Shri Shankaracharya Technical Campus

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SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

SEMESTER – I

SL. NO.	BOARD OF STUDY	SUBJECT CODE	SUBJECT	PERIODS/WEEK			EXAMINATION SCHEME			TOTAL MARKS	CREDIT L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Applied Mathematics	ME224101	Advanced Mathematical Methods	3	1	0	100	20	20	140	4
2	Mechanical Engineering	ME224102	Mechanical Vibrations	3	1	0	100	20	20	140	4
3	Mechanical Engineering	ME224103	Advanced Material Science	3	1	0	100	20	20	140	4
4	Mechanical Engineering	ME224104	Computer Aided Design	3	1	0	100	20	20	140	4
5	Mechanical Engineering		ELECTIVE - I	3	1	0	100	20	20	140	4
6	Mechanical Engineering	ME224191	Mechanical Vibration Lab	0	0	4	75	-	75	150	2
7	Mechanical Engineering	ME224192	Computer Aided Design Lab	0	0	4	75	-	75	150	2
TOTAL				15	5	8	650	100	250	1000	24

L – Lecture, T –Tutorial, P – Practical, ESE − End Semester Exam, CT − Class Test, TA – Teacher's Assessment

ELECTIVE - I			
SL. No.	Board of Study	Subject Code	Subject
1.	Mechanical Engineering	ME224121	Engineering Tribology
2.	Mechanical Engineering	ME224122	Experimental Stress Analysis
3.	Mechanical Engineering	ME224123	Design of Pressure Vessels
4.	Mechanical Engineering	ME224124	Product Design and Development
5.	Mechanical Engineering	ME224125	Automation and Control

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SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224101	Advanced Mathematical Methods	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To impart solution techniques to solve linear and non-linear algebraic equations. 2. To provide exposure to solve engineering problems involving differential equations.	**At the end of this course, the students are expected to be able to:** **CO1:**Apply the methods for solving linear algebraic equations. **CO2:**Apply the methods for solving non-linear algebraic equations. **CO3:**Apply the methods to solve numerical differentiation and integration problems. **CO4:**Apply the methods for solving ordinary and partial differential equations. **CO5:**Design and develop computer programs for the various numerical methods to solve engineering problems.

Unit–1 CO1

Solution of linear algebraic systems: Non-iterative method, Gauss elimination method, LU- factorization method, Matrix inversion method. iterative method, Gauss Seidel iterative method, Jacobi method, ill - conditioning problems, Tridiagonalization, Hoseholder's method, QR-factorization. **[10 Hrs]**

Unit – 2 CO2

Solution of non-linear algebraic systems: Solution of equations by iterations, Fixed point iterations, Newton's method, Secant method, Bi-section method. **[9 Hrs]**

Unit – 3 CO3

Numerical differentiation: Methods for first order ODEs, Euler method, Runge-Kutta methods, Methods for higher order and systems of ODEs, Euler method, Runge-Kutta methods, Stiff systems. Numerical integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule. Numerical double integration.

[10Hrs]

Unit – 4 CO4

Introduction to partial differential equations: 1ST Order PDEs, Mathematical classification second order PDEs, Characteristics. Finite Difference Methods: Different discretization techniques of PDE equations, Backward, forward and central differencing discretization schemes, Euler's explicit, implicit and semi-implicit methods. **[10 Hrs]**

Unit – 5 CO5

Applications to model problems: Parabolic equations, heat equations, Elliptic equations, Laplace and Poisson's equations. Dirichlet problems, ADI method, Neumann and Mixed problems, Hyperbolic equation, wave equation, Upwinding differencing scheme of advection terms. **[9 Hrs]**

Text Books:

1. Introductory Methods of Numerical Analysis: S. S. Sastry, 4th Edition, Prentice Hall of India Pvt Ltd.
2. Advanced Engineering Mathematics: E. Kreyszig
3. Numerical Methods for Scientist and Engineers: R. W. Hamming

