Swami Vivekananda University
Telinipara, Barasat - Barrackpore Road Bara Kanthalia,
N-24 Parganas West Bengal700121

Revised Curriculum and Syllabi

Program Name :- Master of Technology in Geotechnical Engineering

(Course Structure & Curriculum For M. Tech Course)

DEPARTMENT OF CIVIL ENGINEERING

Effective from the Academic Year: 2022-2023

Course Structure & Curriculumfor M. Tech Course *in Civil* **Engineering (Geotechnical Engineering)**

FIRST SEMESTER

Sr.No:	Subject Code	Subject Name	Contacts (Period / Week)			Credits
		A. THEORY	L	T	P	
1.	**MCEC 101**	Advanced Engineering Mathematics	3	1	0	**4**
2.	**MCEC 102**	Soil Structure Interaction	4	0	0	**4**
3.	**MCEC 103**	Soil Exploration and Analysis of Foundations	4	0	0	**4**
4.	**MCEC 104**	Advanced Soil Mechanics	4	0	0	**4**
5.	**MCEC 105**	Elective - I	4	0	0	**4**
		B. LABORATORY / PRACTICAL				
6.	**MCEC 191**	Advanced Geotechnical Engineering Lab	0	0	4	**2**
7.	**MCEC 192**	CAD LAB	0	0	4	**2**
8.	**MCEC 193**	Seminar - I	0	0	2	**1**
		Total	**19**	**1**	**10**	**25**

Elective – I: One subject to be chosen from the following subjects.

Sr. No:.	Subject Code	Subject Name
1.	**MCEGE105 A**	Design of Foundation Structures
2.	**MCEGE105 B**	Dynamics of Soil and Foundations
3.	**MCEGE105 C**	Repair& Rehabilitation of Structure

SECOND SEMESTER

Sr.No:.	Subject Code	Subject Name	Contacts (Period / Week)			Credits
		A. THEORY	L	T	P	
1.	**MCEC(GE)201**	Ground Improvement Techniques	4	0	0	**4**
2.	**MCEC(GE) 202**	Stability Analysis of Slopes, Dams and Embankments	4	0	0	**4**
3.	**MCEC(GE)203**	Finite Element Method	4	0	0	**4**
4.	**MCEC 204**	Elective – II	4	0	0	**4**
5.	**MCEC205**	Elective – III	4	0	0	**4**
		B. LABORATORY / PRACTICAL				
6.	**MCEC 291**	Computational Lab	0	0	6	**3**
7.	**MCEC 292**	Seminar - II	0	0	4	**2**
		Total	**20**	**0**	**10**	**25**

Elective – II: [Note:-One subject to be chosen from the following subjects.]

Sr. No	Code	**Subject**
1.	**MCEC204 A**	Advanced Foundation Engineering
2.	**MCEC204 B**	Pre-stressed Concrete Structures
3.	**MCEC 204 C**	Composite Material & Structures

Elective – III: [One subject to be chosen from the following subjects.]

Sr. No	Code	**Subject**
1.	**MCEC 205 A**	Earthquake Geotechnical Engineering
2.	**MCEC 205 B**	Advanced Concrete Technology
3.	**MCEC 205 C**	Theory of Elastic Stability and Behaviour of Metal Structure
4.	**MCEC 205 D**	Earthquake Geotechnical Engineering

THIRD SEMESTER

Sr. No:	Subject Code	Subject Name	Contacts (Period / Week)			Credits
***A.* Dissertation/Seminar/Viva**			**L**	**T**	**P**	
1.	**MCEC 351**	Project Progress Seminar	0	0	10	**5**
2.	**MCEC 352**	Pre-submission of Dissertation	0	0	20	**10**
		Total	0	0	30	**15**

FOURTH SEMESTER

r. No:	Subject Code	Subject Name	Contacts (Period / Week)			Credits
***A.* Dissertation/Seminar/Viva**			**L**	**T**	**P**	
1.	**MCEC 451**	Comprehensive Exam (Viva-Voce)	0	0	6	**3**
2.	**MCEC 452**	Submission of Dissertation	0	0	24	**12**
		Total	**0**	**0**	**30**	**15**

CREDIT UNIT OF THE PROGRAM:

1.	Semester	**I**	**II**	**III**	**IV**	**Total**
2.	Contacts Hours	**30**	**30**	**30**	**30**	**120**
3.	Credit Unit	**25**	**25**	**15**	**15**	**80**

Total Credit Point: 80

ADVANCED ENGINEERING MATHEMATICS (MCEC101)

