MAHATMA GANDHI UNIVERSITY

SCHEME AND SYLLABI

FOR

M. Tech. DEGREE PROGRAMME

IN

CIVIL ENGINEERING

WITH SPECIALIZATION IN

STRUCTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT

(2013 ADMISSION ONWARDS)

SCHEME AND SYLLABI FOR M. Tech. DEGREE PROGRAMME IN CIVIL ENGINEERING WITH SPECIALIZATION IN STRUCTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT

SEMESTER - I

Sl. No.	Course No.	Subject	Hrs / Week			Evaluation Scheme (Marks)					Credits (C)
			L	T	P	Sessional			ESE	Total	
						TA	CT	Sub Total			
1	MCESC 101*	Analytical Methods in Engineering	3	1	0	25	25	50	100	150	4
2	MCESC 102*	Advanced Design of Concrete Structures	3	1	0	25	25	50	100	150	4
3	MCESC 103*	Theory of Elasticity	3	1	0	25	25	50	100	150	4
4	MCESC 104	Construction Management	3	1	0	25	25	50	100	150	4
5	MCESC 105	Elective - I	3	0	0	25	25	50	100	150	3
6	MCESC 106	Elective - II	3	0	0	25	25	50	100	150	3
7	MCESC 107*	Computer Application Lab	0	0	3	25	25	50	100	150	2
8	MCESC 108	Seminar - I	0	0	2	50	-	50	0	50	1
Total			**18**	**4**	**5**			**400**	**700**	**1100**	**25**

Elective – I (MCESC 105)		**Elective – II (MCESC 106)**	
MCESC 105 – 1*	Advanced Analysis of Structures	MCESC 106 – 1*	Prestressed Concrete
MCESC 105 – 2	Bridge Engineering	MCESC 106 – 2*	Computer Aided Design
MCESC 105 – 3**	Structural Dynamics	MCESC 106 – 3*	Advanced Concrete Technology
MCESC 105 - 4	Advanced construction techniques	MCESC 106 - 4	Construction methods and Equipments

L – Lecture, **T** – Tutorial, **P** – Practical
TA – Teachers' Assessment (Quizzes, attendance, group discussion, tutorials, seminar, field visit etc)
CT – Class Test (Minimum of two tests to be conducted by the Institute)
ESE – University End Semester Exam will have to be conducted by the institute through concerned affiliating University.
* - common for MCESE & MCESC
** - common with MCESE -104

MCESC 101* **ANALYTICAL METHODS IN ENGINEERING**

L	T	P	C
3	1	0	4

Module 1: Differential equations

Linear differential equations–homogeneous equations–boundary value problems–Cauchy–Euler equations–factoring the operator–nonhomogeneous equations–variation of parameters.

Module 2: Partial differential equations

Ordinary differential equations in more than two variables – first order P.D.E–integral surface passing through a given curve–surfaces orthogonal to given system–compatible systems of first order P.D.E–charpits method–solution satisfying the given conditions–P.D.E second order in physics–linear P .D.E with constant coefficients.

Module 3: Boundary value problems

Elementary solutions of Laplace equations, wave equations, series solution of these equations in two dimensions–related problems in engineering.

Module 4: Numerical solutions of P.D.E

Classification of second order equation– finite difference approximations to partial derivatives–solution of Laplace equation by finite difference method–solution of one dimensional wave equations.

References:

1. Michael D Greenberg, “Advanced Engineering Mathematics”, Pearson education.
2. Ian Sneddon, “Elements of Partial Differential Equations”, McGraw Hill, International Editions.
3. B.S Grewal, “Numerical Methods in Engineering and Science”, Khanna Publications.
4. P Kandasamy, “Numerical Methods”, S Chand and company.
5. S.Arumugam,A. Thangapandi Issac, “Numerical methods”, Scitech.
6. George.F. Simmons, “Differential Equations with applications and historical notes”, TMH Edition

MCESC 102* ADVANCED DESIGN OF CONCRETE STRUCTURES

L	T	P	C
3	1	0	4

Module 1

Yield line method of analysis of slabs:– Characteristic features of yield lines– analysis by virtual work method – Yield line analysis by equilibrium method, Design of grid floor –Approximate method– Rigorous method(Concept only), Design of Waffle Slabs- IS code method.

Module 2

Design of continuous beams– Redistribution of moments, Design of portal frames , Design of multistorey building frames, Design of Bunkers and silos – Airy's theory– Janssen's theory.

