

SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)



SYLLABUS

For

**MASTERS IN TECHNOLOGY
(CONSTRUCTION TECHNOLOGY &
MANAGEMENT)**

Course Code: MTCTM

Department of Civil Engineering

Faculty of Engineering

Duration of Course: 2Year

Examination Mode: Semester

Examination System: Grading

Swami Vivekanand University, Sironja, Sagar (M.P.)

2016-2017



MTCEC-0101 – Advance Engineering Mathematics

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total	Practical		LW	Total		
		Max	Min	TW	Max	Min	(h) =									
		(a)	(b)	(c)	(d)	(a+c+d)	(e)	(f)			(g)	(e+f)				
MTCEC 0101	Advance Engg. Mathematics	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS 14

Numerical solution of Partial Differential Equation (PDE): Numerical solution of PDE of hyperbolic, parabolic and elliptic types by finite difference method.

UNIT- 2

MARKS 14

Integral transforms: general definition, introduction to Mellin, Hankel and Fourier transforms and fast Fourier transforms, application of transforms to boundary value problems in engineering.

UNIT- 3

MARKS 14

Integral equations: Conversion of Linear Differential equation (LDE) to an integral equation (IE), conversion of boundary value problems to integral equations using Green's function, solution of Integral equation, IE of convolution type, Abel's IE, Integro differential equations, IE with separable variable, solution of Fredholm Equation with separable kernels, solution of Fredholm and Volterra equations by method of successive approximations.

UNIT- 4

MARKS 14

Calculus of Variation: Functionals and their Variational, Euler's equation for function of one and two independent variables, application to engineering problems.

UNIT--5

MARKS 14

FEM: Variational functionals, Euler Lagrange's equation, Variational forms, Ritz methods, Galerkin's method, discretization, finite elements method for one dimensional problems.



TEXT BOOKS:

1. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill.
2. Advance Engineering Mathematics by Ervin Kreszig, Wiley Eastern Edd.
3. Applied Numerical Methods with MATLAB by Steven C Chapra, TMH

Reference Books:

1. CF Froberg, Introduction to numerical analysis.
2. SS Sastry, Introductory methods of numerical analysis
3. Krasnove, Kiselevanded Makarenho, Integral equations
4. Buchanan, Finite element Analysis (schaum Outline S), TMH
5. Krishnamurthy, Finite element analysis, TMH
6. Numerical Methods in engineering, Salvadori and Baron
7. Theory and problems of Numeric analysis (Schaum Outline S), Schied, TMH



MTCEC-0102 - Construction Materials

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total	Practical		LW	Total		
		L	T	P	C	Max	Min	TW			(d) =	Max			Min	(e) =
MTCEC - 0102	Construction Materials	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS 14

Material Science: Classification, Standardisation, Codification and Variety. Details of Micro Structure of Different construction Materials, Different effects on materials of construction.

UNIT- 2

MARKS 14

Properties of Materials: Environmental Influences : Thermal effects : Effect of Chemicals, Fire resistance, Corrosion and Oxidation, Radiation. Properties of fresh & hardened concrete, Shrinkage & creep of concrete

UNIT- 3

MARKS 14

Concrete: Design and production of concrete ingredients, Additives and admixtures. Special Concretes e.g. light weight, Heavy weight, Ready mix concrete, Fibre Reinforced concrete etc.

UNIT- 4

MARKS 14

New Construction Materials: Polymer materials, Thermo - Plastic, Polymer Concrete, Composite materials, Ferrocement, Ferroconcrete, Building materials from Agricultural & Industrial wastes.

UNIT- 5

MARKS 14

Quality control in construction : Various aspects, Principle of statistical quality control. Different techniques of materials and process Quality control, Destructive and non destructive Testing of Materials, I.S. and international procedures of testing



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TEXT BOOKS:

1. Ammer, D.A. Material Management Irwin Publishers Illionis, 1972.
2. White A.H. Engineering materials, MC Graw - Hill.
3. Deb. A., Engineerig materials, world press.

