Jabalpur Engineering College, Jabalpur

Semester VII Credit Based Grading System (CBGS) w.e.f. July 2018
Scheme of Examination
Bachelor of Engineering B.E. (Civil Engineering)
Subject Wise Distribution of Marks and Corresponding Credits
Scheme of Examination w.e.f. July 2018 Acadamic Session 2018-19

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits	Total Marks
			Theory			Practical							
			End. Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work		L	T	P		
1	CE7001	Environmental Engg.-II	70	20	10	30	20	150	3	1	2	6	
2	CE7002	Structural Design & Drawing-III (RCC)	70	20	10	30	20	150	3	1	2	6	
3	CE7003	Transportation Engg.-II	70	20	10	30	20	150	3	1	2	6	
4	CE7004	Elective-III	70	20	10	-	-	100	3	1	-	4	
5	CE7005	Elective-IV	70	20	10	-	-	100	3	1	-	4	
6	CE7006	Project-I	-	-	-	60	40	100	-	-	4	4	
7	CE7007	Industrial Training (Two Weeks)	-	-	-	30	20	50	-	-	2	2	
		Total	**350**	**100**	**50**	**180**	**120**	**800**	**15**	**5**	**12**	**32**	**800**

MST: Minimum of two mid semester tests to be conducted. **L: Lecture** **T: Tutorial** **P: Practical**

Department Elective-III (Four Subjects)			Department Elective-IV (Four Subjects)	
S.No.	Subject Code	Subject Name	Subject Code	Subject Name
1	CE7004A	Project Management	CE7005A	Traffic Engineering
2	CE7004B	Industrial Waste Treatment	CE7005B	Computational Methods in Structural Engineering
3	CE7004C	Advanced Foundation Design	CE7005C	Earthquake Engineering
4	CE7004D	Bridge Engineering	CE7005D	Environmental Impact Assessment

Controller (Exam.)
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

Registrar (Academic)
for Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

DEAN
Academic
JEC, Jabalpur (M.P.)

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	Environmental Engg.-II	CE7001	3-1-2	6

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, ThOD, 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 &inhoff 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 :-

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

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1.Estimate sewage flow, storm water quantity and fluctuations in sewage flow.
2.Analyse waste water based on physical, chemical and biological parameters.
3.Design preliminary and biological waste water treatment units.
4.Explain the concept of advanced waste water treatment and solid waste management.

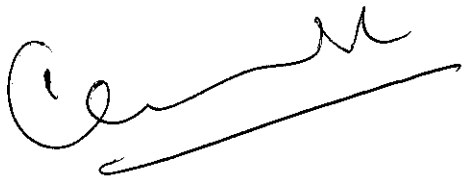
List of experiments:

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 OUTCOMES

After completion of this course the students will be able to

1.Collect waste water samples using various techniques.
2.Determine chemical and biological parameters of waste water sample.



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	Structural Design & Drawing-III (RCC)	CE7002	3-1-2	6

STRUCTURAL DESIGN& DRAWING -III (RCC)

UNIT-I
Design of Multi-storey Buildings - Sway and non sway buildings, Shear walls and other bracing elements.

UNIT-II
Earth Retaining Structures: Cantilever and cowter 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).Prestessing concepts materials, systems ofpreshessing& losses Introduction to working & limit State Design.

Reference 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. Desigr by N.K. RAJU
6. N.Ikishna Raju, Prestessed Concrete, Tata Mc Graw Hill, New Delhi.
7. Pre stresses concrete . T.Y. Lin

COURSE OUTCOMES (COs)

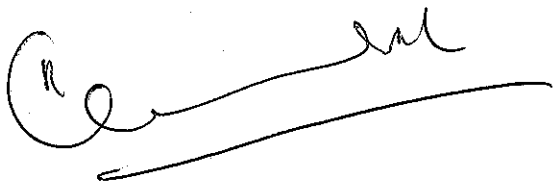
1. Explain bracing elements, shear wall,sway/non-sway buildings, prestressing systems
2. Analyse slab bridges, prestressed concrete beams and slabs
3. Design multi storeybuilding,retainingwalls,overhead and underground water tank,silos& bunkers, slab bridges and pre-stressed members.

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

COURSE OUTCOMES

1. Design multi storeybuilding,retaining walls, overhead and underground water tank, silos and bunkers.



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	Transportation Engg.-II	CE-7003	3-1-2	6

TRANSPORTATION ENGINEERING-II

UNIT-I

High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engineering Surveys for highway location. Cross sectional elements . width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

UNIT-II

Bituminous & Cement Concrete payments: Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatmert. seal coat, tack coat, prime coat, wearing coats disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints dowel bars, tie bars. Brief study of recent developments in cement concrete pavement design, fatigue and reliability.

