SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT

FACULTY OF ENGINEERING & TECHONOLOGY

ORDINANCE No. V-42 (B11)

RELATING TO COURSE CURRICULUM & SYLLABUS OF PG PROGRAM

MASTER OF TECHNOLOGY (M.Tech.) STRUCTURAL ENGG.

(Effective from the Session – 2025-26)

Apporved by the Academic Council of the Meeting held on 06 May 2025

Apporved by the Executive Council of the Meeting held on 28 June 2025

Dr. Amit Saxena

BHAI JAITA SUBHARTI ENGINEERING COLLEGE
SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Structural Engineering/M.Tech(SE)

w.e.f academic Session 2025-26

Sl. No.	Course Code	Course Title	Course Type	Period			CCA				ESE Marks		Total	Credits
				L	T	P	CT	AT	Total	PS	TE	PE		
1	MSE-101	Advanced Structural Analysis	CC	3	0	0	20	10	30	-	70	-	100	4
2	MSE-102	Advanced Solid Mechanics	CC	3	0	0	20	10	30	-	70	-	100	4
3	MSE-111	Theory of Thin plates and shells	PE	3	0	0	20	10	30	-	70	-	100	3
4	MSE- 122	Structural Health Monitoring	PE	3	0	0	20	10	30	-	70	-	100	3
5	METC-112	Disaster Management	PE	3	0	2	20	10	30		70		100	3
6	METC-101	Research Methodology and IPR	CC	3	0	2	20	10	30		70		100	3
7	MSE-151	Structural Design Lab	LAB	0	0	2	-	-		15		35	50	2
TOTAL													650	22

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SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech(SE)

w.e.f academic Session 2025-26

Sl. No.	Course Code	Course Name	Course Type	Period			CCA				ESE Marks		TOTAL	Credit
				L	T	P	CT	AT	Total	PS	TE	PE		
1	MSE-201	FEM in Structural Engineering	CC	3	0	0	20	10	30	-	70	-	100	3
2	MSE-202	Structural Dynamics	CC	3	0	0	20	10	30	-	70	-	100	3
3	METC-211	English For Research Paper Writing	PE	3	0	0	20	10	30	-	70	-	100	3
4	MSE-213	Design of High Rise Structures	PE	3	0	0	20	10	30	-	70	-	100	3
5	MSE-222	Advanced Design of Foundations	PE	3	0	2	20	10	30		70		100	3
6	MSE-203	Design of Pre stressed concrete structures	CC	3	0	2	20	10	30		70		100	3
7	MSE-251	Model Testing Lab	LAB	0	0		2	-	-	15	-	35	50	2
		Total											**650**	**22**

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STUDY & EVALUATION SCHEME

YEAR 2nd , SEMESTER-III

Branch/Course: Structure Engineering/M.Tech(SE)
w.e.f academic Session 2025-26

Sl. No.	Course Code	CourseName	Course Type	Period			CCA				ESE MARKS		TOTAL	Credits
				L	T	P	CT	AT	Total	PS	TE	PE		
1	MSE- 351	Dissertation Phase -I	Proj-1	0	0	2				50		150	200	10
2	MSE-352	Industrial Internship (6-8 Weeks)	PC	0	0	0		-	-	50		150	200	2
Total													400	12

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STUDY & EVALUATION SCHEME

YEAR 2nd , SEMESTER-IV

Branch/Course: Structure Engineering/M.Tech(SE)
w.e.f academic Session 2025-26

Sl. No.	Course Code	Course Name	Course Type	Period			CCA				ESE MARKS		TOTAL	Credits
				L	T	P	CT	AT	Total	PS	TE	PE		
1	MSE-451	Dissertation Phase – II	Proj-2	0	0	32		-	-	100	-	200	300	12
Total													300	16

M.TECH. (SE) GRAND TOTAL CREDITS – 68

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SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT

STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Structural Engineering/M.Tech(SE)

Program Outcomes :

After completion of the program graduates will be able to

- Apply the knowledge of science, mathematics, and engineering principles for developing problem solving attitude
- Identify, formulate and solve engineering problems in the domain of structural engineering field.
- Use different software tools for Analysis and Design structural engineering domain.
- Design and conduct experiments, analyse and interpret data, for development of simulation experiments.
- Function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility.

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-101 - Advanced Structural Analysis (Credits - 4:0:0 = 4)

Teaching Scheme

Lectures: 3hrs/week

Course objective :

- To impart knowledge of analysing beam and framed structure.
- To develop analytical skill of solving beams and trusses using influence line
- To impart analysing axial bars and beams using galarkins method and Rayleigh Ritz method.