References :

1. Billmeyer Jr. F.W. Text Book of Polymer Science, Interscience Publishers Inc.
2. Golding Brage Polymers and Resins Nortrand.
3. Schmidt A.X. & Marties CA "Principle of High Polymer Theory & Practice" MC Graw - Hill.
4. Stille, J.K. "Introduction to Polymer Chemistry" Johwiley.
5. Winding C.C. & Hiatt G.D. "Polymetric".



MTCEC-0103 - Advanced Geotechnical Engineering

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)		
		L	T	P	C	Max	Min	TW			Max	Min				
						(a)	(b)	(c)			(e)	(f)				
MTCEC - 0103	Advanced Geotechnical Engineering	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS 14

Site Investigations & Stress Distribution in soils : Brief review of various methods of subsurface explorations, soil sampling, subsurface soundings, Geophysical explorations. Stress distribution beneath loaded areas by Boussinesq Westergaard's and Steinbrenner methods. Newmark's influence chart. Contact pressure distribution. Settlement analysis.

UNIT- 2

MARKS 14

Well Foundations & Cofferdams : Types of caissons , Wells, and their design criteria. IS and IRC codes and their provisions. Tilt and Shift in wells and their rectifications, Types, Design data for cellular dams, stability analysis. interlock Stresses, Methods of design of cellular coffer dams.

UNIT- 3

MARKS 14

Machine Foundations: Theory of Vibrations. Single and double degree of freedom system, Damped and undamped vibrations, Types of machine foundations, mass spring model of analysis. Apparent mass of soil, Design of block foundations for impact type of machinery, Indian standard on Design and Construction of Foundations for Reciprocating machines

UNIT- 4

MARKS 14

Foundations on Expansive Soils: Characteristics and treatment of expansive soils. Construction techniques in expansive soils, Use of under-reamed piles and their design criteria, CNS Layer techniques. Construction on collapsible soil

UNIT- 5

MARKS 14

Rock Mechanics: Problems in Rock mechanics, Classification of rocks, physical, geological and Mechanical properties of rocks, mechanics of rock, deformation and fracture under load, The range and scope of Rock mechanics in relation to civil engineering projects

TEXT BOOKS:

1. GEOTECHNICAL ENGINEERING BY B.C. PUNMIA
2. SOLI ENGINEERING BY Dr. R.K. ARORA



MTCEC-0104 - Construction Technology

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)		
		L	T	P	C	Max	Min	TW			Max	Min				
						(a)	(b)	(c)			(d)	(e)			(f)	(g)
MTCEC - 0104	Construction Technology	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS 14

Advanced Pavement Construction Techniques: Pavement Construction using Bitumen, Hot mix plant, Concrete Road Construction, Fibre Reinforced Pavement Construction, Low Cost Road Construction Techniques.

UNIT- 2

MARKS 14

Form Work and Temporary Structures : Design and construction features of different types of Temporary Structures. Stationary and slip form work Techniques, Special features of insitu construction. Stripping and Removal of form works, Form works for special structures e.g. shells, bridges, towers etc.

UNIT- 3

MARKS 14

Steel Construction: Shop and in situ construction techniques, different connections. High strength bolts, Clearances and Tolerances, Erection of steel structures like Bridges, Trusses Chimneys, Power Houses.

UNIT- 4

MARKS 14

Prestressing : Plants, Equipment for Prestressed Construction, Different Techniques of Prestressing. Prestressing of Bridge girders, water tanks and special structures

UNIT- 5

MARKS 14

Construction Techniques of Heavy and Special Structures : Dams, Bridges, large spanroofs, high rise Buildings, off shore Platforms, Pipelines, Tunnels and other underground structures, Safety measures in Construction.



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TEXT BOOKS:

- 1.Civil Engineering Construction Technology By Rangwala
- 2.Construction Tecgneques By B.C. Punmia

REFRENCES:

- 1.Highway Engineering By Khanna & Justo
- 2.Prestressed Concrete By B.C. Punmia
- 3.Prestressed Concrete By N.K. Raju



MTCEC-0105 - Low Cost Building Materials and Construction Techniques

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand	Duration of Exam
						Theory			MST	Total	Practical		LW	Total	Total	
		L	T	P	C	Max	Min	TW	(d)	(d) =	Max	Min	(g)	(h) =	(i) =	
		(a)	(b)	(c)	(a+c+d)	(e)	(f)	(e+f)		(d+h)						
MTCEC - 0105	Low Cost Building Materials and Construction Techniques	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS 14

Concepts of low cost materials Soil, Fly ash, ferrocement, Lime, Fibers, Stone Dust, Boulders and oversize metal, Bitumen etc.