Reference Books:

1. Numerical Solution of Partial Differential Equations: G. D. Smith, Oxford University Press, 1985.
2. Introduction to Numerical Analysis: F. B. Hildebrand
3. Fundamentals of Engineering Numerical Analysis: P. Moin

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SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224102	Mechanical Vibrations	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To impart fundamental concepts of vibration and apply the concept in solving industrial problems. 2. To provide exposure to Fourier analysis to understand and solve practical problems involving vibration.	**At the end of this course, the students are expected to be able to:** **CO1**: Understand the fundamentals of single degree of freedom vibration system and solve the associated problems. **CO2:** Understand the fundamentals of vibration isolation and vibration measurement. **CO3:** Understand the fundamentals of multi degree of freedom vibration system and solve the associated problems. **CO4:** Understand the fundamentals of vibrations of continuous systems and their applications to vibrations of string, bars and beams. **CO5:** Understand the fundamentals of transient vibrations and self-excited vibrations.

Unit–1 CO1

Free vibration of SDF system with and without damping, concept of phase plane, logarithmic decrement, quality factor.Response of single degree of freedom system to periodic and non-periodic excitation, rotating unbalance, whirling of rotating shafts. **[10 Hrs]**

Unit– 2 CO2, CO3

Vibration isolation, support motion, absorption and isolation, Measuring instruments. Multi degree of freedom system, normal mode vibration, co-ordinate coupling, modal analysis, orthogonal properties, modal matrix, Lagrange's equation. **[10 Hrs]**

Unit– 3 CO3

Multi degree of freedom system – exact analysis and numerical methods, classical methods like Rayleigh, Dunkerley, Rayleigh-Ritz, Holzer etc. **[10 Hrs]**

Unit– 4 CO4

Vibration in continuous system like string, shaft, bar, beam and membrane.Fourier analysis of signals, Presentation of the results of frequency analysis. **[10 Hrs]**

		October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Unit– 5 CO5

Transient analysis and impulse response, arbitrary excitation, Laplace Transform formulation, response spectrum. **[8 Hrs]**

Text Books:

1. Theory of vibrations with applications – W. T. Thomson, M.D. Dahleh, C Padmanabhan, Pearson, 5th Edition, 2008.
2. Mechanical Vibration – S. S. Rao, Addition-Wesley Publishing Co., 1990.
3. Fundamental of Mechanical Vibration – S. Grahm Kelly, McGraw-Hill Intl. Editions, 1993.

Reference Books:

1. Vibration: Fundamentals and practices ,Clarence W.de Silva; CRC press,2nd Ed., 2006.
2. Vibration and noise for engineers – K. Pujara, DhanpatRai and Co.,2013.
3. Vibrations, Waves and Acoustics – D.Chattopadhyay and P. C.Rakshit; Books and Allied(P) Ltd,2019.

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224103	Advanced Material Science	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To impart knowledge of advanced materials and their scope in industrial applications. 2. To provide exposure to the processing and manufacturing of special purpose materials.	**At the end of this course, the students are expected to be able to:** **CO1**: Understand the mico-structure and describe the properties of stainless steels and other alloy steels. **CO2:** Explain the use of different types of light metal and their alloys with metallurgical aspects. **CO3:** Describe properties and applications of smart and Nano materials. **CO4:**Identify and apply methodologies for the selection of specific advanced materials (ceramics, polymers and composites) for different applications.