Module 3

Design of special RC elements:– Design of slender columns, Design of shear walls(with and without boundary elements), Design of Deep beams, Design of corbels.

Module 4

Design of flat slabs:– Introduction–components–IS Code recommendations– IS code method of design (with and without drop).

References:

1. Pippard A J S, "The Analysis of Engineering Structures", Edward Arnold PublishersLtd.
2. Krishna Raju N., "Advanced Reinforced Concrete Design", CBS Publishers and distributers, New Delhi.
3. Krishna Raju., "Design of Reinforced Concrete Structures"
4. Punmia,Ashok K Jain,Arun K Jain,"Reinforced Concrete Vol:II".
5. P C Varghese, "Limit State Design of concrete structures".
6. S S Bhavikatti , "Advance R.C.C Design Vol II".
7. Rajagopalan, "Design of Storage structures"
8. Reynolds Handbook.
9. Relevant IS Codes.
10. Menon & Pillai – "Design of R.C.C. Structures"

MCESC 103* **THEORY OF ELASTICITY**

L	T	P	C
3	1	0	4

Module 1: Elasticity

Basic concepts– Body force–Surface traction–Stresses and strains–Three dimensional stresses and strains–analysis–transformation equations of 3D stresses & strains–principal stresses & strains–States of stresses & strain–Equilibrium equations–generalized Hooke's Law–Compatibility Conditions–Boundary conditions.

Module 2 : Two dimensional stress–strain problems

Plane stress and plain strain– Analysis–transformation equations–stress–strain relations–equilibrium equations in Cartesian and polar co ordinates Airy's stress function– Biharmonic Equilibrium–St Venant's principle–2D problems in Cartesian coordinate–cantilever with concentrated load at free end– Simply supported With UDL–Cantilever with moment at free end.

Module 3: Analysis of axisymmetric problems and Torsion

General equations in polar co ordinates–Stress distribution symmetric about an axis–Cylinder subjected to external and internal pressures– Rotating disc as a 2D problem. Effect of circular hole in stress distribution of plates.

Torsion of prismatic bar– General solution–Warping function approaches – St. Venant's theory–Membrane analogy– Sand heap analogy– Torsion of Non Circular sections – Torsion of multi celled thin wall open and closed sections.

Module 4: Plasticity

Introduction to plasticity – General concepts – Stress – Strain curves – Ideal plastic body – Plastic flow conditions – theories of failure – plastic work – Plastic potential – Yield criteria – Simple applications – Elasto – plastic analysis for bending and torsion of bars – Residual stresses.

References:

1. Timoshenko S P and Goodier J. N, “Theory of Elasticity”, Tata Mcgraw Hill International Student Edition.
2. Johnson W and Mellor P. B, “Plasticity for mechanical engineers”, Van Nostrand Company Ltd.
3. Sadhu Singh, “Theory of elasticity”, Khanna Publishers, Delhi.
4. Sadhu Singh, “Theory of Plasticity”, Khanna Publishers, Delhi.
5. Srinath L. S, “Advanced mechanics of solids”, Tata McGraw– Hill Publishing Company Ltd., New Delhi.
6. Arthur P Boresi & Omar M SideBottom, “Advanced Mechanics of Materials”, John Wiley & Sons.
7. Sokolnikoff, “Mathematical Theory of Elasticity”.

MCESC 104 CONSTRUCTION MANAGEMENT

L	T	P	C
3	1	0	4

Module 1: Scientific Management

Concept - elements - contributions of pioneers in scientific management - basic principles of management with reference to construction industry - Maslow's hierarchy of needs - organisation - principles - construction organisation setup.

Module 2: Management information Systems

Definition - evolution - organisational theory - systems approach - computer systems - database management - information systems for decision making - MIS effectiveness and efficiency criteria -failure of MIS.

Module 3: Engineering Economics

Definition and scope - cash flow - interest formulas and application - time value of money - bases of comparison - decision making amongst alternatives - rate of return - replacement analysis - break even analysis - incremental analysis - benefit cost analysis - capital budgeting - working capital management - construction accounting - long term and short term financing - problems and case studies.

Module 4: Network Techniques in Construction

Introduction - planning - work scheduling -network diagram - rules for drawing network diagram - Fulkerson's rule - PERT / CPM techniques - precedence networks - least cost scheduling- resource allocation - updating - application of network techniques - related problems.