UNIT- 2

MARKS 14

Low cost building material products:- (a) Walls - Stabilized and sun dried, soil blocks & bricks, Hollow concrete blocks, stone masonry blocks, Ferro-cement partitions. (b) Roofs - Precast R.C. Plank & Joists roof, Precast channel roof, Precast L-panel roof, Precast Funicular shells, Ferrocement shells, Filler Slab, Seasal Fibre roof, Improved country tiles, Thatch roof.

UNIT- 3

MARKS 14

Low cost construction Techniques and Equipment (a) Techniques: - Rat trap bond construction, Precast R.C. and Ferrocement technique, Mud Technology, (b) Equipments: - Brick molding machine, Stabilised soil block making machine and plants for the manufacturing of concrete blocks, (c) Low Cost Roads

UNIT- 4

MARKS 14

Low cost sanitation:- (a) Waste water disposal system, (b) Low cost sanitation for rural and urban areas (c) Ferrocement Drains

UNIT- 5

MARKS 14

Cost analysis and comparison (a) Low cost materials (b) Low cost techniques



Swami Vivekanand University, Sagar(M.P.)



TEXT BOOKS:

- 1.Civil Engineering Construction Technology By Rangwala
- 2.Construction Tecgneques By B.C. Punmia

REFERENCE BOOKS:

- 1.Highway Engineering Bu Khanna & Justo
- 2.Waste Water & Waste Management By B.C. Punmia
- 3.Concrete Technology By Dr. Ramamurtham



MTCEC – 106 LAB-I COMPUTER WORKSHOP

Paper Code	Title of the paper	Period Per Week				Distribution of Marks										Grand Total	Duration of Exam
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)	(i) = (d+h)		
		L	T	P	C	Max	Min	TW (c)			Max	Min					
																(a)	
MTCEC - 0106	COMPUTER WORKSHOP	-	-	6	6	-	-	-	-	-	90	36	60	150	150	03 Hrs	

UNIT- 1

MARKS 14

C++ programming language: Basics of programming, loops, decisions, structures, functions, objects/ classes, arrays.

UNIT- 2

MARKS 14

Overloading, inheritance, virtual functions and pointers, object oriented programming, Turbo C++ features and programming, structure engineering problems programming.

UNIT- 3

MARKS 14

Computer Aided drafting, 2-D and 3-D drawings, Introduction to CAD software, drawing of buildings.

UNIT- 4

MARKS 14

Introduction to computer graphics, 3-D modeling software and analysis software

Reference Books:

1. Robert Lafore, Object oriented programming in C++
2. E. Balaguruswamy, Programming in C
3. Syal and Gupta, Computer programming and engineering analysis.
4. AutoCAD, SolidEdge, Cadlab software and Manuals.



MTCEC- 0107- LAB-II ADVANCE CONSTRUCTION-I

Paper Code	Title of the paper	Period Per Week				Distribution of Marks										Grand Total	Duration of Exam
						Theory			MST	Total	Practical		LW	Total	(i) = (d+h)		
		L	T	P	C	Max	Min	TW			(d) = (a+c+d)	Max				Min	
		(a)	(b)	(c)	(d)	(a+c+d)	(e)	(f)	(g)	(e+f)							
MTCEC - 0107	ADVANCE CONSTRUCTION-I	-	-	6	6	-	-	-	-	-	90	36	60	150	150	03 Hrs	

(A) Construction Materials:

UNIT--I

MARKS:14

Stones

Occurrence, varieties, Characteristics and their testing, uses, quarrying and dressing of stones. Timber : Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment, need for wood substitutes, Alternate materials for shuttering doors/windows, Partitions and structural members etc. Brick and Tiles: Manufacturing , characteristics, Classification and uses, Improved brick from inferior soils, Hand molding brick table, Clay-fly ash brick table, Flooring tiles and other tiles and their characteristics.