TOTAL CONTACT HOURS	: 52	INTERNAL ASSESSMENT	30
LECTURE	: 39	EXAMINATION	70
TUTORIAL	: 13	TOTAL MARKS	100

Statistic: Elements of statistic, frequency distribution; Concept of mean, median, mode and different types of distribution; Standard deviation and variance; Curve fitting by least square method; Correlation and Regression, Testing of Hypothesis; Basic type of factorial design and Analysis of Variance.
10

Matrix operation: Matrix operation Eigen value and Eigen vector by iterative methods. Diagonalisation and square matrix.
8

Laplace transform, Fourier transform Fourier integral and their applications. **6**

Numerical method: Interpolation by Polynomial, Error analysis, Solution of system of linear equation by Gauss Seidal iterative method, Newton Rapson method Numerical Integration by Gauss quadrature, Solution of ordinary differential equation by Rayligh-Ritz method.
10

Ordinary Differential Equation: i) 2nd order homogeneous equation ii) Euler Cauchys equation iii) non homogeneous linear equation. **Partial differential equation**: i) wave equation – one and two dimension, ii) heat equation- one dimension and two dimension. **5**

REFERENCE BOOK:

1) Introductory Methods of Numerical Analysis by S. S. Sastry (PHI)
2) Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R. K. Lyengar, R. K. Jain (New Age)
3) An Outline of Statistical Theory, Vol. I, II by A. M. Goon, M. K. Gupta, B. Dasgupta (The World Press Pvt. Ltd.)
4) The Design of Experiments to Find Optimal Conditions by Yu. P. Adler, E. V. Markova, Ylu V. Granovsky (MIR, 1975, Moscow)
5) Advanced Engineering Mathematics by Erwin Kreyszig (John Wiley & Sons, Inc)
6) Advanced Engineering Mathematics by Stanley Grossman & William R. Derrick (Harper & Row Publishers).

INDUSTRIAL MANAGEMENT (MCEC(SE)102)

TOTAL CONTACT HOURS	: 52	INTERNAL ASSESSMENT	30
		EXAMINATION	70
		TOTAL MARKS	100

Classification and Importance of Operations Management:
Operations Management in corporate profitability & competitiveness; Operations strategy; Types & characteristics of manufacturing systems & service systems. **3**

Operations Planning and Control:
Forecasting for operations; Inventory planning & control; Materials requirement planning; Planning production in aggregate terms; Operations scheduling; **25**

Quality Assurance:
The quality assurance system; choice of process and reliability; control of quality. **8**

Maintenance Function:
Preventive maintenance; Overhaul and replacement. **4**

Management Information System:
Need & structure of MIS; Data Processing Systems; Data Sources & Management. **5**

Human resource management:
Concept and evolution; Manpower planning; recruitment and selection; Motivating personnel; Leadership
7

REFERENCE BOOK:

1) Modern Production / Operations Management by Buffa & Sarin, 8th Ed., John Wiley
2) Operations Management by Russell & Taylor (Wiley India Pvt. Ltd.)
3) Management Information Systems by Larry Long (Prentice Hall)
4) Enterprise Resource Planning by A. Leon (TMH)
5) Human Resource Management by C. B. Gupta (Sultan Chand).

ADVANCED STRUCTURAL ANALYSIS (MCEC(SE)103)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Matrix Algebra – methods for matrix inversion and solution of simultaneous equations – band and sparse matrix techniques-stiffness and flexibility matrices of structural elements – various co-ordinate system and their transformation and synthesis-matrix formulation of force and displacement methods – member approach. Finite element concept in Engineering Analysis – Displacement model shape functions and element properties. Analysis of plane stress/strain – axi-symmetric stress analysis. Weighted residual methods and variational formulation of Finite Element Analysis. Isoparametric element — Numerical integration – assemblage of elements. Solution techniques – Finite element programming – use of package programmes.

REFERENCE BOOK:

1) Numerical Methods for Engineers by Chopra
2) Finite element procedure-- K.J.Bathe
3) matrix analysis of frame structure-- wever/gere
4) Structural analysis – A matrix approach by G.S.Pandit and Gupta
5) Numerical Methods for Engineers by Steven C. Chapra, Raymond P. Canale

SOIL STRUCTURE INTERACTION (MCEC104)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

General soil-structure interaction problems: Contact pressures and soil-structure interaction for shallow foundations, concept of sub grade modulus, effects/parameters influencing subgrade modulus. Soil behaviour, Foundation behaviour, Interface behaviour, Scope of soil foundation interaction analysis, soil response models, Winkler, Elastic continuum, Two parameter elastic models

Beam on Elastic Foundation: Soil Models: Infinite beam, Two parameters, Isotropic elastic half space, Analysis of beams of finite length, Classification of finite beams in relation to their stiffness.