UNIT-III

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning: Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads- types, specifications, construction, maintenance and causes of failures.

Surface and sub-surface drainage, highway materials: Properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated interections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation trip distribution, model split, traffic assignment, plan preparation.

UNIT-IV

Airport Planning, Runway & Taxiway: Airport site selection. Air craft characteristic and their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports. Geometrical elements : Taxi ways and runways, pattern of runway capacity.

UNIT-V

Airport, Obstructions, Lightning and Traffic Control :Zoningregulations, approach area, approach surface imaginary, conical horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. instrumental lending system, precision approach radar, VOR enroute traffic control.

Reference Books:

1. Highway Engineering by S.K.Khanna& C.E.G. Justo
2. Airport Planning & Design by S.K.Khanna& M.G. arora

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Calculate various geometrical elements of highway
2. Design signals and different types of flexible and rigid pavement.
3. Illustrate principles of construction and maintenance of low cost roads, road intersections and traffic marking.
4. Discuss highway planning, airport site selection, basic runway and taxiway elements, and aiport regulatory

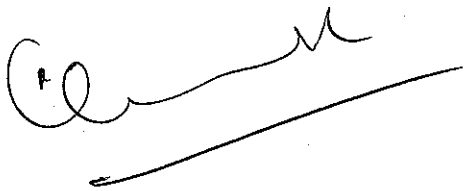
List of Experiments:

1. Impact Test of Aggregates.
2. Abrasion Test of Aggregates.
3. Shape test – Elongation and Flakiness Index Test of Aggregates.
4. Penetration Test of Bitumen
5. Softening point Test of Bitumen
6. Ductility test of Bitumen
7. Crushing strength of Aggregate
8. Bituminous mix design by marshal method
9. Specific gravity and water absorption of aggregate
10. CBR of soil sub grade.

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Perform various tests like impact test, crushing strength test, shape test, specific gravity test, water absorption test on aggregate.
2. Perform various test like softening point test, ductility test, penetration test on bitumen and CBR test on soil subgrade.
3. Perform bituminous mix design using marshal method.



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)

(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-III) Project Management	CE7004(A)	3-1-0	4

PROJECT MANAGEMENT

UNIT-I

Preliminary and detailed investigation method: Methods of construction, formwork 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 i.e. Earthwork, Dredging, Conveyance, Concreting, Hoisting, Pile driving, Compaction and Grouting

UNIT-II

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 modals with their applications, Shovel truck performance with waiting line method

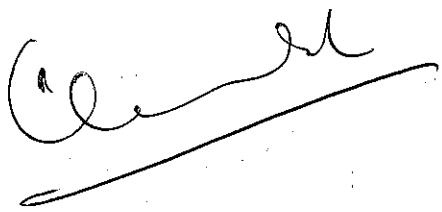
Reference Books:-

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 OUTCOMES (COs)

After completion of this course the students will be able to

1. Illustrate formwork, job layout, construction equipments, various types of contracts, various specification of engineering work, assignment models, functional organisation
2. Analyse a construction project by forming a network/bar chart
3. Draft a tender for a constructional project and measurement of a work



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-III) Industrial Waste Treatment	CE7004(B)	3-1-0	4

INDUSTRIAL WASTE TREATMENT

UNIT-1
Solid, liquid and gaseous effluents of industries, Public Health, Economic and Aesthetic Consideration. River Standards and Effluents Standards, Effect of industrial waste on Sewers and Sewage treatment plants, Disposal of waste in water bodies and on land.

UNIT-2
Environmental Audit-objectives, methodology and present scenario in India, Environmental Management Systems- Guidelines and case examples, Location of industries, method of reduction of wastes, Segregation or intermixing of wastes. Reuse and recovery of by products,

UNIT-3
Analysis of waste waters, Instrumentation for measurement and control of pH, turbidity and other parameters,Potentiometric analysis of wastewater, SCADA-its concept and applications.

UNIT-4
Characteristics and Treatment of waste originating from major industries such as-Textile manufacture, dyeing and finishing wastes (Cotton, Wollen, Silk, Rayon, and Nylon), Sugar, Paper and Pulp Mills, Radio-active wastes, Tanneries, other industries.

UNIT-5
Various aspects of a Common Effluent Treatment Plant, Planning and Site Selection Procedure, Maintenance and Operation of Plants, removal of toxic substances, Disposal of sludges, gases and residues.