UNIT--II

MARKS:14

Advance Construction Materials

Use of fly ash in mortars, concrete, Fly ash bricks, stabilized mud blocks, non-erodible mud plinth, D.P.C. materials, Building materials made by Industrial & agricultural waste, clay products P.V.C. materials, advance materials for flooring, doors & windows, facia material, interiors materials for plumbing, sanitation & electrification.

(B) Construction Techniques:

UNIT--III

MARKS:14

Foundation

Type of soils, bearing capacity, soil slablisation and improvement of bearing capacity, settlement and safe limits. Spread foundations, wall footings, grillage, foundations well foundation, causes of failure and remedial measures; under reamed piles, foundation on shrinkable soils, black cotton soil, timbering for trenches, dewatering of foundations. Hyperbolic paraboloid footing, Brick arch foundation. Simple methods of foundation design, Damp proof courses, Repairs Techniques for foundations.



UNIT--IV

MARKS:14

Masonry and Walls

Brick masonry, Bonds, Jointing, Stone masonry, casting and laying, masonry construction, Brick cavity walls, code provisions regarding load bearing and non load bearing walls. Common defects in construction and their effect on strength and performance of walls, designed Brick masonry, precast stone masonry block, Hollow concrete block, plastering and pointing, white and color washing, distempering, dampness and its protection, Design of hollow block masonry walls. Doors, Windows and Ventilators: Types based on material etc., size location, fittings, construction sunshades, sills and jambs, RCC doors/windows frames. Stairs types, rule of proportionality etc., Repairs techniques for masonry, walls, doors & windows.

UNIT--V

MARKS:14

Floors and Roofs

Types, minimum thickness, construction, floor finishes, Flat roofs, RCC jack arch, reinforced brick concrete, solid slab and timber roofs, pitched roofs, false ceiling, roof coverings, Channel UNIT-, cored UNIT-, Waffle UNIT-, Plank and Joist, Brick panel, L-Panel, Ferrocement roofing UNIT-s, water proofing .Services : Water supply & Drainage, Electrification, Fire protection, thermal insulation, Air Conditioning, Acoustics & Sound insulation, Repairs to damaged & cracked buildings, techniques and materials for low cost housing., Repairs techniques for floors & roofs.

References:

Grading IVth Semester w.e.f.2011-12

1. Mohan Rai & M.P. Jai Singh; Advance in Building Materials & Construction,.
2. S.C. Rangwala; Engineering Materials
3. Sushil Kumar; Building Construction,
4. B.C. Punmia; Building Construction ,.
5. Building Construction, Metchell
6. Construction Technology, Chudley R.
7. Civil Engineering Materials, N. Jackson.
8. Engineering Materials, Surendra Singh.

List of Experiments:

1. Tests on Bricks
2. Tests on Aggregates
3. Tests on Cement
4. Determination of compressive strength of concrete with different cement grades.
5. Determination of workability of concrete by slump test
6. Determination of workability by compacting factor apparatus.
7. Determination of workability by Vee Bee consistometer.
8. Nondestructive testing of concrete by Rebound hammer test
9. Nondestructive testing of concrete by ultrasonic Method.
10. Test for the effect of admixtures on the concrete compressive strength
11. Testing of microconcrete
12. Design of concret



MTCEC-0201 CONSTRUCTION MANAGEMENT

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total	Practical		LW	Total		
		L	T	P	C	Max	Min	TW		(d) =	Max	Min		(h) =	(i) =	
						(a)	(b)	(c)	(d)	(a+c+d)	(e)	(f)	(g)	(e+f)	(d+h)	
MTCEC - 201	CONSTRUCTION MANAGEMENT	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS: 14

Contract Management - I Types of Construction contract, Lump sum, UNIT- rate, cost plus-fee, Cost Plus percentage-fee, Incentive Contracts, Nature of Contract, Contract Documents and Contracting procedures, contract revisions, Negotiated contracts, contract claims.

UNIT- 2

MARKS: 14

Contract Management - II Technical Specifications, Drawings, Tender Bond, Labour and Material Payment Bonds, Scrutiny of Tenders, acceptance, letter of indent. Important Contract clauses, Terms of Payment, retention acceptance and final payment, maintenance period, Time for Completion, Extension of time, Variation in work and conditions, claims and disputes, liquidated damages, Termination rights and responsibility of client, Architect, Engineer, Contractor, Professional liability. Disputes in contracts, Sub-contracts> Purchase orders as contracts. Insurance Contract and Claims. Arbitration, Accounts.

