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Priyadarshini J. L. College of Engineering
Affiliated to RTM Nagpur University Nagpur
Scheme of Teaching, Examination and Evaluation
Civil Engineering for B-Tech Programe

Scheme Name :- CEBTECH-23/R0

Eighth Semester

Sr. No.	Course Category	Course Code	Course Title	Teaching Scheme (Clock Hours/ Week)			Credits	Maximum Marks			Minimum Marks			End Semester Exam Duration (Hrs)
				L	T	P		Continuous Evaluation	End Semester Exam	Total Marks	Continuous Evaluation	End Semester Exam	Total Marks	
1	PCC	CE801T	Digital Land Surveying and Mapping	3	0	0	3	40	60	100	---	15	45	3
2	PEC	CEE802T	Elective - V	3	0	0	3	40	60	100	---	15	45	3
3	PEC	CEE803T	Elective - VI	3	0	0	3	40	60	100	---	15	45	3
4	P	CE804P	Project Phase - II	0	0	12	6	100	100	200	---		100	---
			Total =	9	0	12	15	220	280	500	---	---	---	---

Abbreviations:- L- Lecture, T- Tutorial, P- Practical

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DEPARTMENT OF CIVIL ENGINEERING

SYLLABUS OF FOURTH YEAR BACHELOR OF TECHNOLOGY

SEMESTER VIII

COURSE : DIGITAL LAND SURVEYING AND MAPPING

COURSE CODE: CE801T

Hours/ Week	Credits	Duration of End Sem Exam	Continous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	To introduce digital land surveying and its application
2.	To provide basics of digital surveying and mapping of earth surface using GPS.
3.	To Introduce fundamentals of DGPS
4.	To provide basics of digital surveying and mapping of earth surface using Total Station.

Course Outcomes:

After completion of the course, the student will be able to

CO1	Know the basics of digital land surveying and its applications.
CO2	Handle the GPS for surveying and plot the details on map.
CO3	Know the use of DGPS and its applications and advantages.
CO4	Use total station for land surveying and plotting the details.
CO5	Use advance software for mapping.

R.H. Mohankar

SYLLABUS:

UNIT I	
INTRODUCTION TO SURVEYING	**(7 Hours) (12 Marks)**
Overview of general survey: Introduction, Need, Application and Types Overview of digital land survey: - Introduction, Establishment of control points. Introduction to advanced digital surveying methods.	
UNIT II	
GLOBAL POSITIONING SYSTEM	**(8 Hours) (12 Marks)**
Introduction, components of GPS GPS signals: Introduction, GPS signals, GPS user segment: Introduction, GPS Receiver code receiver, frequency receiver GPS software: Field software, office software, GPS data collection and processing, errors in GPS	
UNIT III	
DGPS AND DATA PROCESSING	**(7 Hours) (12 Marks)**
Introduction to Differential GPS DGPS data application and Processing DGPS control station and loop closure technique	
UNIT IV	
TOTAL STATION	**(7 Hours) (12 Marks)**
Introduction, parts, accessories and setting of total station Measurements of distance, horizontal angle, vertical angle and height, Contouring and mapping Errors in Total station, errors and error propagations and survey specification	
UNIT V	
MAPPING	**(7 Hours) (12 Marks)**
Mapping fundamentals, basics Mapping software and Automated Mapping Working steps and establishment of control point Detailing of digital surveying	

References

Text books:

1. Digital Land Surveying and Mapping by- P.K.Garg
2. Advanced Surveying: Total Station, GPS, GIS & Remote Sensing by- Gopi Satheesh, R. Sathikumar, N Madhu

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SYLLABUS OF FOURTH YEAR BACHELOR OF TECHNOLOGY

PROGRAM ELECTIVE COURSE-V

SEMESTER VIII

COURSE :-ADVANCED STEEL DESIGN **COURSE CODE: CEE802TA**

Hours/ Week	Credits	Duration of End Sem Exam	Continous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1	Analyse the forces and stresses acting on different steel structures.
2	To understand the possible failure modes of structural members.
3	Applying various checks for strength assessment and design the member.
4	To apply methods for ensuring the safety and stability of liquid storage tanks
5	To understand the types of loads acting on liquid storage tanks vessels.

Course Outcomes:

After completion of the course, the student will be able to

CO1	Analyse loads acting on bridge and design of members.
CO2	Analyse industrial building members and their design.
CO3	Analyse forces acting on steel chimney and design of chimney superstructure.
CO4	Analyse loads acting on liquid storing tanks and their design.
CO5	Evaluate the loads acting on storage vessels and their design.

SYLLABUS:

UNIT I	**(8 Hours) (12 Marks)**
Design of Bridges Highway Bridge: Types of Bridges, IRC loadings, Economic span length, Impact factor, Design of deck and through type plate girder bridge. Foot over Bridge: Loading, types of decks. Design of truss bridge.	
UNIT II	**(7 Hours) (12 Marks)**
Design of Industrial Building Industrial sheds, Types & Design of mill bents, bracings. Design of crane and gantry girder. Introduction to Pre Engineered Building. Moment resisting welded and bolted connections. Open web sections : Introduction, design of open web sections.	
UNIT III	**(7 Hours) (12 Marks)**
Design of steel Chimney Types of chimney, chimney plates, linings, Breech opening, Forces acting on steel chimney. Design of self-supporting steel chimney.	
UNIT IV	**(7 Hours) (12 Marks)**
Design of Liquid storage steel tanks Types of steel tanks, forces acting on elevated tanks, staging, wind bracings. Design of rectangular, circular and pressed steel tanks. Design of staging.	
UNIT V	**(7 Hours) (12 Marks)**
Design of storage vessels Storage Vessels : General concepts, design of Bunker & Silo.	

List of Books:

Text Books:

1. Design of Steel structures, N Sbramanian, Oxford university press First edition 2008
2. Fundamentals of Structural Steel Design, M L Gambhir, McGraw Hill Education (India) Pvt ltd, First edition 2013

3. Design of Steel structures, S Ramamurtham, Dhanpat Rai publishijng Company, Second edition 2014
4. Design of Steel structures- Volume II, Ram Chandra, Standard Book House, Delhi Seventh Edition 1991
5. Design of Steel structures, S K Duggal, TataMcGraw

List of Code/Handbook

1. Indian Standard For General Construction In Steel – Code of Practice 2007
2. Steel Structural Handbook / Steel Table

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SYLLABUS OF FOURTH YEAR BACHELOR OF TECHNOLOGY

PROGRAM ELECTIVE COURSE-V

SEMESTER VIII

COURSE :- AIR POLLUTION & SOLID WASTE MANAGEMENT

COURSE CODE: CEE802TB

Hours/ Week	Credits	Duration of End Sem Exam	Continuous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	To provide foundational knowledge of air pollution, its sources, impacts on health and the environment, and its role in global environmental issues.
2.	To introduce meteorological parameters influencing air pollution, plume dispersion, air quality assessment methods, and relevant Indian pollution standards.
3.	To introduce the principles and techniques used to control particulate and gaseous air pollutants using various air pollution control devices.
4.	To provide an overview of solid waste management, including its structure, sources, characteristics, and the need for effective handling and analysis.
5.	To introduce the fundamentals of solid waste management, including its structure, sources, characteristics, and the importance of responsible waste handling and analysis.

Course Outcomes:

After completion of the course, the student will be able to

CO1	Identify air pollutants, analyze their effects, and understand their contribution to global challenges like climate change, ozone depletion, and acid rain.
CO2	Interpret meteorological data, assess plume behavior, read wind rose diagrams, understand AQI, and apply Indian air pollution standards including CPHEEO guidelines.
CO3	Explain the working principles and applications of air pollution control equipment such as gravity settlers, cyclones, ESPs, bag filters, and wet scrubbers.
CO4	Identify sources and types of solid waste, evaluate its physical and chemical properties, and understand sampling, analysis, and per capita waste generation.
CO5	Classify solid waste, assess its quantity and quality, understand per capita contribution, and apply basic sampling and analysis techniques.

SYLLABUS

UNIT I	**(8 Hours) (12 Marks)**
Introduction to air pollution Definition, atmosphere & its zones, Classification and sources of air pollutants, Impacts of air pollution on human health, vegetation, animals, building materials, structures, and atmosphere, soil and water bodies, Global and regional environmental issues of air pollution: Ozone depletion, Climate change, Global warming, Acid rain.	
UNIT II	**(7 Hours) (12 Marks)**
Meteorological parameters: Primary and secondary parameters, atmospheric stability, plume behaviour. Wind rose diagram, Air Quality Index (AQI), Standards for air pollution (as per Indian Standards and CPHEEO).	
UNIT III	**(7 Hours) (12 Marks)**
Air pollution controls methods and equipment: Principles of control methods for particulates and gaseous pollutants, gravity settlers, electrostatic precipitators, bag filters, cyclones and wet scrubbers.	
UNIT IV	**(7 Hours) (12 Marks)**
Introduction to solid waste management(SWM) Structure , necessity and responsibility, Sources, Quantity and quality, Sources of solid waste, classification and components, physical and chemical characteristics, per capita contribution, sampling and analysis	
UNIT V	**(7 Hours) (10 Marks)**
Collection and transportation of solid waste: Method of collection, equipment used for collection and transportation, transfer stations, optimization of transport route Methods of processing, merits and demerits of various methods, 3R concept **Disposal methods:** Composting of waste, methods of composting, factors affecting composting Sanitary land filling: Site requirements, methods, leachate management.	

LIST OF BOOKS:
Text Books:

1. M.N. Rao & H.V.N.Rao, " Air Pollution", Tata McGraw Hill Publishing Co. Ltd.
2. C.S.Rao, "Environmental Pollution Control Engineering", Wiley Estern Ltd. New Delhi.
3. Gurjar, B.R., Molina, L., Ojha, C.S.P. (Eds.), "Air Pollution: Health and Environmental Impacts", CRC Press. 2010.
4. A. D. Bhide, & Sunderesan B.B., "Solid Waste Management in developing countries, INSDOC, N. Delhi
5. Treatment and Disposal of Solid and Hazardous Wastes Kindle Edition by Debashish Sengupta, Brajesh K. Dubey, Sudha Goel
6. Solid and Hazardous Waste Management, Second Edition by M. N. Rao
7. Municipal Solid Waste Management by P Jayarama Reddy
8. Municipal solid waste management rules Handbook.

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SYLLABUS OF FOURTH YEAR BACHELOR OF TECHNOLOGY

PROGRAM ELECTIVE COURSE-V

SEMESTER VIII

COURSE :- FOUNDATION ENGINEERING **COURSE CODE: CEE802TC**

Hours/ Week	Credits	Duration of End Sem Exam	Continous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	To brief information about shallow foundation
2.	To know effect of settlement of foundation
3.	To get information about pile foundation
4.	To understand the use of sheet pile and cofferdams
5.	To learn the basics of expansive soils

Course Outcomes:

After completion of the course, the student will be able to

CO1	Analyse the suitability of shallow foundation and its design
CO2	Find the settlement of foundation by using basic information
CO3	Implementing the knowledge of design and use of pile foundation for respective project
CO4	Choosing the sheet pile and cofferdams for projects
CO5	Predicting the effect of expansive soils on foundation

SYLLABUS:

UNIT I	(7 Hours) (12 Marks)
SHALLOW FOUNDATION Different types of shallow foundation and modes of failure. Bearing capacity of soil By Terzaghi's theory, Design criteria and codal provisions. Effect of water table on bearing capacity, correction factor for shape and depth of footing. Bearing capacity estimation on sand and clays from N-value, factor affecting bearing capacity.	
UNIT II	**(8 Hours) (12 Marks)**
SETTLEMENT OF FOUNDATION elastic and consolidation settlement, differential settlement, control of excessive settlement. Proportioning the footing for equal settlement. **Plate load test:** Procedure, interpretation for bearing capacity and settlement prediction, limitations, IS code method.	
UNIT III	**(7 Hours) (12 Marks)**
PILE FOUNDATIONS Classification of piles, constructional features of cast-in-situ & pre-cast concrete piles. Pile driving methods. Load transfer mechanism of axially loaded piles. Pile capacity by static formula & dynamic formulae. Pile load test and interpretation of data, group action in piles, spacing of piles, negative skin friction and its effect on pile capacity, general feature of under reamed piles. Settlement of pile group, Introduction to IS 2911.	
UNIT IV	**(7 Hours) (12 Marks)**
SHEET PILE AND COFFERDAM Type, material, method of construction, distribution of earth pressure and related approximation. distinction between sheet pile and retaining wall, Cantilever sheet piles and anchored bulkheads, Earth pressure diagram, determination of depth of embedment in sands and clays, timbering of trenches, Earth pressure diagrams, forces in struts.	
UNIT V	**(7 Hours) (12 Marks)**
EXPANSIVE SOILS Foundations in Expansive soils, problems in Expansive soils, Mechanism of swelling, swell pressure and swelling potential, Heave, foundation practices, Sand cushion, CNS technique under, reamed pile Foundations, Granular pile, anchor technique, stabilization of expansive soils.	

Books:

1. Soil Mechanics &Foundation Engg, B.C.Punmia
2. Soil Mechanics &Foundation Engg, K.R. Arora
3. Soil Mechanics &Foundation Engg, Dr. P.N. Modi
4. Soil Mechanics &Foundation Engg, V.N.S. Murthy

References:

1. Das, B.M. (2008). Advanced Soil Mechanics. Taylor and Fracis Group, London, Second edition.
2. Powrie, W. (2002). Soil Mechanics concepts and applications. Spon Press, Taylor and Fracis Group, London, Second edition.
3. Terzaghi, K., Peck, R.B. and Mesri, G. (1996). Soil Mechanics in Engineering Practice.

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SYLLABUS OF FOURTH YEAR BACHELOR OF TECHNOLOGY

PROGRAM ELECTIVE COURSE-VI

SEMESTER VIII

COURSE :-WATER AND WASTE WATER TREATMENT

COURSE CODE: CEE803TA

Hours/ Week	Credits	Duration of End Sem Exam	Continuous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	To provide the knowledge regarding the different sources of water & waste water, characteristics, available treatment technologies and designs.
2.	To design and implement the different water and wastewater treatment units.
3.	To provide the knowledge regarding real problems finding and handling strategies of water and wastewater treatments.
4.	To learn recent and advanced treatments of water and wastewater and disposals methods.
5	To understand Biological unit processes.

Course Outcomes:

After completion of the course, the student will be able to

CO1	Understand the process and design components of water treatment such as Aeration, coagulation-flocculation and Sedimentation.
CO2	Understand the process and design the components of water treatment such as Filtration, Disinfection.
CO3	Understand the various sources characteristics and disposal methods of wastewater.
CO4	Understand and design the different preliminary and primary waste-water treatment.
CO5	Understand and design the different Secondary waste-water treatment.

SYLLABUS:

UNIT-I	**(8 Hours) (12 Marks)**
Introduction to Water Treatment: Objective of water treatment, unit operation and unit processes, treatment flow sheet, site selection for water treatment plant. **Aeration:** objective of aeration, types or aerators. Design of cascade aerator, gas transfer, two film theory. **Coagulation- Flocculation:** Theory of coagulation objectives, types & factors affecting coagulation and flocculation, nature and types of chemical coagulants used in water treatment, coagulant and flocculent aids, Design of rapid and slow mixing devices (hydraulic and mechanical), **Sedimentation:** Theory of sedimentation, factors affecting, types of settling, analysis of discrete and flocculent settling, Design of sedimentation tank and clariflocculators.	
UNIT-II	**(7 Hours) (12 Marks)**
Filtration: mechanism of filtration, types of filters. Design of rapid sand filters, filter media specifications, Preparation of filter sand from stock sand, problems in filtration. **Disinfection:** Method of disinfection, kinetics of disinfection, types of Disinfectants chlorination, method of chlorination (breakpoint chlorination), factors affecting efficiency of chlorination Iron and manganese removal, de-fluorination. Recent development in water treatment	
UNIT- III	**(7 Hours) (12 Marks)**
Introduction to waste water Sources, Physical and chemical characteristics of waste water. DO, BOD, COD, determination of BOD rate constant, Problems on DO and BOD. Disposal of sewage by dilution and by land disposal, Streater-Phelps's equation.	
UNIT- IV	**(7 Hours) (12 Marks)**
Treatment Methods: Waste water treatment flow sheet, preliminary & Primary, secondary methods of treatment, Design of screen, Girt chamber and primary settling tank.	
UNIT- V	**(7 Hours) (12 Marks)**
Biological unit processes: principle of biological treatment processes, design parameters of activated sludge process, aerated lagoons and stabilization ponds. Design of ASP, Sludge treatment, aerobic and anaerobic digestion, reactor types (such as UASB, AFFB, Hybrid reactor) & factors affecting anaerobic digestion and sludge drying beds (excluding design)	

List of Books:

Text Books:

1. Waste Water Treatment for Pollution Control and Reuse. Soli J. Arcelvala, Tata Mcgraw Hill, 2008.
2. Water Supply Engineering, Environmental Engineering Vol.-I, Dr. P.N. Modi, Standard Publication.
3. Water Supply Engineering, Environmental Engineering Vol.-II, Dr. P.N. Modi, Standard Publication.
4. Design of Water Treatment Plant, Dr. A.G. Bhole, IWWA, Nagpur centre.

Reference Books:

1. Environmental Engineering Vol- I & II, Dr. B.C. Punmia, Laxmi Publication.
2. Water and Waste Water Treatment, Disposal And reuse, Metcalf and Eddy, Tata McGraw Hill.

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PROGRAM ELECTIVE COURSE-VI

SEMESTER VIII

COURSE : PAVEMENT ANALYSIS AND DESIGN

COURSE CODE: CEE803TB

Hours/ Week	Credits	Duration of End Sem Exam	Continous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	The student shall understand fundamental parameters required in the design of flexible and rigid pavement of highway and airfield pavements.
2.	The student shall understand the tests to be performed on highway materials and analyze highway and airfield pavements.
3.	The student shall understand design of flexible and rigid pavements by various methods..
4.	The student shall have the knowledge of field tests on pavements and can analyze, apply and evaluate the design strengthening of pavements.

Course Outcomes:

After completion of the course, the student will be able to

CO1	differentiate between rigid and flexible pavement and calculate design parameters.
CO2	evaluate material quality by use of tests and analyze the stresses in a flexible pavement using multi-layered elastic theory.
CO3	Design a flexible pavement and rigid pavement including joints using various methods.
CO4	analyse condition of existing pavement by condition survey and other methods
CO5	Comprehend the concept of strengthening of existing pavements and pavement management system

SYLLABUS:

UNIT I	**(8 Hours) (12 Marks)**
General : Structural action of flexible and rigid pavements, Characteristics of highway and airfield pavements **Design parameters :** Standard axile load and wheel assemblies for road vehicles, Under carriage systems for aircrafts, type and contact pressure, Contact area imprints, computations of ESWL for flexible and rigid pavements	
UNIT II	**(7 Hours) (12 Marks)**
Materials characteristics AASHO sub grade soil classification, Group index, CBR, Dakota cone bearing value, Plate load test for 'K', Layer equivalent concepts **Analysis of flexible pavements:** Stress-Strain deflection analysis for single, two, three and multilayer flexible pavement systems **Analysis of rigid pavements:** wheel load stresses, warping stresses, frictional stresses, combined stresses.	
UNIT III	**(7 Hours) (12 Marks)**
Flexible Pavement design : North Dakota Cone, Group index method, CBR method (including modified CBR method), IRC-37, Burmister's method, Triaxial (Kansas) method **Rigid pavement design:** IRC -58, Design of joint details for longitudinal joints, contraction joints and expansion joints	
UNIT IV	**(7 Hours) (12 Marks)**
Condition analysis of pavements: Pavement failures in both flexibleand rigid, Yield lines patterns, Condition surveys and surfacee evalution for unevenness, Bump integrators, Benkalman Beam deflection Study method along with numerical, Case studies of highways and Airfield pavement projects	
UNIT V	**(7 Hours) (12 Marks)**
Strengthening of pavements : Design of composite and rigid overlays for flexible and rigid pavements, Repairs, maintenance and rehabilitation of pavements, standards for highway and airfield constructions, Cost evalution and comparative study	

List of Books

Text books:

1. Highway Engineering, Khanna S.K. and Justo C.E.G., 1991, Nem Chand & Bros.
2. Traffic engineering and transportation planning, Kadiyali, Khanna Publications, 1987
3. Transportation Engineering: An Introduction, C. JotinKhisty , B. Kent Lall
4. Transportation Engineering and Planning ,C.S. Papacostas, P.D. Prevedouros

Reference books:

1. Highway Engineering, Rangawala B.S. Charotar Publishing House, 2011
2. IRC Handbook and MOST Specifications, Indian Road Congress, 2012

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PROGRAM ELECTIVE COURSE-VI

SEMESTER VIII

COURSE :- DESIGN OF EARTHQUAKE RESISTANCE STRUCTURE

COURSE CODE: CEE803TC

Hours/ Week	Credits	Duration of End Sem Exam	Continous Evaluation	End Sem Exam	Total Marks
3 Hrs	3	3 Hrs	40	60	100

Course Objectives:

1.	To provide a coherent development to the students for the courses in sector of earthquake engineering
2.	To design earthquake resistant structures as per IS 1893
3.	To present the foundations of many basic engineering concepts related earthquake Engineering
4.	To involve the application of scientific and technological principles of planning, analysis, design of buildings according to earthquake design philosophy.
5.	To understand the basics of retrofitting

Course Outcomes:

After completion of the course, the student will be able to

CO1	Understand the philosophy of earthquake resistant design.
CO2	Summarize the concept of various effects on structure due to earthquake.
CO3	Evaluate seismic forces for various structures as per relevant Indian standards
CO4	Design and ductile detailing of structures for seismic resistance as per Indian standards
CO5	Apply the concepts of repair and rehabilitation of earthquake affected structures

SYLLABUS:

UNIT I	**(7 Hours) (12 Marks)**
Engineering seismology, Elastic rebound theory, Theory of plate tectonics and movement of Indian plate, Seismic waves. Seismic intensity, Richter scale, Introduction on to tsunami. Seismic zoning maps of India , Response spectra. Strong motion characteristics.	
UNIT II	**(8 Hours) (12 Marks)**
Earthquake effects on the structures, combination of loads, Seismic damages during past earthquakes, Effect of irregularities and building architecture on the performance of RC structures	
UNIT III	**(7 Hours) (12 Marks)**
Seismic methods of analysis, seismic design methods, Mathematical modelling of multi-storeyed RC buildings with modelling of floor diaphragms	
UNIT IV	**(7 Hours) (12 Marks)**
Design of multi – story RC structure foundation as per latest (IS 1893- 2016) by Equivalent static lateral load method and Response spectrum Method, Introduction to Time history method. Concept of Capacity based design of soft story RC building. Concept of shear walls. Ductile detailing as per latest IS :13920-2016	
UNIT V	**(7 Hours) (12 Marks)**
Seismic retrofitting, Source of weakness in RC framed building, Various retrofitting techniques, case studies. IS code provision for retrofitting of masonry structures, failure modes of masonry structures and repairing techniques Introduction to Base Isolation system.	

List of Books:

Text Books:

1. Design of Seismic Isolated Structures by FarzadNaeim, James M. Kelly
2. Dynamics of Structures: Theory and Applications to Earthquake Engineering by A K. Chopra, Prentice- Hall of India
3. Dynamics of Structures by A K. Chopra
4. Earthquake Resistant Design of Structures by PankajAgarwal and Manish Shrikhande

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SEMESTER VIII

COURSE :-PROJECT PHASE-II **COURSE CODE: CE804P**

Hours/ Week	Credits	Continous Evaluation	End Sem Exam	Total Marks	Min Passing
12 Hrs	6	100	100	200	100

Course Objectives: The objectives of Project phase- II is

1.	To enable the students to extend further investigative study taken up under Project phase- I
2.	Involving both theoretical and practical work under the guidance of a supervisor.
3.	To learn research paper on results in international journal

Course Outcomes:

At the end of the course the students shall be able to

CO1	Apply foundational and advanced civil engineering knowledge to identify, formulate, and solve real-world problems through project work
CO2	Select and use modern engineering tools, software, and techniques for modeling, analysis, and presentation of project outcomes.
CO3	Communicate technical information effectively through reports, presentations, and teamwork, demonstrating leadership and collaboration.
CO4	Understand ethical responsibilities and the impact of engineering solutions in societal and environmental contexts; engage in lifelong learning.
CO5	Demonstrate knowledge of project planning, resource management, budgeting, and scheduling in a civil engineering context.

M.G.P. — R.S. Mohankar — OVS — MDP.

The students will carry out following tasks for Project Phase – II

1. In depth study of the topic assigned in the light of the Report prepared under Project phase- I
2. Review and finalization of the approach to the problem relating to the assigned topic
3. Final development of product/process, testing, results, conclusions and future directions
4. Preparing a paper for Conference presentation / Publication in Journals
5. Preparing a dissertation in the standard format for being evaluated by the Department
6. Final Seminar Presentation before a Departmental Committee

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