Unit–1 CO1

Special Steel and their alloys

Metallurgical aspects, Composition, Properties and applications of: different types of Stainless steels, Dual phase steels, TRIP steels, Maraging steels, High speed steels, Free cutting steels,Ausformed steels, Tool Steels, manganese steels, chrome steels, electrical steels, bearing steels, spring steels, heat resistant steels, creep steels, HSLA steels etc. **[10 Hrs]**

Unit– 2 CO2

Light metals and their alloys

Need of alloying, Aluminium, magnesium and titanium alloys: Metallurgical aspects, Properties and applications. **[8 Hrs]**

Unit– 3 CO3

Nano and Smart materials

Definition, Types, Properties and applications, Carbon nano tubes, Methods of production, Shape memory alloys, Piezoelectric materials, Electro active Polymers, Electro-rheological fluid, Functionally gradient material (FGM), biomaterials, micro-electro mechanical systems (MEMS). **[10 Hrs]**

Unit– 4 CO4

Miscellaneous Advanced Materials

Magnetic materials, ceramics, composites and polymers, surface metal matrix composites, aerospace materials, and cryogenic materials, semi conducting and superconducting materials. **[10 Hrs]**

		October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Unit– 5 CO4

Processing and Characterization of Advance Materials

Processing of Metal Matrix Composites, Polymer Matrix Composites, Ceramic Matrix Composites. Properties and applications: Strength, stiffness, creep, fatigue and fracture; thermal, damping and tribological properties. **[10 Hrs]**

Text Books:

1. Engineering Materials: Properties and applications of Metals and alloys, CP Sharma, PHI
2. Introduction to Composite Materials Design by Ever J. Barbero, CRC Press
3. Engineering Design with Polymers and Composites by Gerdeen and Rorrer, CRC Press
4. Engineering Materials 2: An introduction to Microstructure and Processing by Jones and Ashby, Butterworth-Heinemann .
5. Polymer Engineering Science and Viscoelasticity by Brinson and Brinson, Springer.
6. Mechanics of Composite Materials by Jones, CRC Press.

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224104	Computer Aided Design	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To impart knowledge dealing with computation aspects of engineering drawing and geometric modeling. **2.** To provide exposure to apply the CAD techniques in manufacturing and process planning.	**At the end of this course, the students are expected to be able to:** **CO1**: Understand the techniques of geometric modelling of different analytical and synthetic curves. **CO2:** Understand and apply the geometric modelling techniques of different analytical surfaces. **CO3:** Understand the solid modelling techniques. **CO4:** Understand and apply the transformation of co-ordinate systems. **CO5:** Identify and apply the CAD techniques to various industrial applications.

Unit–1 CO1

CAD Tools: Definition of CAD Tools, Graphics standards, Graphics software: requirements of graphics software, Functional areas of CAD, Efficient use of CAD software.
Basics of Geometric Modelling: Requirement of geometric 3D Modeling, Geometric models, Geometric construction methods, Modelling facilities desired.

Geometric Modeling: Classification of wireframe entities, Curve representation methods, Parametric representation of analytic curves: line, circle, arc, conics, Parametric representation of synthetic curves: Hermite cubic curve, Bezier curve, B-Spleen curvewire, NURBS, Curve manipulations.

Unit– 2 CO2

Surface Modeling : Classification of surface entities, Surface representation methods, Parametric representation of analytic surfaces: plane surface, ruled surface, surface of revolution, tabulated cylinder, Parametric representation of synthetic curves: Hermite cubic surface, Bezier surface, B-Sp line surface, Blending surface, Surface manipulations.

Unit– 3 CO3

Solid Modelling: Geometry and topology, Boundary representation, The Euler-Poincare formula, Euler operators, Constructive solid geometry: CSG primitives, Boolean operators, CSG expressions, Interior, Exterior, closure, Sweeping: linear and non-linear, Solid manipulations, feature modeling.

Unit– 4 CO4

Transformations: 2-D and 3-D transformations: translation, scaling, rotation, reflection, concatenation, homogeneous coordinates, Perspective projection, orthotropic projection, isometric projection, Hidden surface removal, shading, rendering.

Evaluation Criteria: Evaluation criteria of CAD software, Data exchange formats: GKS, IGES, PHIGS, CGM, STEP

Dimensioning and tolerances: Linear, angular, angular dimensions, maximum material condition (MMC), Least material condition (LMC), Regardless of feature size (RFS).

