Indira Gandhi University, Meerpur, Rewari
Scheme of Studies and Examination

B.Tech. (Civil Engineering)

7th and 8th Semester

Scheme effective from 2021-22

Course code and definitions:

Course Code	Definitions
L	Lecture
T	Tutorial
P	Practical
BSC	Basic Science Courses
ESC	Engineering Science Courses
HSMC	Humanities and Social Sciences including Management courses
PCC	Professional Core Courses
LC	Laboratory Courses
MC	Mandatory Courses
PT	Practical Training
S	Seminar
TH	Theory
PROJ	Project

General Notes:

1. Mandatory courses are non-credit courses in which students will be required passing marks in internal assessments.
2. Students will be allowed to use non programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
3. Students will be permitted to opt for any elective course run by the department. However, the department shall offer those electives for which they have expertise. The choice of the students for any elective shall not be binding for the department to offer, if the department does not have expertise. To run the elective course a minimum of 1/3rd students of the class should opt for it.

Scheme of Studies and Examination
B.Tech. (Civil Engineering) – 7th Semester
w.e.f. 2021-22

Sr. No.	Category	Course Code	Course Title	Hours per week			Total Contact Hrs. per week	Credit	Examination Schedule (Marks)				Duration of Exam (Hours)
				L	T	P			Internal Assessment	Theory	Practical	Total	
1	Professional Core course	PCC-CE-401	Construction planning and management	3	0	0	3	3	25	75	-	100	3
2	Professional Core course	PCC-CE-403	Advanced steel structure	4	0	0	4	4	25	75	-	100	3
3	Professional Core course	PCC-CE-405	Estimation, Costing and Valuation	3	0	0	3	3	25	75	-	100	3
4	Professional Elective course	*	ElectiveIII **(Refer List-I)**	3	0	0	3	3	25	75	-	100	3
5	Professional Elective course	**	Elective IV**(Refer List-II)**	3	0	0	3	3	25	75	-	100	3
6	Professional Elective course	***	Elective V (**Refer List-III)**	3	0	0	3	3	25	75	-	100	3
7	Open elective course	****	Open elective-I**(Refer List-IV)**	3	0	0	3	3	25	75	-	100	3
8	Practical Training	PT-CE-425	Industrial training viva					-		**Refer Note 1***			-
9	Mandatory courses (non-credit)	MC-317*	Constitution of India	2	0	0	2	-	-		-	-	3
TOTAL								**22**	**175**	**525**	**00**	**700**	

Note:

1. The valuation of Industrial training viva (PT-CE-425)willbebasedonseminar,viva-voce,reportsubmittedbythestudents.Accordingtoperformance,thestudentsareawardedgrades A,B, C, F. Astudentwhois awarded 'F'gradeis required to repeat Industrial training.

   Excellent:A;Good:B; Satisfactory: C; Not Satisfactory: F
2. ***MC-317** is a mandatory non-credit course in which the students will be awarded gradesA, B, C, F as per their performance. A: Excellent, B: Good, C: Satisfactory, F: Not Satisfactory.A student who is awarded 'F' grade is required to repeat course**.**
3. An elective paper will be offered to the students when atleast 15 students will choose that subject and the expertise of the same is available in the Department/Institute.

4. *Choose any one subject from **LIST I.**
5. **Choose any one subject from **LIST II.**
6. ***Choose any one subjectfrom**LIST III.**
7. ****Choose any one subject from **LIST IV.**

ELECTIVE- III (PEC) –LIST I

S.no	Name of course	Code	L-T-P	Credits
1.	Disaster Management and Mitigation	PEC-CEEL – 407	3-0-0	3
2.	Environmental Management	PEC-CEEL - 409	3-0-0	3
3.	Hydro Power Engineering	PEC-CEEL - 411	3-0-0	3

ELECTIVE- IV(PEC) –LIST II

S.no	Name of course	Code	L-T-P	Credits
1.	Design of Hydraulic Structures	PEC-CEEL - 413	3-0-0	3
2.	Watershed Management	PEC-CEEL –415	3-0-0	3
3.	River Engineering	PEC-CEEL –417	3-0-0	3