References:

1. Dinkar Pagare. " principles of management " - Sultan Chand & Sons,New Delhi.
2. Robert G Murdick, Joel E Ross, James R Clagget. " Information systems for Modern Management "- PHI Learning Private Limited, New Delhi.
3. R Paneerselvam. " Engineering Economics " - PHI Learning Private Limited, New **Delhi.**
4. Prassanna Chandra. "PROJECTS-Planning, Analysis, Selection, Financing, Implementation and Review" -Tata McGraw-Hill Education private Limited.
5. B L Gupta & Amit Gupta. "Construction management and machinery " - Standard publishers Distributors, Delhi.
6. James D Stevens. "Techniques for Construction Network Scheduling" - McGraw-Hill Publishing Company.

MCESC 105 – 1* **ADVANCED ANALYSIS OF STRUCTURES**

L	T	P	C
3	0	0	3

Module 1: Matrix methods

Review of work and energy principles - Maxwell, Betti, Castigliano theorems- principles virtual work- Classification of structures–discrete structures–elements–nodes–degrees of freedom–static& kinematic indeterminacy Stiffness method–coordinate systems–element stiffness matrix.

Module 2: Element approach

Stiffness method – analysis of pin jointed frames (temperature effect, lack of fit), continuous beams (settlement of supports), rigid jointed frames and grids.

Module 3: Direct stiffness approach

Structure stiffness matrix–assembly–equivalent joint load – incorporation of boundary conditions –solutions–Gauss elimination–matrix inversion–analysis of pin jointed frames, continuous beams.

Module 4: Flexibility method

Element Flexibility matrix–truss element–beam element–force transformation matrix – equilibrium–compatibility–analysis of beams & frames (rigid and pin jointed), grids.

References: –

1. Weaver & Gere, "Matrix Analysis of Structures", East West Press.
2. Moshe F Rubinstein– "Matrix Computer Analysis of Structures"– Prentice Hall, 1969.
3. Meek J.L., "Matrix Structural Analysis", McGraw Hill, 1971.
4. Reddy C.S., "Basic Structural Analysis", Tata McGraw Hill Publishing Co.1996.
5. Smith J.C. "Structural Analysis", Macmillian Pub.Co.1985.
6. Rajesekharan & Sankarasubramanian,G., "Computational Structural Mechanics", Prentice Hall of India, 2001.
7. Mukhopadhyay M., "Matrix Finite Element Computer and Structural Analysis", Oxford & IBH, 1984.
8. Wang C.K.& Solomon C.G.," Introductory Structural Analysis", McGraw Hill.1968.

9. Pezemieniecki, J.S, “Theory of Matrix Structural Analysis”, McGraw Hill Co.,1984.
10. Seeli F.B.& Smith J.P., “Advanced Mechanics of Materials”, John Wiley &Sons, 1993.
11. Norris & Wilbur, “Elementary Structural Analysis”, McGraw Hill.
12. Damodar Maity, “Computer Analysis of Framed Structures”, I K International.

MCESC 105- 2 BRIDGE ENGINEERING

L	T	P	C
3	0	0	3

Module 1: Planning of bridges

Investigation for bridges- need for investigation- selection of site- economical span- subsoil exploration— investigation report— importance for proper investigation—Design of RCC bridges- IRC loading- types of bridges- components of bridges- analysis and design of slab bridges and box culvert.

Module 2: Design of girder bridges

T-beam bridges- Analysis and design of deck slab,longitudinal girders and cross girders- Pigeaud's method- Courbon's method- Morice and Little method- Hendry-Jaegar method- prestressed concrete bridges(simply supported case only).

Module 3: Bearings

Importance of bearings— bearings for slab bridges— bearings for girder bridges—Design of elastomeric bearings -Joints -Appurtenances. Substructure- different types- materials for piers and abutments- substructure design- piers and abutments - shallow footings - well foundation.

Module 4: Construction methods

Inspection and maintenance and construction of bridges-case studies of recently constructed major bridges-critical studies of failure of major bridges. Features of suspension bridges and cable stay bridges.

References:

1. Raina V.K (1991), "Concrete Bridge Practice- Analysis, design & economics", Tata Mc-GrawHill, publishing company, New Delhi.
2. Raina V.K (1988), "Concrete Bridge Practice- Construction Maintenance & Rehabilitation", Tata Mc-GrawHill, publishing company, New Delhi.
3. Victor D.J (19991), "Essentials of Bridge Engineering", Oxford & IBH publishing company, New Delhi.
4. Ponnuswami S (1993), "Bridge Engineering", Tata Mc-GrawHill, publishing company, New Delhi.
5. Krishna Raju N (1996), "Design of Bridges", TataMcGrawHill, publishing company, New Delhi.
6. Relevant IS Codes, and IRC Codes.