UNIT- 3

MARKS: 14

Tender Management : Advance Techniques of Estimating. Principles of Analysis of rates and Specification, writing for different types of construction industries, capital structure, Theories.

UNIT- 4

MARKS: 14

Legal Frame Work of Construction : Constitutional provisions relating to Business and industry, Master Plans, Indian Contract Act. Arbitration act.

UNIT- 5

MARKS: 14

Labour Laws and Legislation : Contract labour (RRA) ACT 1970, laws relating to wages, bonus & industrial disputes.



MTCEC-0202 FABRICATION DESIGN & ITS CONSTRUCTION

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)		
		L	T	P	C	Max	Min	TW			Max	Min				
						(a)	(b)	(c)			(d)	(e)			(f)	
MTCEC - 0202	FABRICATION DESIGN & ITS CONSTRUCTION	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS: 14

Prefabricated Construction Prefabricated construction, necessity, Advantages, disadvantages, Mass produced steel, reinforced concrete and masonry systems, Industrialised buildings.

UNIT- 2

MARKS: 14

Modular Construction : Modular coordination, basic module, planning and design modules, Modular grid systems, National Building Code Specification, Standardisation, Dimensioning of products, Preferred dimensions and sizes, tolerances and deviations layout and processes.

UNIT- 3

MARKS: 14

Prefabricates : Classification, foundation, columns, beams, roof and floor panels, wall panels, clay UNIT-s, box prefabricates, erection and assembly.

UNIT- 4

MARKS: 14

Design of prefabricated Elements : Lift points, beams, slabs, columns, wall panels, footings, design of joints to transfer axial forces, moments and shear forces.

UNIT- 5

MARKS: 14

Construction Techniques : Large panel construction, Lift slab system, Glover system, constains' jack- block system, Constain V-Plate system, Bis on system, Silber-Kuhi System, control of construction processes Equipments, horizontal and vertical transportation.



**MTCEC-0203 CONSTRUCTION EQUIPMENT &
MATERIAL MANAGEMENT**

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam	
						Theory			MST	Total	Practical		LW	Total			
		L	T	P	C	Max	Min	TW			Max	Min			(h) =		(i) =
		(a)	(b)	(c)	(d)	(a+c+d)	(e)	(f)			(g)	(e+f)			(d+h)		
MTCEC - 0203	CONSTRUCTION EQUIPMENT & MATERIAL MANAGEMENT	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs	

UNIT- 1

MARKS: 14

Planning and Selection of Construction Equipment : Advantage of mechanization of Construction industry. Merits of Labour intensive construction. Planning for construction equipments. Analytical studies, equipment operation. Selection of construction machinery & equipments.

UNIT- 2

MARKS: 14

Production Estimates, Sizing and Matching : Cycle time capacity ratings and output of Excavators, Power shovels, drag lines, scrapper, bulldozers, tractor shovels rippers, motor graders etc. Sizing and matching. Capacity ratings and output of compactors, aggregate processing plant concrete production plants etc.

UNIT- 3

MARKS: 14

Economics of Construction Equipment : Equipment working rates, Investment cost, Depreciation cost, major repair cost. Cost of fuel and lubricants. Cost of labour, servicing and field repairs, overheads. Recommendations of statutory bodies.

UNIT- 4

MARKS: 14

System Approach : Problems of equipment management. Application of CPM in equipment management. Application of the assignment model, transportation model and waiting line models in equipment management.

UNIT- 5.

MARKS: 14

Material Management : Materials planning and budgeting. Role and functions at different levels of management and budgeting variations. Stages of materials management. A.B.C. analysis. Advantages, mechanics purpose cautions, limitations and tabular analysis, Purchasing parameters and inter relationships. Time source quantity, price, quality, grading systems. Special purchasing systems. Obsolescence. Scrap disposal.



