

MATS School of Engineering & Technology

MATS University

Raipur



Syllabus Scheme

(8th Semester)

For

Bachelor of Engineering

In

CIVIL Engineering

Subject Code For MATS School of Engineering & Tech. Deptt.

8th Semester (Civil)

S.No.	Subject Code	Subject Name
1	BE840	Structural Engineering Design - IV
2	BE841	Water Resources Engineering - II
3	BE842	Computer Applications in Civil Engineering
4	BE843	Water Shed Management
5	Refer table-2	Professional Elective- III
Table -2		Professional Elective- III
6	BE845	Structural Engineering Design – IV Lab
7	BE846	Water Resources Engineering-II Lab
8	BE847	Major Project

**Table -2
Professional Elective- III**

Structural Engineering Group		
S.No.	Subject Code	Subject Name
1.	BE8441	Seismic Design of Structures
2.	BE8442	Remote Sensing and GIS Applications
Environmental Engineering Group		
1.	BE8443	Environmental Pollution and Management



MATS School of Engineering & Technology
MATS University, Raipur
Scheme of Teaching & Examination
8th Semester
Civil Engineering



S. No.	Course code	SUBJECT	Periods per week		Evaluation Scheme		Total Marks
			L	P	IM	ESE	
THEORY							
1	BE840	Structural Engineering Design - IV	5	0	30	70	100
2	BE841	Water Resources Engineering - II	5	0	30	70	100
3	BE842	Computer Applications in Civil Engineering	5	0	30	70	100
4	BE843	Water Shed Management	5	0	30	70	100
5	Refer table-II	Professional Elective- III	5	0	30	70	100
PRACTICAL							
6	BE845	Structural Engineering Design – IV Lab	0	3	20	30	50
7	BE846	Water Resources II Lab	0	3	20	30	50
8	BE847	Major Project	0	3	100	100	200

Table -2
Professional Elective- II

Structural Engineering Group		
S.No.	Subject Code	Subject Name
1.	BE8441	Seismic Design of Structures
2.	BE8442	Remote Sensing and GIS Applications
Environmental Engineering Group		
1.	BE8443	Environmental Pollution and Management

L-Lecturer, P-Practical, ESE- End Semester Examination, IM-Internal Marks

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Semester: B.E.VIII Sem.

Subject:- Structural Engineering Design - IV

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch: - Civil Engineering

Code :- BE840

Total Tutorial Periods: **15**

Unit 1

Design of Combined Footings, Rectangular, Trapezoidal and Strap beam type & raff foundation.

Unit 2

Design of Retaining Walls, Cantilever and Counterfort

Unit 3

Design of Tanks, Rectangular and Circular, resting on ground and overhead type with flexible and fixed base, Intze Type

Unit 4

Bridges, Design of super structure for slab bridge and T-Beam bridge for Highways

Unit 5

Prestressed Concrete, Introduction to Prestressed Concrete, Pre-tensioning and Post-tensioning, Different Systems, Losses in Prestress, Permissible stress in Concrete and Steel, Design of Simply supported beam with symmetrical sections,use of IS code

Name of Text Books:

RCC Structures – B.C. Punmia (Laxmi Publications)

Prestressed Concrete – N. Krishna Raju (New Age Publications)

RCC Design – Sinha & Roy (S. Chand & Co.)

Name of Reference Books:

RCC Structures – N. Krishna Raju (New Age Publications)

RCC Structures (Vol. – I & II) – O.P. Jain (Nem Chand Publications)

Bridge Engineering – R.K. Raina

IS code

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Semester: B.E.VIII Sem.

Subject: - Water Resources Engineering – II

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code :- BE841

Total Tutorial Periods: **15**

Unit 1

Types of Dams, Suitability of a type of dam, Gravity dams – Forces acting on dams, failure of dams and criteria for structural stability, Overturning, Compression or crushing, tension, sliding, principal and shear stress, stability analysis, Elementary profile of a gravity dam, High and low gravity dams, Profile from practical considerations, Design considerations, Openings in dams, Functions and Effects of opening, Joints, Keys and Water stops in gravity dams, Foundation treatment.