Plate on Elastic Medium: Thin and thick plates, Analysis of finite plates, Numerical analysis of finite plates, simple solutions.

Elastic Analysis of Pile: Elastic analysis of single pile, Theoretical solutions for settlement and load distributions, Analysis of pile group, Interaction analysis, Load distribution in groups with rigid cap.

Laterally Loaded Pile: Load deflection prediction for laterally loaded piles, Sub-grade reaction and elastic analysis, Interaction analysis.

REFERENCE BOOK:

1) Selva durai, A. P. S, Elastic Analysis of Soil-Foundation Interaction , Elsevier,1979.
2) Poulos, H. G., and Davis, E. H.,Pile Foundation Analysis and Design, John Wiley,1980.
3) Scott, R. F., Foundation Analysis, Prentice Hall, 1981.
4) Structure Soil Interaction - State of Art Report, Institution of Structural Engineers, 1978.
5) ACI 336. (1988), Suggested Analysis and Design Procedures for combined footings and Mats, American Concrete Institute, 1988.

STRUCTURAL LABORATORY I (MCEC(SE)191)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**40**
L: 0	**T: 0**	**P: 3**	**EXAMINATION**	**60**
TOTAL CONTACT HOURS		**: 36**	**TOTAL MARKS**	**100**

Important physical tests on cement and aggregates, Physical tests on reinforcement, Destructive and non-destructive tests on concrete.

CAD LAB (MCEC192)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**40**
L: 0	**T: 0**	**P: 3**	**EXAMINATION**	**60**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Introduction and important features of a software dealing with analysis and design of structures.

ADVANCED STRUCTURAL DESIGN (MCEC(SE)201)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Flat slab, Grid slab, Deep beam, Shear wall, Frame shear wall interaction, Cylindrical shell, Structures for handing materials like silo and bunkers, Liquid retaining structures, Pile and Pile cap.

Design provisions as envisaged in various Indian Standards.

REFERENCE BOOK:

1) Design of Reinforce Concrete Structures A. K. Gupta
2) Limit State Design of RCC A.K. Jain
3) Limit State Design of RCC Structure by Pillai & Menon

STRUCTURAL DYNAMICS & EARTHQUAKE ENGINEERING (MCEC(SE)202)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Introduction – Single and multi-degree freedom systems, undamped and damped systems, numerical integration scheme, modal analysis for undamped and damped systems. Vibration of continuous elastic media – Beam, Plates.

Characteristics of earthquake, Earthquake response of structures, Concept of earthquake resistant design. Codal provision for design of buildings, design of liquid storage tanks, liquefaction, non-engineered construction, special topics.

REFERENCE BOOK:

1) Structural dynamics theory and computation by Paz Mario
2) Seismic analysis of the Structure b y T.K.Dutta
3) Introduction to Structural Dynamics by John M. Biggs (McGraw Hill)
4) Dynamics of Structures by Jagmohan L. Humar (A. A. Balkema Publisher)

THEORY OF ELASTICITY AND PLASTICITY (MCEC(SE)203)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Elasticity: Introduction to tensor analysis; three dimensional stress and strain analysis. Two dimensional problems in cartesian, polar and curvilinear co-ordinates, bending of a beam, thick cylinder under pressure, complex variable, harmonic and bi-harmonic functions. Torsion of rectangular bars including hollow sections, bending problems. Energy principles, variational methods and numerical methods.

Plasticity: basic concepts and yield criteria. Equations of plasticity, elasto-plastic analysis of torsion and bending problems, torsion of a bar of oval section (Sokoloskey's method), problems of spherical and axial symmetry, slip lines and plastic flow, strain hardening.

REFERENCE BOOK:

1) Theory of Plasticity by Chakraborty
2) Theory of Elasticity by Timoshenko S.P. and Goodier
3) Theory of Elasticity and Plasticity by Timoshenko S.P. and Woinowsky-Kreiger
4) Plasticity Theory by Jacob Lubliner
5) Theory of Elasticity and Plasticity by Harold Malcolm Westergaard (HUP)

STRUCTURAL LABORATORY II (MCEC(SE)291)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**40**
L: 0	**T: 0**	**P: 3**	**EXAMINATION**	**60**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Analysis and design of a multistoried building using software, Preparation of detailed drawings of different structural elements including ductility detailing.