MTCEC-0204 FINANCIAL MANAGEMENT IN CONSTRUCTION INDUSTRIES

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total	Practical		LW	Total		
		L	T	P	C	Max	Min	TW		(d) =	Max	Min		(h) =		
						(a)	(b)	(c)	(d)	(a+c+d)	(e)	(f)	(g)	(e+f)	(d+h)	
MTCEC - 0204	FINANCIAL MANAGEMENT IN CONSTRUCTION INDUSTRIES	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs

UNIT- 1

MARKS: 14

Personnel Management : Principle of personnel management. Qualities of a personnel manager. Objective of personnel management. Personnel policies, procedures and programmes, Organizational structure of personnel department, Man power resources. Human resource planning. Job analysis. Performance standards, work rules. Recruitment and selection process. Tests and interview. Induction, orientation and indoctrination. Policies, promotion, demotion, transfers etc. Training of personnel's. Need for training. Principles of training programmes. Types of training programmes on the job, training policy and implementation. Task analysis, identification and methodologies. Evaluation of training and post training follow up. Performance appraisal-rating scales, rankings etc. Management development programmes. Wage and salary management. Principles of wages and salary administration. Factors influencing wages. Types of wages and salary structure. Theory of wages. Minimum fair and living wages. Types of wages. Wage incentives. Types of incentive schemes. Profit sharing features-Fringe benefits, general scope. Different types of fringe benefits and awards.

UNIT- 2

MARKS: 14

Industrial relations in construction industry. Principles of industrial relationships. Functional requirements and programme, Industrial disputes, causes of disputes. Types Of disputes. Procedures of the settlement of industrial disputes. Implementation mechanism. Trade Unions - Principles of industrial trade unionism. Objectives and functions. Essentials of trade union. Objectives, forms, levels and growth of worker's participation in management. Collective bargaining. Principles and main features of collective bargaining. Different industrial Regulations and labour laws and acts - Industrial Health and Safety. Occupational hazards. Provisions under factory act. Accident and safety at construction sites. Nature and causes of accident. Safety Programmes and their principles. Factors effecting accidents etc.

UNIT- 3

MARKS: 14

Waste Management : Introduction to waste and waste management, the concept of productivity and its inter relationship with productivity. Systems concept of waste. Complementarity of waste and resource management. Identification of construction waste: material waste, man power waste, energy waste, space waste, time waste, equipment waste, capital waste, utilities and services waste. Data and information waste. Design of waste reduction in construction. Reduction, Collection, recycling, treatment and disposal of waste in construction systems. Modelling of resources and waste flow in construction systems, waste management and cost reduction. Roles of legislation and government.



UNIT- 4

MARKS: 14

Financial Management : *Managerial Economics & Financial Statement* Nature and scope of managerial economics. Economic theories. Demand analysis and forecasting . Elasticities of demand. Cost and production analysis. Pricing decisions, Policies and practices. Break even analysis Time value of money, Economics. Comparisons using time value of money basic of comparisons. Decision making amongst alternatives. Cash flow, discounted cash flow. Cash flow forecasting, Project appraisal through financial statements. Statement analysis. Financial ratio analysis, Trend analysis yield. Taxation and inflation, Sinking, fund provisions. Risks and uncertainties. Project risk and firm risk. Replacement analysis, Finances & working capital. Capital budgeting & Performance budgeting. Benefit-cost ratio. Project selection, Control and evaluation, Pre-project and post project evaluation.

UNIT- 5.

MARKS: 14

Capital Generation & Financial Accounting, Banking : Financial Institutes like IFCI, IBI, International financing etc. Book keeping process in construction. The accounting cycle. Journals, ledgers etc. for labour cost, materials and purchases miscellaneous ledgers and accounting procedures, types of financial statements in Govt.



**MTCEC-0205 APPROPRIATE TECHNOLOGY &
ENERGY CONSERVATION**

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam	
						Theory			MST	Total	Practical		LW	Total			
		L	T	P	C	Max	Min	TW			Max	Min			(h) =		(i) =
		(a)	(b)	(c)	(d)	(d) = (a+c+d)	(e)	(f)			(g)	(e+f)			(d+h)		
MTCEC - 0205	APPROPRIATE TECHNOLOGY & ENERGY CONSERVATION	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs	

UNIT- 1

MARKS: 14

Appropriate technology - concept and its role in the present circumstances.