Syllabus Contents:

UNIT-1: Linear Element: Shape Functions, Solution for Poisson's Equation, General One Dimensional Equilibrium Problem.

UNIT-2: Boundary Value Problems (BVP): Approximate Solution of Boundary Value Problems, Modified Galerkin Method for One-Dimensional BVP, Matrix Formulation of the Modified Galerkin Method.

UNIT-3: Applications to Simple Problems: Beams, Plane Trusses, Plane Rigid Jointed Frames and Grids by Structure Approach and Member Approach.

UNIT-4: Stiffness Method applied to Large Frames: Local Coordinates and Global Coordinates. **Stiffness Matrix Assembly of Structures:** Stiffness Matrix in Global Coordinates, Boundary Conditions,Solution of Stiffness Matrix Equations, Calculation of Reactions and Member Forces.

UNIT-5: Influence Coefficients: Physical Significance, Effects of Settlements, Temperature Changeand Lack of Fit, Member Approach and Structure Approach.

Course outcomes: At the end of the course, students will be able to

- Analyze the skeleton structures using stiffness analysis code.
- Use direct stiffness method understanding itsyu limitations

References:

- Matrix Analysis of Framed Structures, Weaver and Gere.
- The Finite Element Method, Lewis P. E. and WardJ. P., Addison-Wesley Publication Co.
- Computer Methods in Structural Analysis, MeekJ. L., E and FN, Span Publication.
- The Finite Element Method, Desai and Able, CBS Publication

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Civil Engineering/M.Tech(SE)

MSE-102 - Advanced Solid Mechanics (Credits - 4:0:0 = 4)

Teaching Scheme

Lectures:3hrs/week

Course objective:

- Understanding of the scope ,principle, norms ,accountabilities and bound of contemporary engineering practice in the specific discipline.
- Application of Established engineering method to complex engineering problem solving
- Fluent application of engineering technique ,tool and resources.

Syllabus Contents:

UNIT-1: Plastic Deformation: Strain Hardening,Idealized Stress- Strain curve, Yield Criteria, von Mises Yield Criterion, Tresca Yield Criterion, Plastic Stress-Strain Relations, Principle of Normality and Plastic Potential, Isotropic Hardening.

UNIT-2: Equations of Elasticity: Equations of Equilibrium, Stress- Strain relations, Strain Displacement andCompatibility Relations, Boundary Value Problems, Co-axialityof the Principal Directions.

UNIT-3: Two-Dimensional Problems of Elasticity: Plane Stress and Plane Strain Problems, Airy's stress Function, Two-Dimensional Problems in Polar Coordinates.

UNIT-4: Torsion of Prismatic Bars: Saint Venant's Method, Prandtl's Membrane Analogy, Torsion of Rectangular Bar, Torsion of Thin Tubes.

UNIT-5: Introduction to Elasticity: Displacement, Strain and Stress Fields, Constitutive Relations, Cartesian Tensors and Equations of Elasticity

Course outcomes: At the end of the course, students will be able to

- Solve simple problems of elasticity and plasticity understanding the basic concepts.
- Apply numerical methods to solve continuum problems.

References:

- Theory of Elasticity, Timoshenko S. andGoodierJ. N., McGraw Hill, 1961.
- Elasticity,SaddM.H.,Elsevier,2005.
- Engineering Solid Mechanics, RagabA.R., BayoumiS.E., CRC Press,1999.

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Civil Engineering/M.Tech(SE)

MSE-111 - Theory of Thin Plates and Shells (Credits - 3:0:0 = 3)

TeachingScheme

Lectures: 3hrs/week

Course Objective:

- To provide an elementary knowledge of mechanism of material and mathematics
- To provide simple and comprehensive mathematical analysis of plate theories and there application to plate bending problem
- To provide a knowledge of fundamental of theory of shell and folded plates

Syllabus Contents:

UNIT-1: Circular Plates: Analysis under Axi- Symmetric Loading, Governing Differential Equation in Polar Co-ordinates. Approximate Methods of Analysis- Rayleigh-Ritz approach for Simple Cases in Rectangular Plates.

UNIT-2: Shells of Revolution: with Bending Resistance - Cylindrical and Conical Shells, Application to Pipes and Pressure Vessels. Thermal Stresses in Plate/ Shell.