ELECTIVE- V(PEC) –LIST III

S.no	Name of course	Code	L-T-P	Credits
1.	Railway and Airport Engineering	PEC-CEEL -419	3-0-0	3
2.	Traffic Engineering	PEC-CEEL -421	3-0-0	3
3.	Bridge Engineering	PEC-CEEL -423	3-0-0	3

OPEN ELECTIVE COURSES -I (OEC) – LIST IV

S.no	Code	Name of course	L-T-P	Credits
1	OEC-ME-410	Quality Engineering	3-0-0	3
2	OEC –EE-412	Electrical Power Generation	3-0-0	3
3.	OEC-CE-416	Solid and Hazardous waste management	3-0-0	3
4	OEC-ECE-451	Electronic Principles	3-0-0	3
5	OEC-CSE-430	Computer Communication	3-0-0	3

Indira Gandhi University, Meerpur, Rewari

NEW SCHEME OF STUDIES AND EXAMINATION
B-TECH 4th YEAR (CIVIL ENGINEERING) – 8thSEMESTER
(w.e.f. 2021-22)

Sl. No.	Course Code	Course Title	Teaching Schedule L	T	P	Examination Schedule (Marks) Internal Assessment	Theory	Practical	Total	Credit	Duration of Exam (Hours)
1.	INTPR-CE-402	Industrial Training/Institutional Project	0	0	6	200	0	300	500	10	3
Total						200		300	500	10	

2 Hours per week per batch for one teacher and batch size will be decided by the HOD/Chairperson of the department.

Procedure for Examination and continuous Assessment

(A) External Exam Marks

1. Project Evaluation 100 Marks
2. Project Seminar 100 Marks
3. Project Viva 100 marks

(B) Continuous Assessment Marks

1. Assessment by Internal Examiner and Viva 150 Marks
   (Before the Committee Constituted by Chairman of the Department)
2. Assessment by Industrial Guide/Chairperson 50 Marks

NOTE: It is Optional.A student can earn at most 6 credits during the duration of the 8th semester subject to the passing of at least two MOOC/NPTEL courses (carrying minimum 2/3 credits). The MOOC/NPTEL chosen by the student should not be on offer/scheme of the degree. These credits will be considered in the Final Mark sheet of the students.

Course code	**PCC-CE- 401**				
Category	Professional Core course				
Course title	**Construction Planning and Management**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

At the end of this course, the students should be able:

- To learn the Basic knowledge of construction management, bar/milestone chart,
- To get knowledge of PERT and CPM, CPM (Cost Model).
- To know the construction equipment's and selection of construction equipment's.

Note:

Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit -I

Module 1: Introduction

Project Management, Project Planning, Scheduling, Controlling, Methods of Planning and Programming, Bar Carts and Milestone Charts and Network Methods/Techniques.

Module 2: PERT (Programme evolution and review technique)

Time Estimates, Frequency Distribution, Mean, Variance and Standard Deviation, Probability Distribution, Beta Distribution, Expected Time, Time Computation, Network Analysis and Critical Path.

Unit -II

Module3: CPM (Critical path method)

CPM Networks, Earliest Event Time, Latest Allowable Occurrence Time, Earliest Start time, Earliest Finish Time, Latest Start Time, Latest Finish Time, Float, Critical Activity and Critical Path.

Module 4: CPM (Cost model)

Project Cost, Direct Project Cost, Indirect Project Cost, Total Project Cost and Optimum Duration, Slope of Direct Cost Curve and Steps in Time Cost Optimization.

Unit -III

Module 5: Construction Equipment

Classification of Major Equipment, Earth Excavating Equipment, Earth Cutting and Hauling Equipment, Earth Compacting and Grading Equipment, Concreting Plant and Equipment.

Module 6: Selection of construction equipment

Task Considerations, Cost Considerations, Equipment Engineering Considerations and Equipment Acquisition Options.

