

JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)
Scheme of Study and Examination (w.e.f. July 2010)

B.E. Fourth Year

Branch: Civil Engineering

SEM: Seventh

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
CE-40	Estimating Costing & Tendering	3	1	-	10	20	30	70	100	4
CE-41	Structural Design-III (RCC)	3	1	-	10	20	30	70	100	4
CE-43	Environmental Engineering –II	3	1	-	10	20	30	70	100	4
CE-45	Project Management	3	1	-	10	20	30	70	100	4
Refer Table	Elective - I	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
CE- 42L	Structural Design-III Lab (RCC)	-	-	2	20	-	20	30	50	2
CE-44L	Environmental Engineering Lab –II	-	-	2	20	-	20	30	50	2
CE-46L	Remote Sensing/GIS Lab	-	-	2	20	-	20	30	50	2
CE-48L	Major Project Planning	-	-	4	40	-	40	60	100	4
CE- 49L	Industrial Training -II*	-	-	2	50	-	50	-	50	2
	Total	15	5	12	200	100	300	500	800	32

*Students will go for Industrial Training after VI semester in the summer vacations and will be assessed in VII semester.

T.A. = Teachers Assessment, CT= Class Test, ESE= End Semester Examination

Total Marks= 800, Total Periods= 32, Total Credits= 32

Elective-I					
CE-047A	1. Computational Methods in Structural Engineering	CE-047B	2 Traffic Engineering	CE-047C	3 Industrial Waste Treatment

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	ESTIMATING COSTING & TENDERING	CE-40	Min “D”	-	5.0

ESTIMATING COSTING & TENDERING

Unit – I : Introduction

Estimation – Definition of estimate, Types of estimate, plinth area rate, cubical content rate, preliminary, original revised and supplementary estimates, approximate estimate.

Purpose & importance of estimates, principles of estimating methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet, bill of quantities measurement book, entries in MB, preparation of bill.

Unit – II : Rate Analysis

Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades, preparation for rates of important item of works current schedule of rates (CSR)

Unit – III : Detailed Estimates :

Preparing detailed estimates of various types of building, works earth work calculations for roads and estimating of culverts services for building such as water supply, drainage & electrification.

Unit – IV : Cost of Works & Tendering

Factors affecting cost of work, over head charges specifications, brief specification, detailed specifications, necessity contingencies and work charge establishment, various.

Percentages for different services in building. Preparation of

Preparing tender papers – invitation of tenders . Tender notice, tender documents, submission, scrutiny & acceptance two envelop method. Award of jobs various conditions to contract right & responsibilities of parties to contracts.

Unit- V : Valuation

Purpose, depreciation, sinking fund, scrap value yours

Purchase, gross and net income, method of valuation. Settlement of buildings, mortgage & lease problems on valuation-annuity of types.

Book References :

1. Quantity Surveying & Costing – B.N. Datta
2. Estimating & Costing for Civil Engg – G.S.Birdi
3. Quantity Surveying & Costing – Chakraborty
4. Estimating & Costing – S.C. Pengawala

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	STRUCTURAL DESIGN-III (RCC)	CE-41	Min “D”	Min “D”	5.0

STRUCTURAL DESIGN-III (RCC)**Unit - I**

Design of Multi-storey Buildings - Sway and nonsway buildings, Shear walls and other bracing elements.

Unit- II

Earth Retaining Structures: Cantilever and counter fort types retaining walls.

Unit - III

Water Tanks: Tanks on ground and underground tanks: Square, rectangular, circular tanks, Overhead tanks: square, rectangular, circular & intze tanks.

Unit - IV

Silos and Bunkers

Unit - V

T-beam & Slab bridges- for highway loading (IRC Loads).

Prestressing concepts materials, systems of prestressing & losses Introduction to working & limit State Design.

Suggested Books: -

1. R.C.C. by O.P. Jain Vol. II
2. R.C.C. by B.C. Punmia
3. Essentials of Bridge engineering – D.J. Victor
4. Bridge Engineering - Ponnuswamy
5. Advanced R.C.C. Design by N.K. RAJU
6. N.Krishna Raju, Prestressed Concrete, Tata Mc Graw Hill, New Delhi.
7. Pre stresses concrete – T.Y. Lin

COURSE CONTENT & GRADE

(w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	ENVIRONMENTAL ENGINEERING-II	CE-43	Min “D”	Min “D”	5.0

ENVIRONMENTAL ENGINEERING-II

Unit - I

Sewerage schemes and their importance, collection & conveyance of sewage, storm water quantity, fluctuation in sewage flow, flow through sewer, design of sewer, construction & maintenance of sewer, sewer appurtenances, pumps & pumping stations.