UNIT-3: Static Analysis of Plates: Governing Equation for a Rectangular Plate, NavierSolution for Simply- Supported Rectangular Plate under Various Loadings, Levy solution for Rectangular Plate with other Boundary Conditions.

UNIT-4: Static Analysis of Shells: Membrane Theory of Shells - Cylindrical, Conical and Spherical Shells.

UNIT-5: Introduction: Space Curves, Surfaces, Shell Co-ordinates, Strain Displacement Relations, Assumptions in Shell Theory, Displacement Field Approximations, Stress Resultants, Equation ofEquilibrium using Principle ofVirtual Work, Boundary Conditions.

Course Outcomes:

At the end of the course, students will be able to

- Use analytical methods for the solution of thin plates and shells.
- Use analytical methods for the solution of shells.
- Apply the numerical techniques and tools for the complex problems in thin plates.
- Apply the numerical techniques and tools for the complex problems in shells.

References:

- Theory of Plates and Shells, Timoshenko S. and KriegerW., McGraw Hill.
- Stresses in Plates and Shells, UguralAnsel C., McGraw Hill.
- Thin Elastic Shells, KrausH., John Wiley and Sons.
- Design and Construction of Concrete Shells, RamaswamyG.S.

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-122 – Structural Health Monitoring (Credits - 3:0:0 = 3)

Teaching Scheme

Lectures:3

hrs/week

Course objective:

- Student knows about how to assess the health of structure using dynamic field tests.
- Student able to know repairs and rehabilitation measures of the structure

Syllabus Contents:

UNIT-1: Introduction to Repairs and Rehabilitations of Structures: Case Studies (Site Visits), piezo–electric materials and other smart materials, electro–mechanical impedance (EMI) technique, adaptations of EMI technique

UNIT-2: Dynamic Field Testing: Types of Dynamic Field Test, Stress History Data, Dynamic Response Methods, Hardware for Remote Data Acquisition Systems, Remote Structural Health Monitoring.

UNIT-3: Static Field Testing: Types of Static Tests, Simulation and Loading Methods, sensor systems and hardware requirements, Static Response Measurement.

UNIT-4: Structural Audit: Assessment of Health of Structure, Collapse and Investigation, Investigation Management, SHM Procedures

UNIT-5: Structural Health: Factors affecting Health of Structures, Causes of Distress, Regular Maintenance. Structural Health Monitoring: Concepts, Various Measures, Structural Safety in Alteration.

Course Outcomes:

At the end of the course, students will be able to

- Diagnosis the distress in the structure understanding the causes and factors.
- Assess the health of structure using static field methods.

Reference Books:

- Structural Health Monitoring, Daniel Balageas, Claus Peter Fritzen, Alfredo Güemes, John Wiley and Sons, 2006.
- Health Monitoring of Structural Materials and Components Methods with Applications, Douglas E Adams, John Wiley and Sons, 2007.
- Structural Health Monitoring and Intelligent Infrastructure, Vol1, J. P. Ou, H. Li and Z. D. Duan, Taylor and Francis Group, London, UK, 2006.
- Structural Health Monitoring with Wafer Active Sensors, Victor Giurglutiu, Academic Press Inc, 2007.

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SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech(SE)

METC-112 – Disaster management (Credits- 3:0:0 = 3)

Teaching Scheme

Lectures: 2hrs/week

Course Objectives: -Students will be able to:

1. Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
2. Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
3. Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
4. Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

Syllabus Contents:

Unit 1: Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude

Unit 2: Disaster Preparedness And Management
Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.

Unit 3 : Risk Assessment Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People's Participation In Risk Assessment. Strategies for Survival. Disaster Mitigation, Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India

Unit 4 : Repercussions Of Disasters And Hazards: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.

Unit 5 : Disaster Prone Areas In India Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics.

Course Outcomes: At the end of this course, students will

1. achieve knowledge on the types of hazards and disasters, disaster prevention strategy, early warning system, disaster mitigation and preparedness.
2. have the capacity to participate in the socio-economical response of human resource development and relate to risk transfer.