MCESC 105-3 STRUCTURAL DYNAMICS**

L	T	P	C
3	0	0	3

Module 1: Introduction

Objectives - types of dynamic problems - degree of freedom - D' Alemberts Principle -principle of virtual displacement - Hamilton's principle. Types of vibration – vibration control.

Module 2: Single Degree of Freedom System

Undamped and damped free and forced vibrations -critical damping - over damping - under damping - logarithmic decrement. Response to harmonic loading - evaluation of damping - vibration isolation - transmissibility -response to periodic forces- vibration measuring equipments. Duhamel integral for undamped system- Response to impulsive loads.

Module 3: Multidegree Freedom Systems and Continuous systems

Natural modes - orthogonality conditions - modal Analysis - free and harmonic vibration -Free longitudinal vibration of bars - flexural vibration of beams with different end conditions -forced vibration.

Module 4: Approximate methods

Rayleigh's method - Dunkerley's method - Stodola's method - Rayleigh –Ritz method -Matrix method.

References:

1. Clough & Penzien, "Dynamics of Structures".
2. Meirovitch.L, "Elements of Vibration Analysis".
3. W.T. Thomson , "Vibration Theory and Applications".
4. M.Mukhopadhyay , "Vibrations, Dynamics & Structural systems".
5. Paz Mario, "Structural Dynamics–Theory and Computation".
6. Denhartog, "Mechanical vibrations".
7. Timoshenko, "Vibration Problems in Engineering".
8. Anil K Chopra, "Dynamics of structures", Pearson Education.
9. V.P Singh, " Mechanical Vibrations"

MCESC 105 - 4 ADVANCED CONSTRUCTION TECHNIQUES

L	T	P	C
3	0	0	3

Module 1: Construction techniques

Box Jacking - pipe jacking - Under water construction of diaphragm walls and Basement. Tunneling techniques. piling techniques - driving well and caisson -sinking cofferdam -cable anchoring and grouting - driving diaphragm walls sheet piles - laying operations for built up offshore system - shoring for deep - well points - dewatering and stand by plant equipment for underground open excavation - Trenchless Technology.

Module 2: Techniques for concreting

Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections launching techniques -Slip form techniques- suspended form work - .erection techniques of tall structures - launching techniques for heavy decks -in situ prestressing in high rise structures, aerial transporting handling erecting lightweight components on tall structures - erection of lattice towers and rigging of transmission line structures.

Module 3: Construction sequence and methods

Bow string bridges, cable stayed bridges. Launching and pushing of box decks. Construction sequence and methods in domes and prestressed domes. Vacuum dewatering of concrete flooring - concrete paving technology- erection of articulated structures.

Module 4: Construction techniques for foundation

Mud Jacking grout through slab foundation - micro piling for strengthening floor and shallow profile pipeline laying - protecting sheet plies, screw anchors - sub grade water proofing under pinning advanced techniques and sequence in demolition and dismantling.

References:

1. Robertwade Brown, “Practical foundation engineering hand book”, McGraw Hill Publications, 1995
2. Patrick Powers .J, “Construction Dewatering: New Methods and Applications”, John Wiley & Sons, 1992
3. Jerry Irvine, “Advanced Construction Techniques”, CA Rockers, 1984

MCESC 106 – 1* **PRESTRESSED CONCRETE**

L	T	P	C
3	0	0	3

Module 1

Introduction: - Basic concept of Prestressing, Analysis of prestress and bending stress: - Stress concept, Strength concept: - Pressure line and internal resisting couple and Load balancing concept for extreme fiber stresses for various tendon profile. Systems of Prestressing: - Pre tensioning and Post tensioning, Thermo elastic and Chemical prestressing. Tensioning devises and Systems, Materials for Prestressed concrete: - Need of high strength concrete and steel, Advantages of prestressed concrete over reinforced concrete.

Losses of Prestress: - Losses of Prestress:- Stages of losses, Types of losses in pre-tensioning and post-tensioning due to Elastic shortening, Shrinkage, Creep, Relaxation, Anchorage Slip, Friction and Sudden changes in temperature. Graphical method for friction loss, Methods of overcoming friction losses. Concept of reduction factor.

Deflection of beams: - Short term, Load deflection curve, Importance of control of deflections, factors influencing deflections, Pre- cracking and Post- cracking, Effect of tendon profile on deflections, Prediction of long term (Concept only).

Module 2

Cracking and Failure: - Micro and visible cracking, Stresses in steel due to loads. Failure: - Flexural failure, Shear failure, other modes of failure.