Unit -IV

Module 7: CPM (Updating)

Updating Process, Data Required for Updating, Steps in the Process of Updating, When to Update. PPT/BOT Techniques and its variance.

Module8: Resources Allocation

Resource's usage profiles, Histograms, Resources Smoothing, Resources Levelling and Risk associated in construction project Management.

Course Outcomes:

After completing this course, students should be able:

- Proficient enough to apply the concepts of the construction project management with time and cost estimates.
- Different Cost of the Projects with total cost of the Project and selection of construction equipment's

Recommended Book:

1. "Project Planning and Control with CPM/PERT", Dr. B.C. Punmia, Laxmi Publication New Delhi.
2. Construction Project Management", K KCHitkara,Tata McGraw Hills.
3. "Construction Equipments", by Mahesh Verma.
4. Construction Project Management an Integrated Approach", Peter Femings Yes Dec Publishing Pvt. Ltd. Chennai 2011

Course code	**PCC-CE- 403**				
Category	Professional Core course				
Course title	**Advanced Steel Structure**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives

- To impart practical knowledge of advanced steel structures and their application.
- To teach the students advance level design of steel structures.
- To make the students familiar with the relevant IS codes to be used in construction industries.
- To teach the students modern design methods such as design of light gauge steel.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module 1: Eccentric and Moment Connections

Beams-Column Connections, Connections Subjected to Eccentric Shear, Bolted Framed Connections, Bolted Seat Connections, Bolted Bracket Connections. Bolted Moment Connections, Welded Framed Connections, Welded Bracket Connections and Moment Resistant Connections.

Unit-II

Module 2: Industrial Buildings

Loads, general arrangement and stability, design considerations, design of Purlins, design of roof trusses, industrial building frames, bracings and stepped columns.

Module 3: Towers

Transmission line towers, Microwave towers, Design loads, classification, Design and specification.

Unit-III

Module 4: Design of Water Tanks

Types of water tank, permissible stresses, design of circular, rectangular and pressed steel tanks including staging.

Module 5: Design of Steel Stacks

Types of steel stack, various loads consideration of steel stacks, Design of steel stacks including foundation.

Unit-IV

Module 6: Cold Formed Sections

Brief description of various types of cold-formed sections, local buckling, concepts of effective width and effective sections, elements with stiffeners, Design of compression and bending elements.

Course Outcomes

At the end of the course, the students will be able to:

- Apply the IS code of practice for the advanced design of steel structural elements.
- Design complicated structures like plate girder, Industrial structures and tanks.
- Design light gauge structures too.
- Use relevant IS code for above structural design.
- Students will be able to understand the advanced design of steel structure with practical application.

References:

1. Design of steel structures, A.S.Arya&J.L.Ajmani, Nemchand& Bros., Roorkee.
2. Design of steel structures (LSM), N,.Subramanian, Oxford Publication.
3. Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
4. Design of steel structures, S.M.A.Kazmi&S.K.Jindal, Prentice Hall, New Delhi.
5. Design of steel structures, S.K.Duggal, TMH Pub, New Delhi.

Course code	**PCC-CE- 405**				
Category	Professional Core course				
Course title	**Estimation, Costing and Valuation**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	2	**1**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives: The objective of this Course is

- To analyze cost/revenue data and carry out make economic analyses in the decision-making process to justify or reject alternatives/projects on an economic basis.
- Prepare engineering students to obtain professional licensure.
- To function in the business and management side of professional engineering practice.
- To preparation estimate of the civil engineering works.
- To preparation specification of construction items.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

COURSE CONTENT

Unit-I

Module 1: Introduction

Purpose of estimating and valuation, Principle of estimation, unit of measurement, item work, Different kinds of estimates,Different methods of estimation.Introduction to estimates of other Civil engineering structures.

Module 2: Building Estimate

Estimation of quantity of load bearing structure with single room & two rooms,Estimation of quantity single storied residential building. Estimation of materials in multi-storey buildings with different sections of walls, foundation, floors and roofs, reinforced brick work, R.C.C works, finishing works and Lump sum items, Estimates of canals, dams, barrages and other structures.