Unit– 5 CO5

Computer Aided Process Planning: Hybrid CAAP System, Computer Aided Inspection and quality control, Coordinate Measuring Machine, Limitations of CMM, Computer Aided Testing, Optical Inspection Methods, Artificial Intelligence and expert system: Artificial Neural Networks, Artificial Intelligence in CAD, Experts systems and its structures, Flexible manufacturing, cellular manufacturing.

References:

1. Geometric Modeling: Michael E. Mortenson, Third Edition, Industrial Press Inc.2006.
2. Mathematical Elements of Computer Graphics, Rogers and Adams, McGraw Hill. 1994
3. CAD CAM Theory and Prectice: I. Zeid, Tata-McGraw Hill, 2006
4. Computer-Aided Engineering Design, B Sahay and ASaxena, Springer, 2005.
5. Differential Geometry of Curves and Surfaces, Thomas F. Banchoff and Stephen T. Lovett, Thomas Banchoff-Stephen Lovett, 2010.
6. Computational Geometry for Design and Manufacture, I.D. Faux and M.J. Pratt, John Wiley, 1980.
7. Lectures on Classical Differential Geometry, Dirk J. Struick, Addison Wesley, 1980.

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224121	Engineering Tribology	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Unit-1

Tribology, Historical background, practical importance and subsequent use in the field.

Lubricants: Types and specific field of applications. Requisite properties of lubricants.Viscosity, its measurement, effect of temperature and pressure on viscosity, standard grades of lubricants, selection of lubricants.Lubricant Rheology, Lubrication Types, Basic equation of lubrication.

Unit- 2

Friction: Origin, Friction Theories, measurement methods, friction of metals and non-metals.

Wear: Classification and Mechanisms of Wear, Delamination theory, Debris analysis, testing methods andstandards, wear mechanism maps and approach to wear reduction. Related Case Studies.

Surface Roughness: Standardization, measurement with contacting and non-contacting instruments, Statistical analysis of surface, characteristics of the surface,tribologicalbehaviour of asperities contact.

Unit- 3

Behaviour of Tribological components:

Plain & Antifriction Bearings: selection, effect of frictional torque, factors affecting performance, failure modes, bearing lubrication.

Gears: friction & stresses, wear, lubrication & failure. Failure Case Studies.

Hydrodynamic Bearings: Mechanism of pressure development, classification, Idealized Journal Bearing, oil filmthickness, pressure distribution, load carrying capacity. Failure Case Studies.

Unit- 4

Elastohydrodynamic Lubrication: Theoretical considerations, line and point contacts, film thickness equations, different regimes in EHL contact.

Antifriction Bearings: Ball and roller bearings, geometry of ball bearings, radial load distribution, stresses and deformations, lubrication of ball bearings. FailureCase Studies.

Unit- 5

Monitoring of Equipment's Condition: Condition monitoring techniques, lubricant, corrosion, temperature &surface roughness monitoring.Failure Case Studies.

Nano/Micro Tribology, Green Tribology.

		October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Text Books:

1. Engineering Tribology– PrasantaSahoo – Prentice Hall of India Pvt. Ltd., New Delhi, 2005.
2. Fundamentals of Tribology – S.K. Basu, S.N. Sengupta, B.B. Ahuja – PHI Learning Pvt. Ltd., 2010.
3. Tribology in Industries – S.K. Shrivastava – S. Chand & Company Ltd., New Delhi, 2001
4. Bearing Design in Machinery, Engineering Tribology and Lubrication - A. Harnoy- Marcel Dekker Inc., 2003

Reference Books:

1. Engineering Tribology – G.W. Stachowiak, A.W. Batchelor – Elsevier India Pvt. Ltd., New Delhi.
2. Introduction to Tribology of Bearings – B.C. Majumdar – S. Chand & Company Ltd., New Delhi.
3. Rolling Bearing Analysis – T.A. Harris – John Wiley & Sons, Inc., New York
4. Engineering Tribology – J. Williams - Cambridge University Press, 2004.

