website .