Unit-II

Module 3: Specification

Objectives and Necessity of specification,Types of specification, General specification, Specification ofdifferent construction materials, Specification as per building classification,Language of specific writing.Specification of Works:Detailed specification for

earthworks, cement, concrete, brickwork, flooring, D.P.C, R.C.C, cement plastering, painting and other finishing.

Module 4:Market Survey

Traditional and modular materials, Market survey of construction materials, Wages of labour, Tool's plant and equipment of construction.

Unit-III

Module 5: Rate Analysis

Prerequisites, factors affecting rate analysis, over head expenses, Procedure for rate analysis: schedule of rates, labour requirement for different works, material requirement for different works, Rate analysis of different Items of work (Earth work, Concrete works, R.C.C works, Reinforce Brick work, plastering, painting, finishing).

Module 6:Abstracting and Billing

Purpose of abstract, preparation of abstract, measurement book, cash book, preparation, examination and payment of bills, first and final bills, administrative sanction, technical sanction. Billing – maintenance of muster roll,record of bills, vouchers and receipt book

Unit-IV

Module 7: Tendersand Contracts

Tender notice and documents, acceptance of tender, Earnest money, security money, retention money, Contract-contractor: terms and conditions of contract, Agreement, Form of Contract, Responsibility of owner, Architect, Contractor and Engineer.Preparation of pay bill, measurement of work for payment of contractors, different types of payment – first &final, running advance and final payment.

Module 8: Valuation

Purpose of valuation, principles of valuation,Types of property, Depreciation, Sinking fund, Lease hold and free hold property, obsolescence, Gross income, Outgoing and Net income, Capitalized value and year's purchase. valuation of a building – cost method, rental – return method.

Course Outcomes:

At the end of the course, students shall be able:

- To understand the methodology of Cost-driven design optimization.
- To get understanding of contract models, contract plans and specifications.
- The students will learn the purpose and importance of valuation

Referenced Books:

1. Dutta BN – Estimating &costing.
2. Chakraborty – Estimate costing &specification in civil engg.
3. Kohli&kohli – Atext book on estimating &costing (Civil) with drawings Ambala ramesh Publications.

Course code	**PEC-CEEL- 407**				
Category	Professional Elective course				
Course title	**Disaster Management and Mitigation**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- To provide basic conceptual understanding of disasters and its relationships with development.
- Provide an understanding of the social nature of natural hazards and disasters
- Increase awareness of hazards and disasters around the world and the unequal social consequences stemming from disaster events.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: Terminology,Global and Indian scenario, role of engineer, importance of study in human life, long term effects of disaster. Geological Mass Movement and land disasters, Atmospheric disasters, Disaster Mitigation

Unit-II

Nature of natural disaster, Flood, Flash flood, drought, cloud burst, Earthquake, Landslides, Avalanches, Volcanic eruptions, Mudflow, Cyclone, Storm, Storm Surge, climate change, global warming, sea level rise, ozone depletion, Man-made Disasters: Chemical, Industrial, Nuclear and Fire Hazards. Role of growing population and subsequent industrialization, urbanization and changing lifestyle of human beings in frequent occurrences of manmade disasters.

Unit -III

Damage profile analysis- Uttarkashi/Bhuj/Latur earthquakes, Kerala floods, cyclone Fani and Amphan, Bihar floods, Covid 19, Forest Related disasters, Mining disasters, Atmospheric disasters.

Unit IV

Importance of public awareness, Preparation and execution of emergency management programme. Scope and responsibilities of National Institute of Disaster Management (NIDM) and National disaster management authority (NDMA) in India. Use of Internet and software for effective disaster management. Applications of GIS, Remote sensing and GPS in this regard.

Course Outcomes:

After completing this course, students should be able:

- To know natural as well as manmade disaster and their extent and possible effects on the economy.