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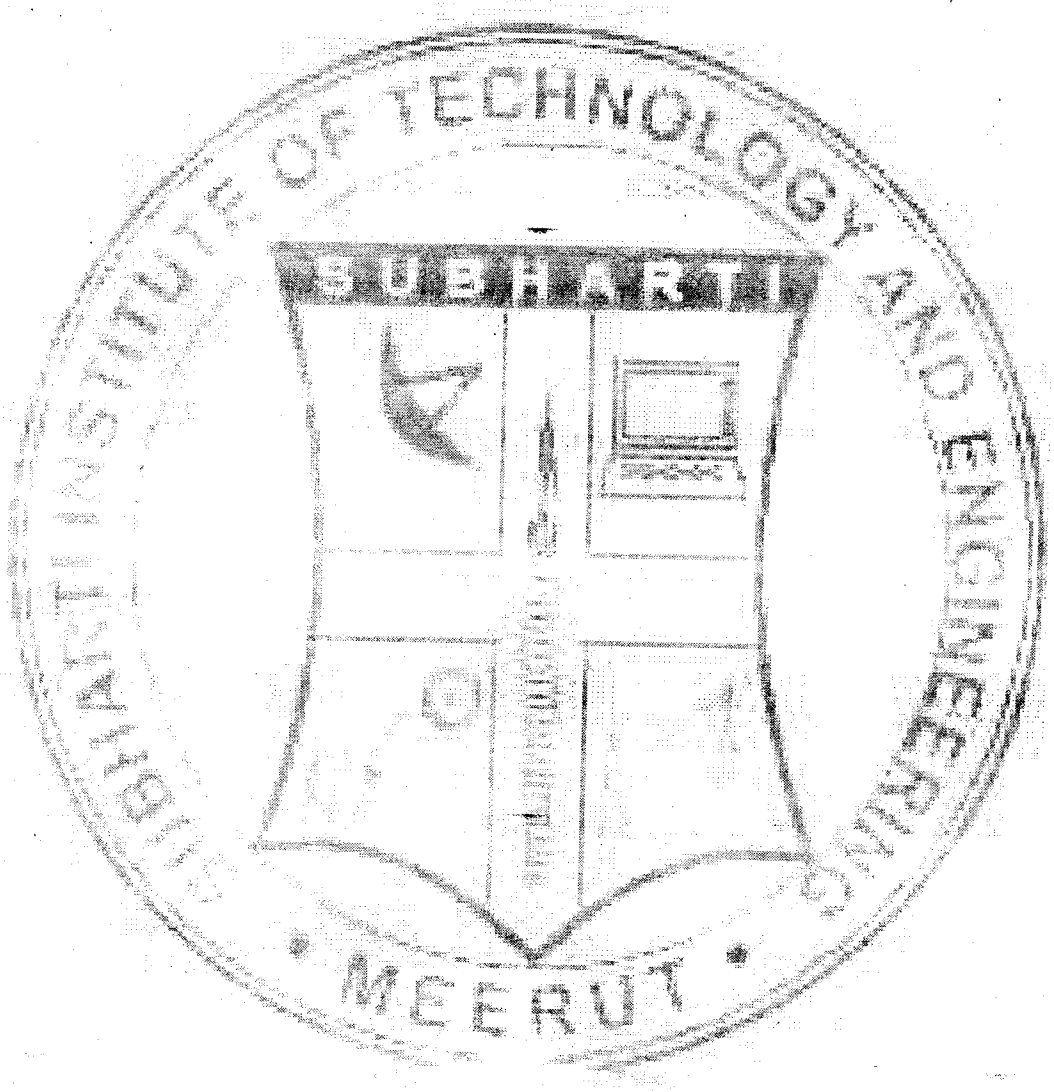
References:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies "'New Royal book Company.
2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., New Delhi.



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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Civil Engineering/M.Tech(SE)

METC-101 Research Methodology and IPR (Credits - 3:0:0 = 3)

Teaching Scheme

Lectures: 2 hrs/week

Course objective:

- Understand research problem formulation.
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

Syllabus Contents:

- **Unit 1:** Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis,interpretation, Necessary instrumentations.
- **Unit 2:** Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee
- **Unit 3:** Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.
- **Unit 4:** Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications.
- **Unit 6:** New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.

Course Outcomes:

At the end of this course, students will be able to

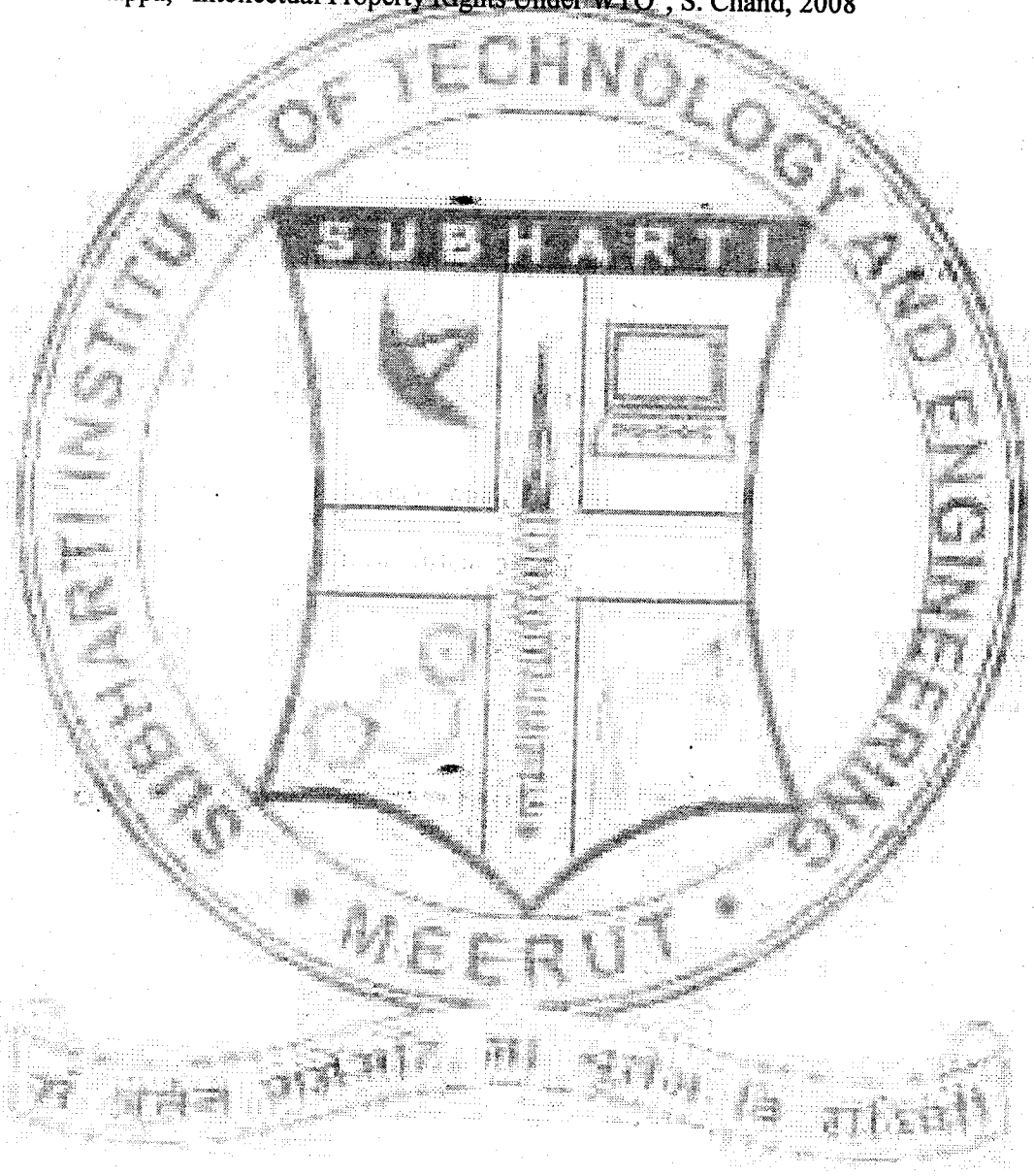
- Analyze research related information
- Follow research ethics.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

Amit

Engineering & Technology

References:

- Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"
- Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"
- Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"
- Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.
- Mayall , "Industrial Design", McGraw Hill, 1992.
- Niebel , "Product Design", McGraw Hill, 1974.
- Asimov , "Introduction to Design", Prentice Hall, 1962.
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.
- T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008



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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-I

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-151 –Structural Design Lab (Credits - 0:0:4= 2)

Teaching

Scheme

Lab: 2 hrs/week

Course Outcomes:

At the end of the course, students will be able to

1. Design and Detail all the Structural Components of Frame Buildings.
2. Design and Detail complete Multi-Storey Frame Buildings.

Syllabus Content:

Design and detailed drawing of complete G+ 8 structures by individual student using latest relevant IS codes.

MSE-152 – Advanced Concrete Lab (Credits - 0:0:4 = 2)

Teaching

Scheme Lab: 2

hrs/week

Course Outcomes:

At the end of the course, students will be able to

1. Design high grade concrete and study the parameters affecting its performance.
2. Conduct Non Destructive Tests on existing concrete structures.
3. Apply engineering principles to understand behavior of structural/ elements.