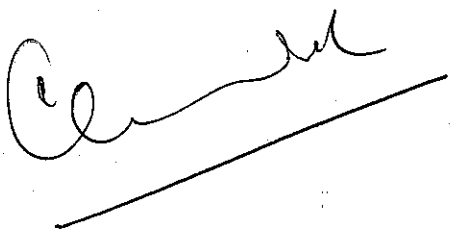
Reference Books:

1. Arceivala, S. J. and Asolekar, S. R. (2007) **"Wastewater Treatment for Pollution Control and Reuse"** Tata Mc Graw Hill Pvt. Ltd., New Delhi., 3rd edition.
2. Dhameja, S. K. (2004) **"Environmental Engineering and Management"** S. K. Kataria&Sons., New Delhi., 2nd edition.
3. Patwardhan, A.D. (2009)***"Industrial Wastewater Treatment"***PHI Learning Pvt. Ltd., New Delhi., 2nd prin
4. Sawyer, C. N., McCarty, P. L., Parkin, G. F. (2003) **"Chemistry for Environmental Engineering and Science"** Tata Mc Graw Hill Pvt. Ltd., New Delhi., 5th edition.

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Identify the problems caused by polluted water.
2. Analyze the extent of water polluted through various methods
3. Revise the extent of pollution in water through conventional Method and combined treatment..
4. Identify the process required to treat different industrial wastes



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-III) Advanced Foundation Engineering	CE7004(C)	3-1-0	4

ADVANCED FOUNDATION ENGINEERING

UNIT-1
Modern methods of soil investigations,Geophysical methods; soil resistivity methods seismic refraction method,stress below ground due to loads.

UNIT-2
Bearing capacity and settlement analysis of shallow foundations: Meyerhof and Hansen's bearing capacity equations, BIS bearing capacity equation, immediate and consolidation settlements in cohesive soil, De-Beer and schmmertman's methods of settlement prediction in non-cohesive soil.

UNIT-3
Classification of piles, load carrying capacity of single piles in clay, silt and sand by dynamic and static methods, Pile load test, Pile group, Negative skin friction, Settlement of pile group.

UNIT– 4
Foundation on expansive soil, Construction on expansive soil, Alteration of soil condition, under-reamed piles. Elements of well foundation, Shape, Depth of scour, well sinking, Tilt, shift and their prevention.

UNIT-5
Stability of slopes, Limit equilibrium method, Method of slices, Simplified Bishop method, Stability Charts. Soil behavior under dynamic loads,Machine foundation: classification, definitions, design principle in brief, Barken's method.

References:

1. J. E. Bowles – Analysis and Design of Foundation.
2. V. N. S. Murthy – Soil Mechanics and Foundation Engineering.
3. K. R. Arora – Soil Mechanics & Foundation Engineering.
4. Alam Singh – Modern Geotechnical Engineering.
5. GopalRanjan and A. S. R. Rao – Basic and Applied Soil Mechanics
6. B. M. Das – Foundation Engineering, CENGAGE Learning

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-III) Bridge Engineering	CE7004(D)	3-1-0	4

BRIDGE ENGINEERING

UNIT- 1

Standard Specifications and Code of practice for general requirements of Road Bridges. Design loads for Bridges, IRC loading Standards, Traction Forces and Temperature Effect. General Design requirements. Economic Span of Bridge. Various Types of Bridges.

UNIT - 2

Design of Solid Slab and Girder Slab Bridges, Courbon's Theory and Pigeaud' Theory for design of Girders and Slabs.

UNIT - 3

Design of Balanced Cantilever Bridges. Design of Cantilever section, Suspended Span and Articulations.

UNIT - 4

Design of Supporting Structures, Piers and Abutments, Solid and Hollow Piers. Single Cellular and Multi Cellular Piers, Design of Bearings. Introduction of Continuous and Arch Bridges.

UNIT - 5

Steel Bridges subjected to Railway Loading, Truss Bridges, Girder Bridges, Design of Rocker and Roller Bearing.

Book & References Recommended :

Text Books

1. D. Johnson Victor, *Essentials of Bridge Engineering.*
2. Aswani M.G., Vazirani V.N., Ratwani M.M., *Design of Concrete Bridges.*
3. Ratwani M.M., *Steel Structures Vol. III.*

Reference Books

1. Ponnuswamy S., *Bridge Engineering.*

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Explain standard specifications and codal provisions for gerenal requirements of road bridge.
2. Calculate various loads on bridges.
3. Design solid slab bridge, slab girder bridge, truss bridges, balanced cantilever bridge, rocker and bearing, bridge piers etc.
4. Explain Courbon's and Pigeaud's theory

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-IV) Traffic Engineering	CE7005(A)	3-1-0	4

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) Vehicularcharacteristics: 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) Differenttypes 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.