Elastic Design: - Shear and Torsional Resistance of PSC members: - shear and Principal Stresses. Ultimate shear resistance of PSC members: - Section cracked and uncracked, Design for shear using IS code. PSC members in torsion:-Pure torsion, Combined bending moment and torsion, Combined bending moment, shear and torsion: - Codified procedures, Design of reinforcement using IS code provision. Flexural strength: - Simplified code procedure for bonded and unbonded symmetrical and unsymmetrical sections. Behavior under flexure: - Codel provision for Limit state design:-Design stress strain curve for concrete. Design of sections for flexure: - Expressions for minimum section modulus, Prestressing force and Eccentricity. Design: - Analytical and Graphical. Limiting zone for prestressing force. **End blocks: -** Anchorage zone Stresses, Stress distribution in end block, Methods of investigation, Anchorage zone reinforcements, Design (IS Code method only).

Module 3

Design of Pretensioned and Post-Tensioned Flexural Members: - Dimensioning of Flexural Members. Estimation of Self Weight of Beams, Design of Pre tensioned and Post tensioned members symmetrical about vertical axis.

Design of Compression members (Concepts only, no design expected):-Design of compression members, with and without flexure, its application in the design of Piles, Flag masts and similar structures.

Prestressing of statically indeterminate structures: - Advantages, Effect, Method of achieving continuity, Primary, Secondary and Resultant moments, Pressure line, Concept of Linear transformation, Guyon's theorem, Concordant cable profile.

Module 4

Composite construction of Prestressed and in situ Concrete: - Types, Analysis of stresses, Differential shrinkage, Flexural strength, Shear strength, Design of composite section.

Tension members: - Load factor, Limit state of cracking, Collapse, Design of sections for axial tension.

Design of Special Structures (concept only, no design expected):- Prestressed Folded plates, Cylindrical Shells, Pipes, Circular water tanks.

References:

1. T.Y. Lin and H. Burns Ned., "Design of prestressed concrete structures", John Wiley and sons, New York.
2. N. Krishna Raju, "Prestressed concrete", Tata McGraw Hill Publishing Co.Ltd.
3. BIS, IS: 1343-1980, "Code of Practice for Prestressed Concrete", Bureau of Indian standards, India.
4. R. H. Evans and E. W. Bennet, "Prestressed Concrete Theory and Design", Chapman and Hall, London.
5. N. Rajagopal, "Prestressed Concrete", Narosa Publishing House, New Delhi.
6. S. Ramamrutham, "Prestressed Concrete", Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
7. Y. Guyon, "Prestressed Concrete", C. R. Books Ltd., London.
8. P.W. Abeles, "An Introduction to prestressed Concrete", Vol. I & II, Concrete Publications Ltd., London.

9. H. Nilson Arthur, “Design of Prestressed Concrete”, 2nd edn. John Wiley and Sons, New York.
10. F. Leonhardt, “Prestressed Concrete and Construction2nd edn.” Wilhelm Ernst and Sohn, Berlin, Munich.

MCESC 106 – 2* **COMPUTER AIDED DESIGN**

L	T	P	C
3	0	0	3

Module 1

History and overview of CAD– advantages of CAD over manual drafting and design – hardware requirements – computers and workstation, elements of interactive graphics, input/out put display, storage devices in CAD, and an overview of CAD software – 2D Graphics, 3D Graphics.

Module 2

Popular CAD packages, Type of structure, Unit systems, structure geometry and Co-ordinate systems - global co- ordinate system, Local co-ordinate systems –Relationship between Global and Local co-ordinate systems Edit Input-Command Formats-Text Input. Graphical Input Generation-"Concurrent"-Verifications-Library-Geometry-Generation–Dimensioning-loading-Analysis.

Module 3

Construction activities:- The critical path method- Definitions of terms and symbols- Steps in critical path scheduling- Developing a critical path schedule - Determining free float- Determining total cost of project - Manual versus Computer analysis of critical path methods– Popular packages in Construction Management and MIS.

Module 4

Information types and uses:- General application software's- Civil engineering packages, Project management software, advanced structural engineering software's, Expert systems for construction.

References:

1. Sujith Kumar Roy & Subrata Chakrabarty, "Fundamentals of Structural Analysis", S Chand $ Company Ltd., New Delhi.
2. B.Sengupta & H. Guha, "Construction Management and Planning", Tata Mc Graw Hill Publishing Co. Ltd, New Dehi.
3. R.L Peurifoy, "Constuction Planning, Equipment and methods", Tata Mc Graw Hill Publishing Co. Ltd, Kogakusha.