List of Experiments/Assignments:

1. Study of stress-strain curve of high strength concrete, Correlation between cube strength, cylinder strength, split tensile strength and modulus of rupture.
2. Effect of cyclic loading on steel.
3. Non-Destructive testing of existing concrete members.
4. Behavior of Beams under flexure, Shear and Torsion.

Reference Books:

- Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012.
- Concrete Technology, Shetty M. S., S. Chand and Co., 2006.

DEAN

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SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT

STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-201 - Finite Element Method in Structural Engineering(Credits- 3:0:0 = 3)

Teaching Scheme

Lectures: 3 hrs/week

Course Objectives:

- To learn basic principles of finite element analysis procedure .
- To learn the theory and characteristics of finite elements that represent engineering structures.
- To learn and apply finite element solutions to structural, thermal, dynamic problem to develop the knowledge and skills needed to effectively evaluate finite element analyses performed by others.

Syllabus Contents:

UNIT-1: Introduction: History and Applications. Spring and Bar Elements, Minimum Potential Energy Principle, Direct Stiffness Method, Nodal Equilibrium equations, Assembly of Global Stiffness Matrix, Element Strain and Stress.

UNIT-2: Application to Solid Mechanics: Plane Stress, CST Element, Plane Strain Rectangular Element, Isoparametric Formulation of the Plane Quadrilateral Element, Axi-Symmetric Stress Analysis, Strain and Stress Computations. **Computer Implementation** of FEM procedure, Pre-Processing, Solution, Post-Processing, Use of Commercial FEA Software

UNIT-3: Types: Triangular Elements, Rectangular Elements, Three-Dimensional Elements, Isoparametric Formulation, Axi-Symmetric Elements, Numerical Integration, Gaussian Quadrature.

UNIT-4: Beam Elements: Flexure Element, Element Stiffness Matrix, Element Load Vector

UNIT-5: Method of Weighted Residuals: Galerk in Finite Element Method, Application to Structural Elements, Interpolation Functions, Compatibility and Completeness Requirements, Polynomial Forms, Applications..

Course Outcomes:

At the end of the course, students will be able to

- Use Finite Element Method for structural analysis.
- Execute the Finite Element Program/ Software.
- Solve continuum problems using finite element analysis.

Reference Books:

- Finite Element Analysis, Seshu P., Prentice-Hall of India,2005.
- Concepts and Applications of Finite Element Analysis, Cook R. D., Wiley J., New York, 1995.
- Fundamentals of Finite Element Analysis, Hutton David, Mc-Graw Hill, 2004.
- Finite Element Analysis, Buchanan G.R., McGraw Hill Publications, New York, 1995.
- Finite Element Method, Zienkiewicz O.C. & Taylor R.L. Vol. I, II & III, Elsevier, 2000.
- Finite Element Methods in Engineering, Belegundu A.D., Chandrupatla, T.R., Prentice Hall India, 1991.

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-202 – Structural Dynamics (Credits - 3:0:0 = 3)

Teaching Scheme

Lectures: 3 hrs/week

Course Objective:

- To impart knowledge about theory of vibrations and vibration parameters to analyse the dynamic forces caused by an earthquake.
- To introduce the design of buildings for blast and impact forces as per BIS codes of practice.

Syllabus Contents:

UNIT-1: Introduction: Objectives, Importance of Vibration Analysis, Nature of Exciting Forces, Mathematical Modeling of Dynamic Systems.

UNIT-2: Single Degree of Freedom System: Free and Forced Vibration with and without Damping, Response to Harmonic Loading, Response to General Dynamic Loading using Duhamel's Integral, Fourier Analysis for Periodic Loading, State Space Solution for Response**Numerical Solution** to Response using Newmark Method and Wilson Method, Numerical Solution for State Space Response using Direct Integration.

UNIT-3: Multiple Degree of Freedom System (Lumped parameter): Two Degree of Freedom System, Multiple Degree of Freedom System, Inverse Iteration Method for Determination of Natural Frequencies and Mode Shapes, Dynamic Response by Modal Superposition Method, Direct Integration of Equation of Motion.

UNIT-4: Multiple Degree of Freedom System (Distributed Mass and Load): Single Span Beams, Free and Forced Vibration, Generalized Single Degree of Freedom System.

UNIT-4: Special Topics in Structural Dynamics(Concepts only): Dynamic Effects of Wind Loading, Moving Loads, Vibrations caused by Traffic, Blasting and Pile Driving, Foundations for Industrial Machinery, Base Isolation.