ELECTIVE – I

BRIDGE ENGINEERING

(MCEC(SE)101A)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Introduction, historical review, Engineering and aesthetic requirements in bridge design, Introduction to bridge codes. Economic evaluation of a bridge project. Site investigation and planning;. Factors affecting scour and its evaluation. Bridge foundations - open, pile, well and caisson. Piers, abutments and approach structures; Superstructure - analysis and design of right, skew and curved slabs. Girder bridges - types, load distribution, design. Introduction to long span bridges - cantilever, arch, cable stayed and suspension bridges.

REFERENCE BOOK:

1) Principle & Practice of Bridge Engineering by S.P. Bindra- Dhanpat Rai
2) Bridge Engineering by Demetrios E. Tonias, Jim J. Zhao
3) Design of Bridge Structures – Jagadish & Jayaram – Prentice Hall
4) Bridge Engineering by S. Ponnuswamy (Manohar Publishers & Distributor)

STRUCTURAL OPTIMIZATION (MCEC(SE)101B)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Classical methods – theory of layout – Differential calculus – simultaneous modes of failure – Fully stressed design – optimality criterial methods.

Mathematical programming and computer techniques – linear programming – Revised simplex method, non-linear programming fundamentals – Methods for one dimensional minimization – Direct search and gradient methods for unconstrained problems – use of penalty functions and sequential L.P. for constrained optimisation problems – Geometric

programming and dynamic programming – application to structural engineering problem.

REFERENCE BOOK:

1) Engineering Optimization : Theory and Practice by Rao, Singireshel S.
2) Advances In Structural Optimization by J. Herskovits (Springer-Verlag New York, LLC)
3) Elements Of Structural Optimization by Raphael T. Haftka (Springer-Verlag New York, LLC)
4) Topology Optimization: Theory, methods and Applications Springer, 2003 by M. P. Bendsoe, O. Signmund

REPAIR AND REHABILITATION OF STRUCTURES (MCEE101C)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Appraisal of damage and deterioration of structures by non-destructive and other techniques; Cause of deterioration; Environmental aspects and earthquake effects; Repair and strengthening of superstructure – structural components, load bearing wall, panel walls; Strengthening of foundation; Grouting; Grout material, guniting, shotcreting, under pinning; Repair of steel structures – bridge, building, towers etc., monuments and historical structures. Prevention of water leakage in structures; Under-water repair; Durability of repairing material; Case histories

REFERENCE BOOK:

1) Testing of Concrete in Structure by Bungey (Surrey University Press)
2) Non Destructive Testing by Malhotra & Carino (CRC Press)
3) Corrosion of Steel in Concrete by Broomfield John P. (Taylor & Francis)

ELECTIVE – II

ADVANCED FOUNDATION ENGINEERING (MCEE201A)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Bearing capacity: Bearing capacity of shallow foundation in layered soils, Footings on slopes, Foundation with uplift or tension forces.

Settlements: Settlement Analysis of shallow foundations in sand, clay, and layered deposits, Reliability of settlement calculations, Structural tolerances.

Design of rectangular footings, combined footings and mat foundations.

Deep foundations: Pile foundations under vertical and lateral loads, Negative skin friction of piles; Uplift capacity of piles and anchors, Well foundations.

Foundations on expansive soils; Introduction to soil dynamics and machine foundation

REFERENCE BOOK:

1) Foundation Analysis & Design By J.E. Bowels (Mc Graw Hill)
2) Principles of Foundation Engg. By B.M. Das (PWS Publishing
3) Pile Foundation- Analysis & Design Poulus & Davis
4) Constructional methods in Foundation Engineering Koener
5) Foundation design and construction by Tomlinson .M.J.
6) Raft foundation design and analysis with practical approach by Gupta .s.c
7)

PRESTRESSED CONCRETE STRUCTURES (MCEE201B)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Specification of materials, methods of prestressing, losses, analysis and design of members for moment and shear, stresses in anchorage zones of pretensioned and post tensioned members, design of end block, prestressed concrete compression members, partial prestressing, composite construction with prestressed concrete and reinforced concrete; two-way prestressing, circular prestressing, indeterminate structures. Review of IS code.

REFERENCE BOOK:

1) Design of prestressed concrete structure by Lin
2) Design of pre stressed Concrete by Krishna Raju
3) Design of Prestressed Concrete by Mallik & Gupta

COMPOSITE MATERIALS & STRUCTURES (MCEE201C)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

FRP composites, Types, Mechanics, behaviour, properties, application;

Steel — Concrete composite structures, design philosophy, shear connectors, beams, girders and slabs, Concrete — Prestressed concrete composite structures.