Unit -II

Characteristics and analysis of waste water cycles of decomposition, physical, chemical & biological parameters. Oxygen demand i.e. BOD & COD, TOC, TOD, Th OD, Relative Stability, population equivalent, instrumentation involved in analysis, natural methods of waste water disposal i.e. by land treatment & by dilution, self purification capacity of stream, Oxygen sag analysis.

Unit -III

Unit operations for waste water treatment, preliminary treatment such as screens, grit chamber, floatation tank, sedimentation and chemical clarification, role of micro-organism in biological treatment, Sewage filtration- theory & design.

Unit - IV

Methods of Biological Treatment (Theory & Design) - Activated Sludge process, Oxidation ditch, stabilization ponds, aerated lagoon, anaerobic lagoons, septic tank & imhoff tank, sources & treatment of sludge, sludge thickening and digestion sludge drying beds, sludge disposal.

Unit - V

Advanced Waste Water treatment - Diatomaceous earth filters, ultrafiltration, Adsorption by activated carbon, Phosphorus removal, Nitrogen removal, Physico chemical waste water treatment, Solid waste disposal - classification, composition, collection, & disposal methods. Rural sanitation - collection & disposal of refuse, sullage & night soil

Reference Books :-

1. Water Supply & Sanitary Engg. - G.S. Birdie - Dhanpat Rai Publishing Company,
2. (P) Ltd. New Delhi
3. Waste Water Engg. by B.C. Punmia - Laxmi Publication (P) Ltd. New Delhi
4. Environmental Engg. - M.L. Davis & D.A. Cornwell - Mc Graw Hill Company
5. Chemistry for Environmental Engg. - Sawyer & Mc Carty - Mc Graw Hill Book Company New Delhi
6. Water & Waste Water Technology - Mark J Hammer - Prentice - Hall of India, New Delhi
7. Waste Water Engineering - Metcalf & Eddy - Mc Graw Hill Book Company New Delhi

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	PROJECT MANAGEMENT	CE-45	Min “D”	-	5.0

PROJECT MANAGEMENT**Unit -I**

Preliminary and detailed investigation methods: Methods of construction, form work and centering.

Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis.

Unit -II

Construction equipments: Factors affecting selection, investment and operating cost, output of various

equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.

Unit -III

Contracts: Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, security deposit and earnest money, conditions of contract, arbitration, administrative approval, technical sanction.

Unit -IV

Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works. Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

Unit-V

Site Organization & Systems Approach to Planning: Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering. Problem of equipment management, assignment model, transportation model and waiting line models with their applications, shovel truck performance with waiting line method.

Reference Books :-

1. Construction Equipment by Peurify
2. CPM by L.S. Srinath
3. Construction Management by S. Seetharaman
4. CPM & PERT by Weist & Levy
5. Construction, Management & Accounts by Harpal Singh
6. Tendering & Contracts by T.A. Talpasai

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	COMPUTATIONAL METHODS IN STRUCTURAL ENGINEERING	CE-047A	Min "D"	-	5.0

COMPUTATIONAL METHODS IN STRUCTURAL ENGINEERING

Unit - I.

Matrix formulation for the principle of virtual work and energy principles, principle of contragradience, stiffness and flexibility matrices, Degree of Freedom. Axial, bending, shear and torsional deformations.

Local and Global Element stiffness matrices for bar, beam, shaft, grid, shear wall, beamcolumn, beam with rigid ends, beam on elastic foundation and elements with special boundary conditions. nonprismatic and curved elements, forces and displacements in general coordinate axes, structure stiffness matrix.

Unit - II.

Basics of the Direct Stiffness method - Analysis of pinjointed frames, rigid jointed structures, plane grids and composite structures for different loads including temperature, shrinkage, prestressing forces. Elastic stability analysis of 2-D rigid jointed frames, (Sway & Nonsway)

Unit - III.

Concepts of Bandwidth, various storage schemes & equation solvers; Reduction in order of stiffness matrix - use of substructures, static condensation method, Exploiting symmetry, skew symmetry and cyclic symmetry in structures, Imposition of Constraints - Lagrange Multiplier and Penalty Methods.

Unit - IV.

Analysis of continuum structures - Fundamental equations of theory of elasticity (2D), basic concepts of Finite Element Analysis, derivation of generalised element stiffness matrix and load vectors, convergence requirements, stiffness matrices for various elements using shape functions, Triangular and Rectangular elements. (PSPS)

Unit - V.