Course Outcomes:

At the end of the course, students will be able to

- Analyze and study dynamics response of single degree freedom system using fundamental theoryand equation of motion.
- Analyze and study dynamics response ofMulti degreefreedom system using fundamental theory and equation of motion.
- Use the available software for dynamic analysis.

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech(SE)

MSE-213 – Design of High Rise Structures (Credits - 3:0:0 = 3)

Teaching Scheme

Lectures: 3 hrs/week

Course Outcomes:

At the end of the course, students will be able to

- Analyses design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.
- Analyses design and detail the RC and Steel Chimney.
- Analyses. Design and detail the tall buildings subjected to different loading conditions using relevant codes.

Syllabus Content:

UNIT-1: Application of software in analysis and design.

UNIT 2: Analysis and Design of RC and Steel Chimney, Foundation design for varied soil strata.

UNIT-3: Tall Buildings: Structural Concept, Configurations, various systems, Wind and Seismic loads, Dynamic approach, structural design considerations and IS code provisions. Firefighting design provisions.

UNIT-4: Design of transmission/ TV tower, Mast and trestles: Configuration, bracing system, analysis and design for vertical transverse and longitudinal loads.

Reference Books:

- Structural Design of Multi-storeyed Buildings, Varyani U. H., 2nd Ed., SouthAsian Publishers, New Delhi, 2002.
- Structural Analysis and Design of Tall Buildings, Taranath B. S., Mc Graw Hill, 1988.
- Illustrated Design of Reinforced ConcreteBuildings(GF+3storeyed), Shah V. L. &Karve S. R., Structures Publications, Pune, 2013.
- Design of Multi Storeyed Buildings, Vol. I & 2, CPWD Publications, 1976.
- Tall Building Structures, Smith Byran S. and Coull Alex, Wiley India, 1991.
- High Rise Building Structures, Wolfgang Schueller, Wiley., 1971.
- Tall Chimneys, Manohar S. N., Tata Mc Graw-Hill Publishing Company, New Delhi

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STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II

Branch/Course: Structure Engineering/M.Tech

(SE)

MSE-222 – Advanced Design of Foundations (Credits- 3:0:0 = 3)

Teaching Scheme

Lectures: 3 hrs/week

Course Objective:

- To impart knowledge about the suitability of soil strata for different projects.
- Student able to design shallow foundation and deciding the bearing capacity of soil.

Syllabus Contents:

UNIT-1: Shallow Foundations, Requirements for Satisfactory Performance of Foundations, Methods of Estimating Bearing Capacity, Settlements of Footings and Rafts, Proportioning of Foundations using Field Test Data, Pressure - Settlement Characteristics from Constitutive Laws.

UNIT-2: Pile Foundations, Methods of Estimating Load Transfer of Piles, Settlements of Pile Foundations, Pile Group Capacity and Settlement, Laterally Loaded Piles, Pile Load Tests, Analytical Estimation of Load- Settlement Behavior of Piles, Proportioning of Pile Foundations, Lateral and Uplift Capacity of Piles.

UNIT-3: Well Foundation, IS and IRC Code Provisions, Elastic Theory and Ultimate Resistance Methods.

UNIT-4: Tunnels and Arching in Soils, Pressure Computations around Tunnels. **Open Cuts**, Sheeting and Bracing Systems in Shallow and Deep Open Cuts in Different Soil Types. **Coffer Dams**, Various Types, Analysis and Design, Foundations under uplifting loads, Soil-structure interaction.

UNIT-5: Planning of Soil Exploration for Different Projects, Methods of Subsurface Exploration, Methods of Borings along with Various Penetration Tests.

Course Outcomes:

At the end of the course, students will be able to

- Analyze and design the pile foundation.
- Understand analysis methods for well foundation.

Reference Books:

- Design of foundation system, N.P. Kurian, Narosa Publishing House
- Foundation Analysis and Design, J. E. Bowles, Tata McGraw Hill New York
- Analysis and Design of Substructures, Sawmi Saran, Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.

BHAI JAITA SUBHARTI ENGINEERING COLLEGE

SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT

STUDY & EVALUATION SCHEME

YEAR 2nd , SEMESTER-III

Branch/Course: Structure Engineering/M.Tech (SE)

METC 211 - English For Research Paper Writing (Credits- 3:0:0 = 3)

Teaching Scheme

Lectures: 3 hrs/week

Course objectives:

Students will be able to:

1. Understand that how to improve your writing skills and level of readability
2. Learn about what to write in each section
3. Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

Syllabus Contents:

Unit 1: Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check., key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,

Unit 2: Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction.