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224122	Experimental Stress Analysis	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Unit-1

Basic elasticity theory, Analysis of Stress and Strain, Plane stress plane strain problems, Equation of Equilibrium, Equation of Compatibility, Boundary Condition.

Unit- 2

Strain Measurement Methods: Various types of strain gauges, Electrical Resistance strain gauges, semiconductor strain gauges, strain gauge circuits, transducer applications, Recording instruments for static and dynamic applications.

Unit- 3

Photo elasticity: Theory of photo elasticity, Analysis techniques, three dimensional photo elasticity,Reflection Palanscope and application.

Unit- 4

Brittle coating methods of strain indication.
Moire Method of strain analysis.Grid method of strain analysis

Unit- 5

Computer interfacing and on-line monitoring of strain and stress fields.

Text Books:

1.Experimental Stress Analysis by E.S.A.Dally&Rolly

Reference Books:

1. Experimental Stress Analysis –Sadhu Singh
2. Experimental Stress Analysis – Adel Mubeen

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224123	Design of Pressure Vessels	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Unit-1

Basic principles: Elastic analysis of shells of revolution, membrane solutions, spherical and cylindrical shells, Junctions of shells of different geometry, Limit analysis, Shakedown.

Unit- 2

Pressure vessel branches: Radial nozzle in spherical shell, stress concentration factors due to combined loadings, design methods to reduce SCF.

Unit- 3

Non-radial nozzles in spherical shells, Junction analysis of radial and non-radial nozzles in cylindrical shells. Pressure vessel ends: different design forms. Flanges.

Unit-4

Stress analysis and design methods. Local loading and local attachments: Supports design. Creep and fatigue in thin pressure vessels and its components. Pressure vessel design codes.Thick wall design.

Unit-5

Monoblock cylinders and spheres, multiplayer constructions. Pre-stressing of thick shells, shrink fit construction, wire and ribbon wound cylinders, Plastic radial expansion – autofrettaging.
Thermal stress, creep and stress rupture; Dynamic and fatigue behaviour.
Case studies: Vessels for special purposes.
Computer aided design of pressure vessels.

Text Books:

1. Theory & Design of Pressure Vessel By John F Harvey.

Reference Books:

1. Pressure Vessel Design Manual By Dennis R.Moss.

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224124	Product Design and Development	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Unit-1

Introduction to Product Design: Characteristics of successful product Development.
Who designs & develops products- Industrial & Practical Examples.
Creative thinking- Invention- innovation & inventiveness in a society.

Unit- 2

Development Process & Organization.
A Generic Development Process & Concept Development.
Identifying Customer Needs.

Unit- 3

Concept Generation, Concept Selection.
Product Architecture, Industrial Design.

Unit- 4

Human Factors & System Information Input- Text graphics, symbols and codes.
Work Place Design- case studies.
Human Factors Application – case studies.

Unit- 5

Human Errors – accidents and safety. Techno legal issues.
Intellectual Property Rights.

Text Books:

1. Product Design & Development- Karl T. Ulrich, Steven D Eppinger, McGraw Hill Publishers.
2. The Mechanical Design Process – by David G. Ullman
3. Human Factors in Engineering Design- Mark S sanders & Ernst J. McCornick McGraw Hill Publishers.
4. Product Design & Process Engineering – Benjamin W Nishel& Alan B Draker- McGraw Hill Publishers.

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SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224125	Automation and Control	L = 3	T = 1	P = 0	Credits = 4
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Unit-1

Introduction: Review of Laplace Transform, Close-loop control versus open-loop control, Linear Time Invariant (LTI) systems.

Representation of physical system: Transfer function and impulse response function, modelling in state space, transformation of mathematical models with MATLAB, signal flow graphs, linearization of nonlinear mathematical models.