Two Dimensional Iso parametric elements, shape functions for Simplex. Lagrangian and Serendipity family elements in natural coordinates, computation of stiffness matrix for isoparametric elements, degrading of elements, plate bending elements.

Reference Books :-

1. Ghali A & Neville M., Structural Analysis - A Unified Classical and Matrix Approach, Chapman and Hall, New York.
2. Weaver William & Gere James M., Matrix Analysis of Framed structures, CBS Publishers and Distributors, New Delhi.
3. Cook R.D., Concepts and Applications of Finite Element Analysis, Wiley, New York.
4. Gallagher R., Finite Element Analysis Fundamentals, Prentice-Hall, Englewood Cliffs, NJ.
5. Rubenstein M.F., Matrix Computer Analysis of structures, Prentice Hall, Englewood Cliffs, N.J.
6. Zeinkiewicz O.C & Taylor R.L., The Finite Element Method, McGraw Hill, London

COURSE CONTENT & GRADE (w.e.f. July 2010)

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	TRAFFIC ENGINEERING	CE-047B	Min "D"	-	5.0

TRAFFIC ENGINEERING

Unit -I.

Traffic Characteristics : (i) Road user's characteristics - general human characteristics, physical, mental and emotional factors, factors affecting reaction time, PIEV theory. (ii) Vehicular characteristics: Characteristics affecting road design-width, height, length and other dimensions. weight, power, speed and braking capacity of a vehicle.

Unit -II.

Traffic Studies : (i) Spot Speed Studies and Volume Studies. (ii) Speed and Delay Studies purpose, causes of delay, methods of conducting speed and delay studies. (iii) Origin and Destination Studies (O & D) : Various methods, collection and interpretation of data, planning and sampling. (iv) Traffic Capacity Studies: Volume, density, basic practical and possible capacities, level of service. (v) Parking Studies: Methods of parking studies cordon counts, space inventories, parking practices.

Unit -III.

Traffic Operations and Control : (i) Traffic regulations and various means of control. (ii) One way streets- advantages and limitations. (iii) Traffic signals- isolated signals, coordinated signals, simultaneous, alternate, flexible and progressive signal systems. Types of traffic signals, fixed time signals, traffic actuated signals, speed control signals, pedestrian signals, flashing signals, clearance interval and problems on single isolated traffic signal.

Unit -IV.

Street Lighting : (i) Methods of light distribution. (ii) Design of street lighting system. (iii) Definitions- Luminaire, foot candle, Lumen, utilization and maintenance factors. (iv) Different types of light sources used for street lighting. (v) Fundamental factors of night vision.

Unit -V.

Accident Studies & Mass Transportation : (i) Accident Studies : Causes of accidents, accident studies and records, condition and collision diagram, preventive measures. (ii) Expressways and freeways, problems on mass transportation and remedial measures, brief study of mass transportation available in the country.

Reference Books :-

1. Traffic Engineering and Transport Planning by L.R. Kadiyali, Khanna Publishers, Delhi
2. Traffic Engineering by Matson, W.S.Smith & F.W. Hurd
3. G.J. Pingnataro, Principles of Traffic Engineering
4. D.R.Drew, Traffic Flow Theory
5. W.R. Mcshane and R.P. Roess "Traffic Engg"
6. Wohl & Martin, Traffic System Analysis for Engineering & Planners

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	INDUSTRIAL WASTE TREATMENT	CE-047C	Min "D"	-	5.0

INDUSTRIAL WASTE TREATMENT**Unit - I.**

Problem of Water Pollution: Effects of wastes on streams and sewage treatment plant. natural purification of streams. oxygen sag curve. allowable organic load on streams classification of stream, stream standards and effluent standards. requirement of water for different purposes.

Unit - II.

Measurement of Waste Water Volume: Sampling of waste waters, grab and composite samples. analysis of waste water. biochemical oxygen demand. chemical oxygen demand and pH value of waste, toxicity of waste by bioassay method.

Pretreatment of Wastes: Volume and strength reduction, salvage of materials, recovery of by products, reuse of waste water.

Unit - III.

Conventional Methods of Treatment of Waste Water: Removal of suspended solids, removal of inorganic and organic dissolved solids, sludge disposal, advance methods of treatment, such as reverse osmosis, ion exchange, electrodialysis, algal harvesting etc. low cost treatment plants. common effluent treatment plant, design and operation.

Unit - IV.

Combined Treatment of Waste Water Sewage: Energy requirement optimization and budget, municipal regulation, sewer rental charge, instrumentation in waste water treatment plants, collection of data, operation and maintenance of plants, water pollution control board.