- To Plan national importance structures based upon the previous history.
- To acquaint with government policies, acts and various organizational structures associated with an emergency.
- To know the simple dos and don’ts in such extreme events and act accordingly.

Reference Books:

1. Singhal J.P. Disaster Management, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, Disaster Science and Management, McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011

Course code	**PEC-CEEL- 409**				
Category	Professional Elective course				
Course title	**Environmental Management**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

The course should enable the students to:

- Global environmental issues and their Management.
- Green technologies for cleaner production.
- Major principles and steps required in environmental impact assessment.
- Causes of land degradation, biodiversity loss and methods of their management.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

UNIT-I

Global Environmental Problems: Global warming, green-house effect, ozone depletion, acid rain, oil pollution, radiation hazard and control, global climate change. Main clauses and basic steps for Environmental Management System certification. Environmental Laws/Acts.

UNIT-II

Cleaner Production Technologies Need and benefits, cleaner production techniques and options, zero impact manufacturing initiatives CDM and carbon credits/case studies.

UNIT-III

Environment Impact Assessment: Importance for environment management, constituents of environment impact assessment, project data for EIA study, prediction of impacts, EIA methodologies, constraints in implementation of EIA, impact prediction on water resources projects and other relevant case studies. Environment pollution.

UNIT-IV

Degradation of Land Resources: Deforestation: Forest land, deforestation and its effects onland use and Environmental quality, wetland and their importance in environment, causes and extent of wasteland, Soil degradation problems, erosion, salinization, water logging, land use management & planning.

Course Outcomes:

- An ability to understand the major global environmental issues, their causes, sources, management and laws/polices related to these technologies involved in eco-friendly production and mechanism of carbon credits.
- An ability to understand the major principles of environmental impact assessment.
- An ability to understand the implications of current rules and regulations in relation to environmental impact assessment.
- An ability to understand the causes, implications and management of local environmental issues like land degradation, wasteland and water logging.

Recommended Books:

1. Peavy, Rowe, 'Techobanoglous, Environmental Engg.' Tata McGraw Hill.
2. Mackenzie L. Davis, 'Environmental Engg.' Tata McGraw Hill.
3. Baljeet S. Kapoor; 'Environmental Engg. An overview', Khanna Publishers.
4. Glbert H. Masters, 'Environmental Engineering and Science', Prentice Hall of India Pvt. Ltd.
5. G.N. Panday, G.C. Carney Environmental Engineering, Tata McGraw Hill.
6. P.D. Sharma, Ecology and Environment, Rastogi Publications.

Course code	**PEC-CEEL- 411**				
Category	Professional Elective course				
Course title	**Hydro Power Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives

The objective of this Course is

- To introduce energy systems and renewable energy resources with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.
- To explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources.
- To introduce basicsof turbine and powerhouse.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module 1: Introduction to Energy Sources

Sources of energy, Status of hydropower, thermal vs hydropower, advantages of hydropower, Energy contribution of hydropower in power system.

Module 2: Basics of Hydropower

Electrical load on hydropower, load curves, load factor, capacity factors, utility factors anddiversityfactors, load on hydropower stations, load curves, load duration curves, firm power, secondary power, Prediction of loads.

Unit-II

Module 3: Types of Hydropower Stations

Elements of Hydro power, classification of hydropower stations, run of river plants, General layout of run of river plants, Valley dam plants, storage and pondage.

Module 4: Basic features of Pump Storage Plants

Advantages of pump storage plants, types of pump storage plants, efficiency of pump storage plants, Reversible Turbines.

Unit-III

Module 5: Intakes

Intake structures: functions and their types, Components of intakes: forebay, trash racks, gates and valves, Force required to operate Gates.

Module 6: Water Conveyance System

Classifications of Penstocks, Design criteria of penstocks, anchor blocks, typesof valves, water hammer effects, instantaneous closure of power canal, Surge tank and its classification.

Unit-IV

Module 7: Turbines

Type of turbines, criteria for selection, specific speed of turbines, unit power, unit discharge, cavitation in turbines, Design of the draft tube.