REFERENCE BOOK:

1) Composite structure of steel and concrete (by Johnson)
2) Mechanics of composite material and structure by M. Mukhopadhay (university press)
3) An Introduction to Composite Material by D. Hull (Cambridge University Press)
4) Engineering Mechanics of Composite Material by Isaac M. Daniel & Ori Ishai (OUP)
5) Steel Concrete and Composite Design of Tall Building by Bungate Taranath (McGraw Hill)

ELECTIVE – III

ENVIRONMENTAL IMPACT ASSESSMENT

(MCEC(SE)202A)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Legal Aspects of EIA, Objectives of EIA, General Methodology of EIA, Base line Studies, Screening, Scoping, Public Consultation, Data Collection, Environmental Impact Analysis, Mitigation and Impact Management, Case Studies, Environmental Audit.

REFERENCE BOOK:

1) Environmental Impact Assessment by Bartwal R. R. (New Age)
2) Introduction to Environmental Impact Assessment by John Glasson, Riki Therivel, Andrew Chadwick (Taylors & Francis)
3) Environmental Impact Assessment Practice & Participation by Fevin Stuart Hanna (OUP)
4) Methods of Environmental Impact Assessment by Peter Morris (Taylor & Francis)
5) Environmental Impact Assessment by Alan Gilpin (CUP)

ADVANCED CONCRETE TECHNOLOGY (MCEE202B)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**: 30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**: 70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Microstructural aspects of cement paste; Models of hydrated Portland cement gel; Mechanism, application and specification of chemical admixtures, mineral admixtures and other cement replacement materials; Special cementitious systems, viz., phosphate cement, magnesium oxychloride cement, regulated set cement, high alumina cement etc.; concrete- environment interaction; Marine concrete; Resistance of concrete to Fire and influence of temperature; Extreme weather concreting;

Properties and mix proportioning of flyash concrete, silica fume concrete, fibre reinforced concrete, sprayed concrete, high performance concrete, self compacting concrete and geopolymer concrete.

REFERENCE BOOK:

1) Design of Concrete Mixes by Krishna Raju
2) Concrete Microstructure, Properties and Material by P.kumar Mehta &Paulo J. M. Monteiro
3) Concrete Technology by M.S. Shetty (S. Chand)
4) Properties of Concrete by A. M. Neviel
5) Concrete Technology by Shanta Kumar, Neviel & Brookes
6) Progress in Cement and Concrete in Series by S. N. Ghosh

CONSTRUCTION TECHNOLOGY & MANAGEMENT (MCEC(SE)202C)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Different Construction techniques — equipments used — new technologies;
Network scheduling CPM, PERT, Planning & Scheduling of activity Networks;
Scheduling with limited resource, Resource Planning, Resource Allocation, Project Schedule Compression, Project Scheduling, Estimation of Project Cost, Monitoring Project Progress, Project Appraisal & Selection, Recent Trends in Project Management.

REFERENCE BOOK:

1) Construction and project management for Engineer—Krishnamurthy
2) Urban Construction Project Management (McGraw-Hill Construction Series) by Richard Lambeck, John Eschemuller
3) Construction Management Fundamentals By: Kraig Knutson, Clifford J. Schexnayder, Christine M. Fiori, Richard Mayo
4) Construction Method and Management by Stephens W. Nunnally (Prentice Hall)

THEORY OF ELASTIC STABILITY AND BEHAVIOUR OF METAL STRUCTURE (MCEE202D)

CONTACT HOURS			**INTERNAL ASSESSMENT**	**30**
L: 3	**T: 1**	**P: 0**	**EXAMINATION**	**70**
TOTAL CONTACT HOURS		**: 52**	**TOTAL MARKS**	**100**

Introduction; Fundamental principles and models for elastic stability, stability of column; classification of dynamical systems, linear and nonlinear eigen value problems. Stability of plates, frames, beams and arches Lateral buckling of beams, combined bending and axial force, combined bending and torsion. Buckling of thin elements Torsional buckling of thin walled structures and open sections Column-strength curves. Buckling and post-buckling strength of plate elements with special references to the codal provisions. Behaviour of light gauge steel structures.

REFERENCE BOOK:

1) Fundamental of Structural Stability by Simitses
2) Stability Analysis and Design of Structures, New Delhi by Gambhir M.L
3) Stability of structure by Banzant
4) Structural Stabilty of steel- Concepts and Applications for structural engineers- Galambos Theodore V
5) Advanced Design in Structural Steel – Lothers – Prentice – Hall
6) Design of Steel Structure by S. K. Duggal (McGraw Hill)
7) Design of Steel Structure by N. Subramanian