UNIT- 2

MARKS: 14

Rural Housing & Rural Environmental Technologies - Planning, use of locally available materials, construction techniques. Concept and scope in rural areas planning of water supply schemes in rural areas, development of preferred sources of water, springs, wells, infiltration wells infiltration galleries, collection of rain water, specific problems and method's in rural water supply and treatment. Treatment and disposal of waste water, commUNIT-y and sanitary latrines. Compact and simple waste water disposal systems, biogas plants.

UNIT- 3

MARKS: 14

Rural roads - Planning of rural roads, Socio-economic aspects, materials for rural roads, design aspects, drainage problems, and maintenance of rural roads.

UNIT- 4

MARKS: 14

Energy Conservation :- Energy production, distribution and utilization, a review of global situation. Energy Trends, renewable and non renewable sources, research reviews, Building designs and energy factors affecting energy budget in buildings and settlements, Design of buildings for minimising energy, Solar, Wind and Tidal energies, a review and their adoptability.

UNIT- 5

MARKS: 14

Low energy materials, construction techniques and environmental control.



MTCEC-0301 ELECTIVE I
(A) Advanced Highway Construction

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam	
						Theory			MST	Total	Practical		TW	Total			(h) = (i) = (d+h)
		L	T	P	C	Max	Min	TW			Max	Min			(e) = (f) = (g) = (e+f)		
						(a)	(b)	(c)			(d)	(a+c+d)			(e)		
MTCEC - 0301	ELECTIVE I	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs	

UNIT- 1

MARKS 14

Earthwork and Soling : Classification of types of highway construction, Suitability of each type under Indian conditions. Selection of base course and surface course. Selection of soils, construction of embankments, excavation and compaction equipments. Field and laboratory tests for quality control. Stone soling, brick soling, current practices. Construction of earth roads, gravel roads, soil stabilised roads, water bound macadam. Paved roads (i) bricks (ii) stones.

UNIT- 2

MARKS 14

Bituminous Construction: Properties, requirements and specifications of materials, equipments and plants. Detailed construction procedure of each type. Field and laboratory tests for quality control. Choice o binders under different conditions. IRC, British, and MOST Specifications. Bituminous surface treatments, interface treatments-primecoat, and tackcoat, surface dressing and seal coat, grouted or penetration macadam, bituminous bound macadam, Sheet asphalt, bituminous concrete, mastic asphalt, dense tar surfacing.

UNIT- 3

MARKS 14

Cement Concrete Road Construction : Necessity of providing a base course under cement concrete road construction. Selection o materials, constructions methods, detailed construction procedure, Quality control tests (Lab. And Field). Construction equipments. Classification of various types of joints, necessity of providing each type, method of construction of joints, load transfer devices, dowel bars, tie bars. joints filler and sealermaterials, IRC Specifications.

UNIT- 4

MARKS 14

Reinforced Cement Concrete Road Construction : Necessity of providing reinforcement in cement concrete pavements, continuously reinforced concrete pavements, prestressed concrete pavements and fibre reinforced concrete pavements Selection of the mix, compaction method and construction prcedure for each type Recommendations under Indian conditions.

UNIT- 5

MARKS 14

Construction Planning and Management : CPM/PERT in Highway Construction.



MTCEC-0301 (B) Multi Storied Buildings

UNIT- 1

MARKS 14

Structural systems and their suitability, structural design criteria in planning.

UNIT- 2

MARKS 14

Multistoried Buildings, Preliminary design, Analysis of building frames for vertical and lateral loads by approximate method, Matrix methods for the analysis of building frames & computer programming for the same.

UNIT- 3

MARKS 14

Analysis of ShearWalled Buildings Design of sections in reinforced concrete by working stress and limit state methods, Detailing of joints.

UNIT- 4

MARKS 14

Yield line Analysis of reinforced concrete slabs, concept of moment redistribution.

UNIT- 5

MARKS 14

. Foundation - Superstructure interaction, Earthquake effects and design for ductility.