Module 8: Power Houses

General layout and arrangements of hydro-power units, number and size of units, substructure, spacing of units, super-structure, underground power stations.

Course Outcomes:

At the end of the course, students will be able to learn

- Different energy systems and renewable energy resources, with a scientific examination of the energy field and an emphasis on alternative energy sources and their technology and application.
- Explore society's present needs and future energy demands, examine conventional energy sources and systems, including fossil fuels and nuclear energy, and then focus on alternatives, renewable energy sources.
- Basics of turbine and powerhouse.

References:

1. Water power Engineering by Dandekar and Sharma.
2. Hydropower structures Volume III-By R S Varshney.
3. Hydro Power Engineering by DrDarde P N, Vayu Education,Delhi.
4. Hydro-Electric Engineering Practice Vol.I, II& III Brown J.G.
5. Water Power Engineering, Borrows, H.K.
6. Water Power Development, Vol.I& II, Mosonyi,E.
7. Water Power Engineering, M.M.Deshmukh.

Course code	PEC-CEEL - 413				
Category	Professional Elective course				
Course title	**Design of Hydraulic Structures**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- To understand design processes of hydraulic structures
- To further develop understanding on cross drainage works.
- To further develop understanding on design considerations of Dams
- To develop understanding on seepage conditions.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit- I

Module 1: River training works

Objectives and classifications of river training works, Methods of river training Bends and Meandering rivers, marginal embankments, spurs, cutoffs, bank pitching and launching apron. Design consideration of guide banks.

Module 2: Flood Routing

Flood routing categorization and methods,Basic equations in flood routing, Concept of Hydraulic routing, Hydrologic method of flood routing.

Unit II

Module 3: Design of Cross Drainage Works

Need of cross drainage works and their suitability, Canal regulation structures and design of cross drainage works, canal drops, operation and maintenance of canals.

Module 4: Hydraulic structure

Blight creep and Khosla theory, stream lines, critical exit gradient, need of weirs and barrage, Factors controlling the design of weirs and barrages and its components. Design of weirs.

Unit III

Module 5: Design of Spillways

Need of spillway, Design consideration of main spillway, Design of ogee spillway, crest of spillway and stilling basins.

Module 6: Design of Fall

Location and Necessity of falls, componentsofSarda type fall and itsdesign, characteristics of sloping glacis falls.

Unit-IV

Module7:Dams

Planning and investigations of reservoir and dam sites, Choice of dams, preparation and protection of foundation and abutments. Dam construction problems, Forces acting on gravitydams, modes

of failure and design criteria for structural stability of gravity dams, seepage line in a homogenous earth dam, equipotential lines, path lines, kozeny parabola.

Course Outcomes:

After completing this course, students should be able:

1.To identify the design lines of hydraulic structures

2. To being able to read charts for various designing purposes

Reference Books:

- Garg, S. K., "Irrigation Water Power & Water Resources Engg." Standard Publishers & Distributors, Delhi, latest edition
- Modi, P.N. "Irrigation, Water Resources and Water Power Engg." Standard Book House, N. Delhi latest edition
- Arora, K R "Irrigation Water Power & Water Resources Engg." Standard Publishers & Distributors, Delhi, latest edition
- Sharma, S.K., Principles and Practice of Irrigation Engineering, S.Chand& Co., latest edition
- Punmia, B.C., "Irrigation and Water Power Engg." Standard Publishing.

Course code	**PEC-CEEL- 413**				
Category	Professional elective course				
Course title	**Ground Water Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

1. To introduce the student to the principles of Groundwater governing Equations and Characteristics of different aquifers.
2. To understand the techniques of development and management of groundwater.
3. Some real- world example problems are also been incorporated to give an idea about the complexities and challenges encountered during the management of groundwater processes.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module 1: Hydrogeological Parameters

Ground water exploration and methods of investigations, Characteristics of ground water, forms of subsurface water, Global distribution of water, groundwater column, Ground water table fluctuation and its interpretations, Groundwater development and Potential in India, Groundwater balance.