Earth Dams

Types of Earth fill dams, design criteria, Causes of failures, Control of Seepage, Stability of slopes.

Unit 2

Spillways and Energy Dissipaters

Introduction, essential requirements of a spillway, spillway capacity, components, Types of spillways, Design of Ogee Spillway, Energy Dissipation below spillways, Types of Energy dissipater, Hydraulic jump as energy dissipater, Stilling basins, design of stilling basin, USBR stilling basins, standard basins.

Unit 3

Diversion Headworks

Introduction, Types of diversion works, location and components, Weir and Barrage, Effect of construction of weir on the river regime, Causes of failures of Weirs on permeable foundations, their remedies, Bligh's creep theory, Lane's Theory, Theory of seepage flow, Khosla's theory, Design of Vertical drop Weir, Design of Glacis Weir, Canal head regulator.

Unit 4

Regulation Works

Introduction, Definition of falls, necessity and location of falls, Design and comparative study of the main types of falls, Cross regulator and distributary regulators, their designs.

Hydraulic Gates

Control equipments for out-lets, spillway gates, types, design criteria for radial gates, air vents.

Unit 5

Cross Drainage Works

Introduction, types, suitability, design of various types of C-D Works, Aqueduct, Syphon Aqueduct, Super Passage, Syphon, level crossing, inlets and outlets.

Channel Transition

Design of channel transition-expansions and contractions, curves for sub-critical and super critical flows.

Name of Text Books:

Irrigation Engineering and Hydraulic Structures – S.K. Garg (Khanna Publications)

Irrigation Engineering – B.C. Punmia (Laxmi Publications)

Name of Reference Books:

Irrigation, Water Resources and Water Power Engineering – Dr. P.N. Modi (Standard Book House)

Theory and Design of Irrigation Structures (Volume – I & II) – Varshney (Nem Chand Bros.)

Irrigation Engineering – Asawa G.L. (New Age International Publications)

Fundamentals of Irrigation Engineering – Bharat Singh (Nem Chand & Bros.)

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Semester: B.E.VIII Sem.

Branch:- Civil Engineering

Subject:- Computer Applications in Civil Engineering Code :- BE842

Total Theory Periods: - **40**

Total Tutorial Periods: **15**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Unit 1

Fluid Mechanics Applications

Flowcharts, Algorithms and C++ programs for – Flow through pipes, Computation of friction factor, Hardy Cross method of water supply distribution, Determination of depth of flow and discharge in rectangular and circular open channels.

Unit 2

CPM and survey applications

Flowcharts, Algorithms and C++ programs for – Determination of earliest expected time for an activity, Network analysis and determination of critical path, Survey adjustments, Determination of RL of various points by Rise & Fall and HI methods.

Unit 3

Geotechnical Engineering Applications

Flowcharts, Algorithms and C++ programs for – Determination of vertical effective stress at a given depth for any soil profile and water table conditions, Determination of bearing capacity of soil for given soil and water table conditions, Determination of one dimensional preconsolidation settlement under compacted fill, Determination of horizontal and vertical hydraulic conductivities for flow through anisotropic soils.

Unit 4

Structural Analysis Applications

Flowcharts, Algorithms and C++ programs for – Computation of SF & BM at any desired section of a simply supported beam for any loading conditions, Analysis of portal frames by moment distribution method, Determination of maximum shear force at a section of a simply supported beam subjected to a system of rolling loads, Determination of maximum bending moment at a section of a simply supported beam subjected to a system of rolling loads.

Unit 5

Structural Design Applications

Flowcharts, Algorithms and C++ programs for – Design of Simply supported beams, Design of Columns, Design of Slabs, Design of Foundations.

Name of Text Books:

Let us C++ – Yeshwant Kanitkar (BPB Publications)

Problem Solving with C++ – Savitch (Addison Wesley Publication)

Name of Reference Books:

C++ Interactive Course – Lafore (BPB Publications)

C++ Components and Algorithms – et. al. (BPB Publications)

Object Oriented Programming in Turbo C++ – Rober Lafore (Galgotia Publications)

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Semester: B.E.VIII Sem.