Unit - V.

Brief study of industrial processes and treatment methods of waste water from common industries, such as textile, dairy, paper and pulp, tannery, distillery.

Hazardous wastes- Impact handling and disposal.

Reference Books :-

1. "Liquid Waste of Industries - Theories, Practice and Treatment" - N.L. Nemerow, Wesley Publishing Co.
2. Treatment of Industrial Waste - E.B. Besselièvre & Max Schwartz - Mc Graw Hill Book Company
3. "Waste Water Engg. - Treatment Disposal & Reuse" - Metcalf & Eddy - Tata Mc Graw Will, New Delhi
4. Waste Water Treatment - Arceivala - Tata Mc Graw Will, New Delhi
5. Industrial Pollution Control, hand book - Lund H.F. Tata Mc Graw Will, New Delhi

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	Structural Design-III Lab (RCC)	CE-42L	Min “D”	Min “D”	5.0

Structural Design-III Lab (RCC)**List of experiments**

1. Design and drawing of multistory building.
2. Design and drawing of cantilever retaining walls.
3. Design and drawing of counter fort retaining wall.
4. Design and drawing of water tanks resting on ground.
5. Design and drawing of underground water tank.
6. Design and drawing of overhead water tanks.
7. Design and drawing of silo.
8. Design and drawing of bunkers.
9. Design and drawing of RCC slab for highway loading
10. Design and drawing T beam bridge for highway loading.

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	ENVIRONMENTAL ENGINEERING LAB-II	CE-44L	Min “D”	Min “D”	5.0

ENVIRONMENTAL ENGINEERING LAB-II**List of experiments**

1. To study the various standards for waste water
2. To study the sampling techniques for waste water
3. To determine the alkalinity in water sample
4. To determine the acidity in water sample
5. Determination of Dissolved Oxygen in the water and waste water sample
6. Determination of Biological Oxygen demand of a waste water sample
7. Determination of Chemical Oxygen demand of a waste water sample
8. Determination of various types of solids in the waste water sample
9. Determination of bacterial number by membrane filter Technique
10. Determination of bacterial colonies by standard plat count method

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	REMOTE SENSING/GIS LAB	CE-46L	-	Min "D"	5.0

REMOTE SENSING/GIS LAB

1. Study of topo sheets
 - (a) Land use
 - (b) Natural features
 - (c) Interpretation of scales
2. Study of stereoscope
 - (a) Parallel bar
 - (b) Serial photo
 - (c) Measurement using stereoscope and parallel bar
3. Study of satellite imagery
 - (a) land use
 - (b) Natural features
 - (c) Interpretation of image.
4. EMR interaction with earth material
 - (a) EMS
 - (b) LSR
 - (c) S.S of soil
 - (d) S.S of rocks
 - (e) S.S of land use
5. Application of satellite image
 - (a) Town planning
 - (b) Site suitability for dams /tunnels/bridge and other structure
 - (c) Damage estimation by earthquake
 - (d) Damage estimation by landslide
 - (e) Damage estimation by flood
6. Underground sensing by resistivity survey
 - (a) Field interpretation
 - (b) Date interpretation
 - (c) Plotting of III DTM
7. G.I.S introduction about components
 - (a) Uses of maps
 - (b) Uses of imagery
8. GIS application by procurement of data
 - (a) Data input
 - (b) Data verification
 - (c) Data storage
 - (d) Data analysis
 - (e) Data presentation
9. Free hand of software
 - (a) ARC-GIS
 - (b) EXDAS imagine

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	MAJOR PROJECT PLANNING	CE-48L	-	Min “D”	5.0

MAJOR PROJECT PLANNING

Students will perform literature survey and perform preliminary experimental work for the preparation of major project work of VIII semester. All the work will be supervised by the guide already allotted in VI semester minor project. Student may be permitted for extension of the VI semester minor project with consent of the guide. The work will be evaluated by the guide at the end of the session and marks will be awarded on the basis of individual performance.

COURSE CONTENT & GRADE**(w.e.f. July 2010)**

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	INDUSTRIAL TRAINING – II *	CE-49L	-	Min “D”	5.0

INDUSTRIAL TRAINING (4 weeks)

Student shall go to an Industry at the end of Sixth Semester during summer and shall prepare a report on the Practical Training undergone there. Student has to present the report in seventh semester and assessment will be done by committee (headed by HOD with faculty members of the department). Student has to submit a report of 30-40 pages (max) including certificate and cover pages.