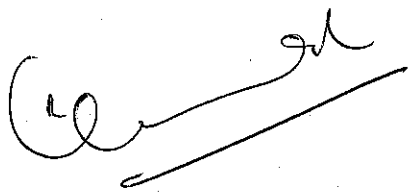
Reference Books :-

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 Flaw Theory
5. W.R. Mchsne and R.P. Roess "Traffic Engg"
6. Wohl& Martin, Traffic System Analysis for Engineering & Planners

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Illustrate traffic characteristics, its impact on road traffic,variousproblems on mass transportation and road accidents.
2. Practice different traffic studies and give its practical significance.
3. Design different traffic signal system, traffic islands and street lighting.



Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-IV) Computational Methods In Structural Engineering	CE7005(B)	3-1-0	4

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, beam column, beam with rigid ends, beam on elastic foundation and elements with special boundary conditions. Non-prismatic and curved elements, forces and displacements in general coordinate axes, structure stiffness matrix.

UNIT - II

Basics of the Direct Stiffness method - Analysis of pin-jointed 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 & Non-sway)

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 generalized 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 Isoparametric 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 Publishersand 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 OUTCOMES (COs)

After completion of this course the students will be able to

1. Analyze different structural elements by stiffness & flexibility matrix method.
2. Modify the matrices in order to increase the efficiency for solving time taking computational problems by various methods
3. Analyze the continuum structures using theory of elasticity and finite element concept
4. Analyze the two dimensional Isoparametric elements using finite element concept

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-IV) Earthquake Engineering	CE7005(C)	3-1-0	4

EARTHQUAKE ENGINEERING

UNIT-I
Internal structure of earth, Causes of earthquakes, Seismic waves, Magnitude, Intensity and Energy released, Characteristics of Earthquakes

UNIT-II
Response of Structure to Earthquake motion, Modeling of structures, Dynamics of Single degree of freedom system

UNIT-III
Dynamics of multi degree of freedom system, Idealization of structures, Seismic response

UNIT-IV
Introduction to Earthquake resistant design, Equivalent lateral force method, Response spectrum method, Time history method, Introduction to earthquake resistant brick and masonry buildings

UNIT-V
Reinforced concrete framed buildings, Code provisions, Introduction to machine foundation & its design, Degree of freedom of a Block Foundation

References:-

1. Introduction to Structural Dynamics-J.M. Biggs
2. Elements of Earthquake Engineering-Jai Krishna and A.R. Chandrasekaran
3. IS:1983-1984 Criterion for Earthquake Resistant Design
4. Earthquake Resistant Design of structures- Agrawal and Srikhande
5. Earthquake Resistant Design of structures- S.K. Duggal

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Explain basics of earthquakes.
2. Evaluate the dynamic response of structures.
3. Design earthquake resistant structures

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System based scheme)
Bachelor of Engineering (CBGS) Semester: VII (Civil Engineering)
(w.e.f. July 2018)

Course	Subject Title	Subject Code	Hours/week	Total Credits
B.E.	(Elective-IV) Environmental Impact Assessment	CE7005(D)	3-1-0	4

ENVIRONMENTAL IMPACT ASSESSMENT

UNIT-I
Concept of EIA: Introduction of EIA, Utility and scope of EIA, Significant Environmental Impacts,Stage of EIA, Environmental Inventory, Environmental Impact Statement (EIS)

UNIT-II
Methods of Impact Identification: Environmental Indices and indicators for describing the affectedenvironment, matrix methodologies, network, checklist, and other method.

UNIT-III
Impact analysis: Framework, statement predication and assessment of impact of air, water, noise andsocio-economic environment.

UNIT-IV
Preparation of written documentation: Initial planning phase, detailed planning phase, writing phase,organizing relevant information, co-ordination of team writing effort.

UNIT-V
Public Participation in Environmental Decision making: Basic definitions, Regulatory requirements,Advantages& disadvantages of Public Participation, Selection of Public participation techniques,Practical considerations for implementation.

COURSE OUTCOMES (COs)

After completion of this course the students will be able to

1. Explain Environmental Impact Assessment
2. Identify the impact on environment by various methods
3. Analyze the impact of air, water, noise and socio-economic environment
4. Prepare the written documents of planning and relevant information
5. Predict public participation in environmental decision making.