Subject:- Watershed Management

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code :- BE843

Total Tutorial Periods: **15**

Unit 1

Soil and Water, Issues related to plant life like composition of soil, water requirement of crops, necessary conditions for plant growth etc. Soils, their origin and classification.

Unit 2

Land classification for WM, Land capability rating, determination of land capability class, land capability and suitability surveys.

Unit 3

Soil erosion, problem, types, conservation, and control measures in agricultural and non-agricultural land. Water conservation and Harvesting, Agronomical measures in soil and water conservation. Examples and critical reviews.

Unit 4

Watershed Management, Approach in Govt. programmes, people's participation, conservation farming, watershed-management planning, identification of problems, objectives and priorities, socioeconomic survey, use of tools like GIS.

Unit 5

Hill slope processes, forest and land use, hill slope conservation. Bad lands, bad land development.

Name of Text Books:

Watershed Management – J.V.S. Murthy (New Age International Ltd.)

Name of Reference Books:

Watershed Management – B.M. Tideman (-----)

Modern physical geography – Strahler A.N. and Strahler A.H. (-----)

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Semester: B.E.VIII Sem.

Subject:- Seismic Design of Structures

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code :- BE8441

Total Tutorial Periods: **15**

Unit 1

Engineering seismology

Causes of earthquakes; seismic waves; magnitude, intensity and energy release, characteristics of strong earthquake ground motions, Introduction to theory of vibrations - Flexibility of long and short period structures, concept of response spectrum, Seismic zones.

Unit 2

Seismic design concepts

Desirable features of earthquake resistant buildings, Building forms for earthquake resistance, Seismic design philosophy, Performance of buildings in past earthquakes, Lessons from structural damage during past earthquakes, Equivalent static lateral earthquake force, codal provisions

Unit 3

Structural Dynamics – Response of single degree freedom system, free & forced vibrators

Masonry buildings

Seismic design based on IS Code only and detailing of masonry buildings,.
Rcc Buildings- Seismic design based on IS Code only and detailing of RCC buildings
.Detailing of drawing minimum 6 sheets

Unit 4

Steel Buildings

Seismic design and detailing of Steel buildings.

Name of Text Books:

Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition) – Anil K Chopra (Pearson Education Publication)

IS 1893, IS 13920, IS 4326, IS 13828, Bureau of Indian Standards, New Delhi

Name of Reference Books:

Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)

Fundamentals of Vibrations – Anderson,R.A. (Mc Millan)

Vibration and Stuctural Dynamics – Timoshenko, S. (VanNostrand Co.)

Vibration and Structural Dynamics – Mukyopadhyaya (Oxford & IBH)

Dynamics of Structural Dynamics- R.W. Clough & J Penzien (Mcgraw Hill Publication)

Structural Dynamics (Theory & computations)- Mario Paz (CBS Publishers & Distributions New Delhi)

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Semester: B.E.VIII Sem.

Branch:- Civil Engineering

Subject:- REMOTE SENSING AND GIS APPLICATIONS

Code :- BE8442

Total Theory Periods: - **40**

Total Tutorial Periods: **15**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Unit 1

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units. Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy, evaluation, spectral properties of water bodies, introduction to digital data analysis.

Unit 2

Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping. Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Unit 3

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

Unit 4

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

Unit 5

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yongg, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.

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Semester: B.E.VIII Sem.

Branch:- Civil Engineering

Subject:- Environmental Pollution and Management

Code :- BE8443

Total Theory Periods: - **40**

Total Tutorial Periods: **15**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Unit 1

Basic principles of environmental management, its Pollution and control, Environmental Policies and Legislation, Rules, acts, standards, criteria, specification, nature and scope of environmental problems.

Unit 2

Ecology of population, population attributes, world population growth and the effect of overcrowding on ecology, economy and the future of man.