Unit 3: Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, BeingConcise and Removing Redundancy, Avoiding Ambiguity and Vagueness.

Unit 4: skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions.

Course outcomes:

- Student will be able to write research paper effectively.
- Able to know how to write methodology,literature review in project work.

Reference Books:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

Engineering & Technology DEAN

BHAI JAITA SUBHARTI ENGINEERING COLLEGE
SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 2nd , SEMESTER-III
Branch/Course: Structure Engineering/M.Tech
(SE)

MSE-203 - Design of Prestressed Concrete Structures (Credits- 3:0:0 = 3)
Teaching Scheme

Lectures: 3 hrs/week

Course objective:

- Provide an understanding of the behaviour and performance of prestressed concrete structures.
- To impart knowledge to analyze and design prestressed concrete flexural members, design of commonly used prestressed concrete structures such as circular prestressing, composite construction members.

Syllabus Contents:

UNIT-1: Introduction to prestressed concrete: types of prestressing, systems and devices, materials, losses in prestress. Analysis of PSC flexural members: basic concepts, stresses at transfer and service loads, ultimate strength in flexure, code provisions.

UNIT-2: Transmission of prestress in pretensioned members: Anchorage zone stresses for post tensioned members.**Statically indeterminate structures** - Analysis and design - continuous beams and frames, choice of cable profile, linear transformation and concordancy.

UNIT-3: Statically determinate PSC beams: design for ultimate and serviceability limit states for flexure, analysis and design for shear and torsion, code provisions.

UNIT-4: Composite construction with precast PSC beams and cast in-situ RC slab - Analysis and design, creep and shrinkage effects. Partial prestressing - principles, analysis and design concepts, crack- width calculations

UNIT-5: Analysis and design of prestressed concrete pipes, columns with moments.

Course outcomes:

At the end of the course, students will be able to

- Find out losses in the prestressed concrete. Understand the basic aspects of prestressed concrete fundamentals, including pre and post-tensioning processes.
- Analyseprestressed concrete deck slab and beam/ girders.
- Design prestressed concrete deck slab and beam/ girders.
- Design of end blocks for prestressed members.

References:

- Design of Prestressed Concrete Structures, Lin T.Y., Asia Publishing House, 1955.
- Prestressed Concrete, Krishnaraju N., Tata McGraw Hill, New Delhi, 1981.
- Limited State Design of PrestressedConcrete,GuyanY., Applied Science Publishers, 1972.
- IS: 1343- Code of Practice for Prestressed Concrete
- IRC: 112

Manoj Kapil

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SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 1st, SEMESTER-II
Branch/Course: Structure Engineering/M.Tech (SE)

MSE-251 – Model Testing Lab (Credits- 0:0:4 = 2)

Teaching Scheme

Lectures: 2 hrs/week,

Course Outcomes:

At the end of the course, students will be able to

- Understand the response of structures.
- Prepare the models.
- Conduct model testing for static loading
- Conduct model testing for free and forced vibrations

Syllabus Content:

- Response of structures and its elements against extreme loading events.
- Model Testing: Static - testing ofplates, shells, and framesmodels.
- Model Testing: Free and forced vibrations, Evaluation of dynamic modulus.
- Beam vibrations, Vibration isolation, Shear wall building model, Time and frequency-domain study, Vibration Characteristics of RC Beams using Piezoelectric Sensors etc.

Faculty of Engineering & Technology
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BHAI JAITA SUBHARTI ENGINEERING COLLEGE
SWAMI VIVEKANAND SUBHARTI UNIVERSITY, MEERUT
STUDY & EVALUATION SCHEME

YEAR 2nd, SEMESTER-III
Branch/Course: Structure Engineering/M.Tech
(SE)

MSE-351 - Dissertation Phase -1 (Credits- 0:0:2 = 10)

Teaching scheme
Lecture: - 2 h/week

Course Objectives:

- This study focuses on the Masters-Level preparedness in the structural engineering area within the civil engineering field
- Study to better define the portion of the young engineers preparation beyond the undergraduate program for one specialty area of civil engineering.
- The objective of this dissertation to create a Framework of Knowledge for the young engineer which identifies and recognizes the needs of the profession, along with the profession's expectations of how those needs can be achieved in the graduate-level academic setting, in the practice environment, and through lifelong learning opportunities with an emphasis on the initial five years experience past completion of a Masters program in structural engineering.