Unit- 2

Mathematical modeling of control systems: Mechanical, Electrical and Electronic systems, liquid-level systems, pneumatic and hydraulic systems.

Time response analysis: Transient and Steady-State Response Analyses, 1st order, 2nd order and higher-order systems, Routh's Stability Criterion, Effects of Integral and Derivative Control Actions on System Performance, Steady-State Errors in Unity-Feedback Control Systems.

Unit- 3

Control Systems Analysis and Design by the Root-Locus Method: Plotting Root Loci with MATLAB, Root-Locus Plots of Positive Feedback Systems, Lag, Lead and Lag–Lead Compensation.

Frequency-Response Method: Bode Diagrams, Polar Plots, Log-Magnitude-versus-Phase Plots, Nyquist Stability Criterion.

Unit- 4

PID Controllers: Ziegler–Nichols Rules for Tuning PID Controllers, Design of PID Controllers with Frequency-Response Approach.

Unit- 5

Case study by using MATLAB.

Text books:

1. Modern Control Engineering by K.Ogata, 5th edition, Prentice Hall, 2010.

Reference books:

1. Automatic Control Engineering by F.H.Raven, 5th ed., McGraw Hill International, 1994.
2. Digital Control Systems by B.C.Kuo, Prentice Hall.

		October 2020	1.00	Applicable for AY 2020-21 Onwards
Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Shri Shankaracharya Technical Campus

(An Autonomous Institute affiliated to Chhattisgarh Swami Vivekanand Technical University Bhilai)

SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224191	Mechanical Vibration Lab	L = 0	T = 0	P = 4	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	75	_--	75	150	--

List of Experiments (to be performed at least 10 experiments)

1. To determine radius of gyration of a body by using bi-filler suspension.
2. To verify Dunkerely for transverse vibration.
3. Damped Torsional vibration of a body.
4. To determine damping coefficient of single rotor system.
5. To find the node points and natural frequency of double (2) rotor system
6. To find the curve between frequency ratio and amplitude ratio for single degree of freedom system with spring and dashpot.
7. To study the forced damped vibration of a simply supported beam at various amount of damping.
8. To calculate the whirling speed of a speed of a shaft with different end conditions and verify the results experimentally.
9. To study static and dynamic balancing machine
10. To study jump phenomenon of Cam-Follower system.
11. To study the non-linear vibration of a pendulum system. (Simple)
12. To study the non-linear vibration of a compound pendulum system
13. To find natural frequency using accelerometer
14. To find natural frequency using vibrometer.

List of Equipments /Machine Required

Universal Vibration Apparatus

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SCHEME OF EXAMINATION AND SYLLABUS

M. Tech. (MACHINE DESIGN)

Subject Code ME224192	Computer Aided Design Lab	L = 0	T = 0	P = 4	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	75	_--	75	150	--

Experiments to be performed

1. Creating Sketches in Sketching environment in CAD, Using PROE.
2. Solid Modelling-I using PROE(WF2.0).Tools like Revolve, Extrude.
3. Advance Solid ModellingI using PROE(WF2.0),Tools like Sweep, Blend, Spline etc.
4. Use of solid Modelling Edit Tools like hole, pattern, chamfer, round, fillet etc.
5. Assembly Modelling of pedestal Bearing.
6. To create drawing views of part model of a connecting rod.
7. To create a surface model of Telephone receiver/Scroll Mouse.
8. To Generate CNC Program for slot cutting in Aluminium workpiece using Master Cam on CNC Milling.
9. To Generate CNC program to drill a hole for pocketing in aluminium workpiece using Master CAM on CNC Milling.
10. To simulate stress distribution in a cantilever steel beam using PRO-MECHANICA.
11. To perform part Manufacturing using PROE & MECHANICA.
12. To perform one dimensional steady state Thermal Analysis of Clutch plate.
13. To perform Stress Analysis in Dummy Axle.