MTCEC-0302 ELECTIVE II
(A) Advanced Dam Design and Construction

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam	
						Theory			MST	Total	Practical		LW	Total			(i) = (d+h)
		L	T	P	C	Max	Min	TW			Max	Min			(h) = (e+f)		
						(a)	(b)	(c)			(d)	(a+c+d)			(e)		
MTCEC - 0302	ELECTIVE II	3	1	-	4	70	28	10	20	100	-	-	-	-	100	03 Hrs	

MTCTM-0302

UNIT- 1

MARKS 14

Gravity Dams : River valley projects and their purpose, preliminary investigations and surveys, Selection of site for a reservoir; Types of Dams and their choice. Stability factors; Stresses, Elementary profile, low and high Dams, Forces acting on a Dam. Evolution of the profile of a Dam by Method of Zones Practical profiles. Design of openings in Gravity Dams, contraction joints. Foundation treatment by Grouting.

UNIT- 2

MARKS 14

Spillways : Design of ogee spillway section, Bucket and Energy Dissipation arrangements : Design and Details of siphon, Shaft, side channel, and chute spillways, Miscellaneous types of spillways. Design of spillway crest gates and sluice gates, hoisting Machines.

UNIT- 3

MARKS 14

Elementary Design of Arch Dams : Definition of an Arch Dam, classification of Arch Dams. Principles of Elastic Theory and applied Load Analysis, Inclined arches, Dome-Dams, Details and Methods of analysis.

UNIT- 4

MARKS 14

Earth Dams : Introduction, Design criteria, against over topping, Control of seepage, Theory of flownets for homogeneous and Zoned embankments. Pore pressure, Stability of slopes, Methods of Analysis slip circle Method, Protection of slopes, Protection against free passage of water, Rockfill dams.

UNIT- 5

MARKS 14

Application of Photoelasticity to the Design of Dams. Use of the Electrical Analogy Method in the Design of Dams, stress computations with embedded Electrical Instruments River Diversion for construction of Dams, Constructional aspects in the Execution of River Valley projects.



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MTCEC-0302 (B) ADVANCED FOUNDATION ENGINEERING

UNIT- 1

MARKS 14

Shallow Foundations : Bearing Capacity, Terzaghis analysis, Computations of bearing capacity factors. Skempton's analysis. Meyerhof's analysis. Balla's theory. Hansen's theory. Design of Shallow Foundations.

UNIT- 2

MARKS 14

Pile Foundation : Use of piles, Types of piles, Design of Piles, Group action in cohesive and cohesionless soils. Negative skin friction. Laterally loaded piles. Piles under inclined loads, pile load test, Hrennikoff Method.

UNIT- 3

MARKS 14

Engineering with Geosynthetics : Introduction Basic Mechanism of reinforced earth strength characteristics of reinforced soil.

UNIT- 4

MARKS 14

Bridge Substructures: Introduction, elements of bridge substructure, stability analysis of well foundation, design of pier & abutments, sinking of wells.

UNIT- 5

MARKS 14

Marine Substructures : Introduction, Types of Marine structures elements, design criteria, design of gravity wall, piled wharf structure breakwaters.



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MTCEC-0303 Project/Seminar

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)		
		L	T	P	C	Max	Min	TW			Max	Min				
						(a)	(b)	(c)			(d)	(e)			(f)	(g)
MTCEC - 0303	Project /Seminar	-	-	4	4	-	-	-	-	-	100	30	-	100	100	-



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MTCEC-0304 Dissertation Part-I
(Literature Review/Problem Formulation/ Synopsis)

Paper Code	Title of the paper	Period Per Week				Distribution of Marks									Grand Total	Duration of Exam	
						Theory			MST	Total (d) = (a+c+d)	Practical		LW	Total (h) = (e+f)			(i) = (d+h)
		L	T	P	C	Max	Min	TW			Max	Min					
						(a)	(b)	(c)			(d)	(e)					
MTCEC - 0304	Dissertation Part-I	-	-	8	8	-	-	-	-	-	120	48	80	200	200		



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MTCEC-0404 Dissertation Part-II

Paper Code	Title of the paper	Period Per Week				Distribution of Marks								Grand Total	Duration of Exam	
						Theory			MST	Total (d) = (a+c+d)	Practical		LW			Total (h) = (e+f)
		Max	Min	TW	Max	Min										
							(a)	(b)			(c)	(d)		(e)		
MTCEC - 0401	Dissertation Part-II	-	-	20	20	-	-	-	-	-	300	120	200	500	500	-