4. Mikell P. Groover & Emroy W Zimmers,Jr, “CAD/CAM Computer Aided Design and Computer Aided Manufacturing”
5. Reference Manuals of Packages.
6. L S Sreenath, CPM – PERT.
7. C.S. Krishnamoorthy, S.Rajeev, A Rajaraman, “Computer Aided Design – Software and Analytical Tools”, Narosa Publishing House, New Delhi

MCESC 106 – 3* ADVANCED CONCRETE TECHNOLOGY

L	T	P	C
3	0	0	3

Module 1: Aggregate

Classification, Testing Aggregates, fibres. Cement, grade of Cement, chemical composition, Hydration of Cement, Structure of hydrated Cement, Special Cement, Water, Chemical and Mineral Admixtures.

Module 2: Principles of Concrete mix design

Methods of Concrete mix design, Design of high strength and high performance concrete. Rheological behaviour of fresh Concrete, Properties of fresh and hardened concrete, Strength, Elastic properties, Creep and Shrinkage, Variability of concrete strength. Non destructive testing and quality control, Durability, corrosion protection and fire resistance.

Module 3: Modern trends in concrete manufacture and placement techniques

Methods of transportataion, Placing and curing–extreme whether concreting, Special concreting methods, Vaccum dewatering of concrete– Under water concreting.

Module 4: Light weight Concrete

Fly–ash Concrete, Fibre reinforced Concrete, Polymer Concrete, Epoxy resins and screeds for rehabilitation – properties and application – Emerging trends in replacement of fine aggregates.

References:

1. Krishnaraju, N., "Advanced Concrete Technology", CBS Publishers.
2. Nevile, A. M. (1985), "Concrete Technology", Prentice Hall, New York.
3. Santhakumar A.R (2006), "Concrete Technology", World Rights Publisher.

MCESC 106 - 4 CONSTRUCTION METHODS AND EQUIPMENTS Module 1: Modern

L	T	P	C
3	0	0	3

Construction Methods

Open excavation, shafts and tunnels, pile, pier and caisson foundations. Basement construction – construction methods - supporting the excavations – control of ground water - shoring and underpinning – basement waterproofing.

Module 2: Construction Method

Construction Method for: Bridges, roads, railways, dams, harbours, river works and pipelines.

Module 3: Construction equipment and techniques

Construction equipment and techniques for: Earth moving, excavating, drilling, blasting, tunneling and hoisting and erection. Equipment for: Dredging, tunneling, dewatering. Equipment for Flooring-dewatering and floors finishing.

Module 4: Equipment for production of aggregate and concrete

Crushers – feeders – screening equipment – batching and mixing equipment – hauling, pouring and pumping equipment – transporters.

References:

1. Antil J.M., (1982) "Civil Engineering Construction", McGraw Hill Book Co.
2. Peurifoy, R.L., Ledbette. W.B. (2000), "Construction Planning, Equipment and Methods", McGraw Hill Co.
3. Ratay, R.T. (1984), "Hand Book of Temporary Structures in Construction", McGraw Hill.
4. Koerner, R.M. (1984), "Construction & Geotechnical Methods in Foundation Engineering", McGraw Hill.
5. Varma,M. (1979), "Construction Equipment and its Planning & Applications", Metropolitain Book Co.
6. Smith, R.C, Andres, C.K. (1986), "Principles and Practive of Heavy Construction", Prentice Hall.

MCESC 107 COMPUTER APPLICATION LABS

L	T	P	C
0	0	3	2

Project management using CPM/PERT Software - PRIMAVERA & MS Project software

- Practice on the GUI of the software and Input of Date.
- Practice on Creating Bar Charts/Grant charts.
- Practice on creating CPM/PERT charts and finding out critical path.
- Practice on resource allocation and leveling of resources.
- Practice on Project Monitoring (Cost &Time).
- Plotting and printing of various charts and project.
- Filters and layouts- formatting the display- printing and reports.
- Tracking progress- scheduling options and out of sequence progress.

Note:

The students must practice the application of both project management softwares in civil engineering projects.

References

1. PRIMAVERA Reference Manual

2. MS Project Reference Manual

MCESC 108

L	T	P	C
0	0	2	1

SEMINAR-I

Each student is required to present a technical paper on a subject approved by the department. The paper should be on a recent advancement/trend in the field of structural engineering. He/she shall submit a report of the paper presented to the department.