Unit 3

Environmental Research Methodology, approaches, method of Data collection, sampling systems, approach to environmental problems, health and environmental implications of solid waste management, Fate of pollutants in air, water, soil and ground water.

Unit 4

Management and handling of hazardous substances, Sanitary landfills, incineration, composting, hydropulping, pyrolysis. Environmental Audit, The Indian Scenario, definition of audit, procedure of auditing.

Unit 5

Introduction to sustainable development, Definitions, strategies for sustainable development, environmental debts, appropriate technologies, related case studies. Environmental inventory, Environmental Impact Assessment methods, Basic steps for prediction and assessment, water environment, air environment, noise environment.

Name of Text Books:

Environmental Engineering – Peavy & Rowe (Tata McGraw Hill, New Delhi).

Introduction to Environmental Science – Y. Anjaneyulu (B.S. Publications)

Name of Reference Books:

Introduction to Environmental Engineering and Science – Masters, G.M. (Prentice Hall of India Pvt. Ltd., 1991)

Waste Water Engineering – Metcalf Eddy (Tata McGraw Hill, New Delhi).

Introduction to Environmental Science – Y. Anjaneyulu (B.S. Publications).

Environmental Science and Engineering – Henry and Heinke (Pearson Education).

Waste Water Engineering – Metcalf Eddy (Tata McGraw Hill, New Delhi).

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Semester: B.E.VIII Sem.

Subject:- Structural Engineering Design-IV Lab

Total Theory Periods: - **40**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Branch:- Civil Engineering

Code :- BE845

Total Tutorial Periods: **15**

Experiments to be performed (Min 10 experiments)

1. Details of reinforcement in a simply supported RCC beam (singly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.
2. Details of reinforcement in a simply supported RCC beam (doubly reinforced) with the given design data regarding the size and number of bars, stirrups their size and spacing.
3. Details of reinforcement in a simply supported RCC beam (T section) with the given design data regarding the size and number of bars, stirrups their size and spacing.
4. Details of reinforcement in a one way slab with the given design data regarding the size and number of bars, their size and spacing.
5. Details of reinforcement in a two way slab with the given design data regarding the size and number of bars, their size and spacing.
6. Details of reinforcement in a stair case with the given design data regarding the size and number of bars, their size and spacing.
7. Details of reinforcement for a RCC rectangular column with isolated footing.
8. Details of reinforcement for a RCC circular column with isolated square footing.
9. Detailing of Combined footings.
10. Detailing of Retaining walls.
11. Detailing for Water Tanks.
12. Detailing for R.C.C. slab Bridge.
13. Detailing for R.C.C. T-Beam Bridge.
14. Detailing for Prestressed Concrete Girder.
15. Bar bending schedules for few of the above items.

Field Visit (Minimum 3 times)

Study of complete standard drawing

- a. Multistoried building
- b. Bridge
- c. Water tank

List of Equipments / Machine Required:

List of Equipments – Not Required.

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Semester: B.E.VIII Sem.

Branch:- Civil Engineering

Subject:- Water Resources Engineering II Lab

Code :- BE846

Total Theory Periods: - **40**

Total Tutorial Periods: **15**

Total marks in end semester Exam: **100**

Minimum Number of Class test to be conducted: **02**

Experiments to be performed (Min 10 experiments)

1. Drawing of gravity dam section showing following details: openings in dams, joints, key and water stops.
2. Drawing of Earth dam section showing details of different types of earth dam.
3. Drawing of Ogee Spillway section.
4. Drawing of different types of energy dissipater and stilling basins.
5. Drawing of layout of diversion head works showing its different components.
6. Drawing of vertical drop weir.
7. Drawing of Glacis weir.
8. Drawing of canal head regulator.
9. Drawing of main types of canal fall.
10. Drawing of different types of hydraulic gates.
11. Drawing of aqueduct.
12. Drawing of Syphon Aqueduct.
13. Drawing of Super Passage.
14. Drawing of Canal Syphon.
15. Drawing of Level Crossing and inlets and outlets.

List of Equipments / Machine Required:

Recommended Books: