

Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE402	ENVIRONMENTAL ENGINEERING – II	3-0-0-3	2016

Prerequisites: CE405 Environmental Engineering- I

Course objectives:

- To understand the various sources and characteristics of wastewater
- To know the various treatment methods available for wastewater treatment

Syllabus : Wastewater, sources, characteristics, oxygen demand Design of sewers, Circular sewers, Partial flow and full flow conditions. Sewer appurtenances, Disposal of wastewater, Streeter Phelps equation, Oxygen sag curve, Treatment methods, Aerobic and anaerobic methods, Design of various treatment units-Screening, Grit chamber, Sedimentation tank, Activated Sludge process, Trickling filter, Rotating biological contactor, Septic tanks, Imhoff tanks, Oxidation ditches, Oxidation ponds, Upflow anaerobic sludge blanket reactors, Sludge digestion, Sludge drying bed.

Course Outcomes:

The students will

- have an understanding of the various types of treatment methods for wastewater
- know the design aspects of various treatment units in a wastewater treatment plant.

Text Books

1. B.C Punmia , “Waste Water Engineering”, Laxmi Publications Pvt. Ltd, 2012
2. Howard S Peavy, Donald R Rowe, George Tchobanoglous, Environmental Engineering, Mc Graw Hill Education, 1984
3. P N Modi, “Sewage Treatment & Disposal and Waste water Engineering”, Standard Book House, NewDelhi, 2e, 2008.
4. S.K. Garg , “Sewage disposal and Air pollution Engineering”, Khanna Publishers, 2008
5. G S Birdie, Water Supply and Engineering, Dhanpat Rai Publishing Company, 2014

References

1. G. L. Karia, R.A. Christian, Wastewater treatment: Concepts And Design Approach, PHI learning Pvt Ltd, 2013
2. J. Arceivala, Shyam R. Asolekar, Wastewater Treatment for Pollution Control and Reuse, McGrawhill Education, 2007
3. K N Duggal, Elements of Environmental Engineering, S Chand Publications, 2007
4. Mackenzie L Davis, Introduction to Environmental Engineering, McGraw Hill Education (India), 5e, 2012
5. Metcalf and Eddy, “Waste Water Engineering”, Tata McGraw Hill publishing Co Ltd, 2003

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	Wastewater- Sources and flow rates, Domestic wastewater, Estimation of quantity of wastewater, Dry weather flow, storm water flow, Time of concentration Sewers, Design of circular sewers under full and partial flow	6	15

	conditions		
II	Sewer appurtenances-Man holes, Catch basin, flushing devices, Inverted siphon. Ventilation of sewers. Sewage, Sewerage, Systems of sewerage Sewage characteristics- Physical, chemical and biological parameters, Biological oxygen demand, first stage BOD, Chemical oxygen demand, Relative stability, Population equivalent.	7	15
FIRST INTERNAL EXAMINATION			
III	Waste water disposal systems- Self purification of streams, Dilution -Oxygen sag curve, Streeter Phelp's Equation, land treatment Treatment of sewage-Preliminary and Primary treatment -Theory and design of Screen, Grit chamber, Detritus chamber, Flow equalization tank and Sedimentation tank.	6	15
IV	Secondary treatment methods-Contact bed, Intermittent sand filter, Theory and design of Trickling filter, Activated sludge process, Trickling filter-High rate, standard. Rotating biological contactor	7	15
SECOND INTERNAL EXAMINATION			
V	Design of Septic tank and Imhoff tank, Principle and working of Oxidation ditch and oxidation ponds. Aerated lagoons, Design of upflow anaerobic sludge blanket reactors	8	20
VI	Sludge treatment and disposal-Methods of thickening, Sludge digestion- Anaerobic digestion, Design of sludge digestion tanks and Sludge drying beds, methods of sludge disposal	8	20
END SEMESTER EXAMINATION			

- EXTERNAL EVALUATION:**

Maximum Marks :100

Exam Duration: 3 Hrs

QUESTION PAPER PATTERN (External Evaluation) :

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a,b,c,d)

Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE404	CIVIL ENGINEERING PROJECT MANAGEMENT	3-0-0-3	2016

Prerequisite: HS300 Principles of Management

Course objectives:

- To impart knowledge on principles of planning and scheduling projects, with emphasis on construction.
- To understand the uses and suitability of various construction equipment,
- To study the legal and ethical issues related to construction projects
- To become familiar with TQM and similar concepts related to quality
- To impart knowledge in the principles of safe construction practices
- To understand the need of ethical considerations in construction.

Syllabus : Construction Planning and Scheduling, Construction disputes and settlement, Ethics in Construction, Construction safety, Principles of Materials management, Quality management practices, Construction procedures

Expected Outcomes:

The students will be able to:

- i. Plan and schedule a construction project.
- ii. Select an appropriate construction equipment for a specific job
- iii. Familiarise the legal procedures in construction contracts
- iv. Formulate suitable quality management plan for construction
- v. Familiarise the safety practices and procedures.
- vi. Apply principles of ethics in decision making.

Text Books:

1. Kumar Neeraj Jha, Construction Project Management, Pearson, Dorling Kindersley (India) Pvt. Lt
2. L.S. Srinath – PERT and CPM –Principles and Applications, Affiliated East-West Press, 2001
3. Peurifoy and Schexnayder – Construction Planning, Equipment, and Methods, Tata McGraw Hill, 2010

Reference Books

1. B.C.Punmia & K K Khandelwal, Project Planning with CPM and PERT, Laxmi Publication, New Delhi, 2016
2. Charles D Fledderman, Engineering Ethics, Prentice Hall, 2012
3. [F. Harris](#), Modern Construction and Ground Engineering Equipment and Methods, Prentice Hall, 1994
4. Gahlot and Dhir, Construction Planning and Management, New Age International, 1992
5. K KChitkara, Construction Project Management, McGraw Hill Education Pvt Ltd., 2000
6. Khanna, O.P., Industrial Engineering and Management., Dhanapat Rai Publications, 1980
7. National Building Code, BIS
8. P.P. Dharwadkar, Management in Construction Industry, Oxford and IBH
9. Shrivastava, Construction Planning and Management, Galgotia Publications, 2000

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %

I	Unique features of construction projects ; Identification of components –Principles of preparing DPR- Construction planning and scheduling - I – Bar charts, Network Techniques, Use of CPM and PERT for planning – Drawing network diagrams – time estimates – slack – critical path-Examples	7	15
II	Crashing and time –cost trade off, Resource smoothing and resources levelling - Construction, equipment, material and labour schedules. Preparation of job layout. Codification of the planning system : Codification approach- Work package and activities identification code – Resource codes – Cost and Finance accounting codes – Technical document codes.	7	15
FIRST INTERNAL EXAMINATION			
III	Construction disputes and settlement : Types of disputes – Modes of settlement of disputes – Arbitration- Arbitrator - Advantages and disadvantages of arbitration – Arbitration Award. Construction cost and budget :Construction cost – Classification of construction cost – Unit rate costing of resources- Budget – Types of budget – Project Master budget.	6	15
IV	Concept of ethics – Professional ethics – ethical problems – provisions of a professional code – Role of professional bodies.Project management information system- Concept – Information system computerization – Acquiring a system – Problems in information system management - Benefits of computerized information system.	7	15
SECOND INTERNAL EXAMINATION			
V	Concept of materials management – inventory – inventory control – Economic order quantity- ABC analysis. Safety in construction – Safety measures in different stages of construction – implementation of safety programme.	7	20
VI	Construction procedures: different methods of construction – types of contract – Tenders – prequalification procedure - earnest money deposit – contract document – General and important conditions of contract - measurement and measurement book - Inspection and quality control - need, principles and stages. Basics of Total Quality Management	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester examination)

Maximum Marks :100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a, b, c, d)

Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE409	QUANTITY SURVEYING AND VALUATION	3-0-0-3	2016

Pre-requisites: CE334 Computer Aided Civil Engg. Lab

Course objectives:

- To have an awareness regarding specifications, analysis of rates, valuation etc. in connection with construction
- To prepare detailed estimates, bar bending schedules of various items of work

Syllabus :

Specifications- Analysis of rates- CPWD data book and schedule of rates- Detailed specification, preparation of data and analysis of rates for various items of work- Quantity Surveying- Types of Estimate - Valuation- Methods of valuation-Depreciation- Fixation of rent- Detailed estimate including quantities, abstract and preparation of various items of works, Preparation of bar bending schedules for various RCC works

Expected Outcomes:

The students will be able to

- work out the quantities of materials and labour required for different types of civil works
- prepare schedule of rates for various items of work

Text Books

1. B N Dutta, Estimating and costing in Civil Engineering, USB publishers and distributors Ltd. New Delhi
2. D D Kohli, RC Kohli, A textbook of Estimating and costing, S Chand Publishing, 2011
3. Dr. S. Seetharaman, M. Chinnasamy, Estimation and Quantity Surveying, Anuradha Publications , Chennai.

References:

1. BS Patil, Civil Engineering contracts and estimates, Universities press
2. V N Vazirani & S P Chandola, Civil engineering Estimating and Costing, Khanna Publishers.
3. IS 1200-1968; Methods of measurement of Building & Civil Engineering works.
4. CPWD data book and schedule of rates.

Note:

For analysis of rate and cost estimation, unit rate and labour requirement should be given along with the questions in the question paper.. No other charts, tables, codes are permitted in the Examination Hall. If necessary, relevant data shall be given along with the question paper.

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	General Introduction- Quantity Surveying- Basic principles-Types of Estimates - Specifications- purposes and basic principles-general specifications - Detailed specifications-Method of measurement of various items of work. Analysis of rates- Introduction to the use of CPWD data book and schedule of rates- conveyance and conveyance statement -	6	10

	Miscellaneous charges.		
II	Preparation of data and analysis of rates for various items of work connected with building construction and other civil engineering structures with reference to Indian Standard Specification.	6	10
FIRST INTERNAL EXAMINATION			
III	Detailed estimate including quantities, abstract and preparation of various items of works- buildings- centerline method and long wall short wall method- sanitary and water supply works- soak pits, septic tanks, overhead tanks, culverts, Retaining walls, road construction. Bar-bending schedule-preparation of bar-bending schedule for RCC works connected with building construction, culverts and minor irrigation works.	18	50
SECOND INTERNAL EXAMINATION			
IV	Valuation - Explanation of terms, types of values, sinking fund, years purchase, Depreciation - Straight line method, constant percentage method, S.F method .Obsolescence. Valuation of real properties-rental method, profit based method, depreciation method. Valuation of landed properties -belting method, development method, hypothecated building scheme method. Rent calculation. Lease and Lease hold property	12	30
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester examination)

Maximum Marks: 100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 10 marks each

Part B - Module III : 2 questions out of 3 questions carrying 25 marks each

Part C - Module IV : 2 questions out of 3 questions carrying 15 marks each

Note : 1. Part A should have at least one question from each module

2. Part B three full questions carrying 25 marks on building estimate, preparation of bending schedule, or estimation of any other structure.

3. Part A and C each question can have a maximum of 2 subdivisions (a, b)

Course Code	Course Name	L-T-P	Credits	Year of Introduction
BT461	Design of Biological Wastewater Treatment Systems	3-0-0	3	2016
Prerequisite : Nil				
Course Objectives				
<ul style="list-style-type: none"> To provide the necessary theoretical background for the design of most common biological waste treatment systems. 				
Syllabus				
Characteristics and <i>impacts of wastewater on</i> the environment, basic design considerations, types of biological treatment processes and reactors, aerobic suspended growth systems, anaerobic digesters, design consideration for upflow anaerobic sludge blanket reactors, biogas production.				
Expected outcome				
A student who successfully completes this course will be able to <ol style="list-style-type: none"> Explain the characteristics of wastewater. Identify different types of reactors for wastewater treatment. Design a completely mixed activated sludge system. Explain the design features of an upflow anaerobic sludge blanket reactor. Explain the factors affecting biogas production. 				
Reference Books				
<ol style="list-style-type: none"> G Karia, R A Christian, <i>Wastewater Treatment: Concepts and Design Approach</i>, 2/e, PHI Learning Pvt., Ltd., 2013. P Venugopala Rao, <i>Textbook of Environmental Engineering</i>, Prentice-Hall of India Pvt. Ltd., 2002. Metcalf & Eddy, <i>Wastewater Engineering: Treatment and Reuse</i>, 4/e, Tata McGraw-Hill Education, 2003. M Narayana Rao, Amal K Datta, <i>Waste Water Treatment: Rational Methods of Design and Industrial Practices</i>, 3/e, Oxford & IBH Publishing Company Pvt. Ltd., New Delhi, R S Khoiyangbam, Navindu Gupta, Sushil Kumar, <i>Biogas Technology: Towards Sustainable Development</i>, The Energy and Resources Institute (TERI), 2011. 				
Course Plan				
Module	Contents	Hours	Sem. Exam Marks	
I	Wastewater-origin, characteristics, <i>impacts of wastewater on</i> the environment, basic design considerations-estimation of wastewater quantities, variation in wastewater flow rates-average daily flow, maximum daily flow, peak hourly flow, minimum daily flow, minimum hourly flow, process flow sheet, reactor considerations.	5	15%	
II	Objectives and fundamentals of biological treatment, types of biological treatment processes, types of reactors used for wastewater treatment process, kinetics of biological treatment systems-batch and continuous systems, biological nitrogen removal, biological phosphorous removal.	5	15%	
FIRST INTERNAL EXAM				

III	Aerobic suspended growth systems-Conventional activated sludge processes and its modifications-theoretical principles, design of completely mixed activated sludge system, F/M ratio, hydraulic loading, MLSS, MLVSS, sludge age, sludge return, calculation of the reactor volume, production and removal of excess sludge, sludge volume index, Solids Retention Time (SRT) or Mean Cell Residence Time, oxygen requirements.	8	15%
IV	Aerobic attached growth system-Trickling filters-theoretical principles, classification, design principles, process design considerations, Oxidation ponds-construction and design considerations, aerobic sludge digestion, waste stabilization ponds, oxidation ditches-theory and design, factors affecting the design, theory and design of rotating biological contactors	8	15%
SECOND INTERNAL EXAM			
V	Fundamentals of anaerobic treatment, types of anaerobic digesters-conventional systems, high-rate systems and combined treatment systems, design of upflow anaerobic sludge blanket reactors, anaerobic sequencing batch reactor, anaerobic filters-upflow and downflow anaerobic filters, sludge treatment and disposal, sludge digestion, sludge drying, sludge conditioning, sludge drying characteristics.	8	20%
VI	Biogas technology-microbiology of biogas production, process parameters for a biogas plant, biogas yield from different substrates, methods to enhance biogas production-effect of heating, insulation and stirring on gas production, basic components of a biogas plant, biogas plant designs-continuous type plants, semi-continuous plants, fixed dome type, floating gasholder digester (KVIC),kinetic models for predicting biogas production, design equations of biogas plants.	8	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3 hours

The question paper consists of Part A, Part B and Part C.

Part A consists of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer two questions (15×2=30 marks).

Part B consists of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer two questions (15×2=30 marks).

Part C consists of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer two questions (20×2=40 marks).

For each question there can be a maximum of 4 subparts.

Course code	Course Name	Credits	Year of Introduction						
**492	PROJECT	6	2016						
Prerequisite : Nil									
Course Objectives <ul style="list-style-type: none"> • To apply engineering knowledge in practical problem solving • To foster innovation in design of products, processes or systems • To develop creative thinking in finding viable solutions to engineering problems 									
Course Plan In depth study of the topic assigned in the light of the preliminary report prepared in the seventh semester Review and finalization of the approach to the problem relating to the assigned topic Preparing a detailed action plan for conducting the investigation, including team work Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed Final development of product/process, testing, results, conclusions and future directions Preparing a paper for Conference presentation/Publication in Journals, if possible Preparing a report in the standard format for being evaluated by the dept. assessment board Final project presentation and viva voce by the assessment board including external expert									
Expected outcome The students will be able to <ul style="list-style-type: none"> iii. Think innovatively on the development of components, products, processes or technologies in the engineering field iv. Apply knowledge gained in solving real life engineering problems 									
Evaluation Maximum Marks : 100 <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">(i) Two progress assessments</td> <td style="width: 50%;">20% by the faculty supervisor(s)</td> </tr> <tr> <td>(ii) Final project report</td> <td>30% by the assessment board</td> </tr> <tr> <td>(iii) Project presentation and viva voce</td> <td>50% by the assessment board</td> </tr> </table> <p><i>Note:</i> All the three evaluations are mandatory for course completion and for awarding the final grade.</p>				(i) Two progress assessments	20% by the faculty supervisor(s)	(ii) Final project report	30% by the assessment board	(iii) Project presentation and viva voce	50% by the assessment board
(i) Two progress assessments	20% by the faculty supervisor(s)								
(ii) Final project report	30% by the assessment board								
(iii) Project presentation and viva voce	50% by the assessment board								