Module 2: Groundwater Management

Database for Groundwater Management, Groundwater budgets, Water bearing formations of Rock and their properties, safe yield, Type of aquifers, Darcy's Law, Aquifer properties.

Unit-II

Module 3: Well Hydraulics

Objectives of Groundwater hydraulics, Governing equation for flow through porous medium - Steady flow, Dupuit assumptions, equilibrium equations for confined and unconfined aquifers, Heim's equilibrium formula.

Module 4: Unsteady State Flow

Governing equation for flow through porous medium - unsteady state flow – Jacob method – Chow method- Recovery test-pumping tests, Conjunctive use – Collector well and Infiltration gallery, well loss coefficient, Partially penetrating wells - Wells in a leaky confined aquifer, interference of wells.

Unit-III

Module 5: Water Withdrawals and Uses– water for energy production, water for agriculture, water for hydroelectric generation; flood control, analysis of surface water supply, open wells in unconsolidated formations, sanitary protection of open wells.

Module 6: Tube well

Tube wells types, site selection, components, strains and its types, design of tube wells in different aquifers, drilling operation and its different methods, Construction and working of tube wells, verticality and alignment, development of tube wells, gravel packing, well sickness, corrosion and failure of tube wells, silting of tube well, optimum capacity of well.

Unit-IV

Module 7:Groundwater Conservation

Reclaimed wastewater recharge, Soil aquifer treatment, Aquifer Storage and Recovery, Seawater Intrusion and Remediation – Ground water Basin management and Conjunctive use, Contamination source inventory and remediation schemes.

Module 8: Artificial Recharge

Artificial recharge of ground water, recharge techniques induced infiltration, water spreading, flooding, basins, ditching, modification of natural channels, irrigation, recharge pits, shafts, Hydraulics of recharge wells.

Course Outcomes: The students will be able to**.**

1. Understand aquifer properties and its dynamics.
2. Get an exposure towards well design and practical problems of groundwater aquifers.
3. To understand the importance of artificial recharge and groundwater quality concepts.
4. Gain knowledge on conservation of groundwater.
5. Understand different tube wells and their components.

Recommended Books:

1. Raghunath H.M., “Ground Water Hydrology”, New Age International (P) Limited, New Delhi, 2010.
2. Todd D.K., “Ground Water Hydrology”, John Wiley and Sons, New York, 2000.
3. S.P. Garg, Groundwater and Tube Wells, Oxford & IBH Publishing Co., 1993.
4. Fitts R Charles, “Groundwater Science”. Elsevier, Academic Press, 2002.

Course code	**PEC-CEEL- 415**				
Category	Professional Elective course				
Course title	**Watershed Management**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- To understand different watershed behaviour.
- To be able to interpret runoff data and quantify erosion by using various modelling methods.
- To understand land use classification and impact of land use changes on hydrological cycle parameters.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction and Basic Concepts: Concept of watershed, need for watershed management, different stakeholders and their relative importance, watershed management policies and decision making. Sustainable integrated watershed management, natural resources management, agricultural practices, integrated farming, Soil erosion and conservation; Principles of soil erosion- causes and types of soil erosion,estimation of soil erosion from small watersheds. Control of soil erosion, methods of soil conservation-structural and non-structural measures.

Unit-II

Integrated Watershed Management: Introduction to integrated approach, Integrated water resources management, conjunctive use of water resources, rainwater harvesting; roof catchment system. Watershed Modeling: Standard modeling approaches and classifications, system concept for watershed modeling, overall description of different hydrologic processes, modeling of rainfall-runoff process, subsurface flows and groundwater flow.

Unit-III

Social Aspects of Watershed Management: Community participation, Private sector participation, Institutional issues, Socio-economy, Integrated development, Water legislation and implementations, Case studies. Use of modern techniques in watershed management: Applications of Geographical Information System and Remote Sensing in Watershed Management, Role of Decision Support System in Watershed Management.

Unit-IV

Storm Water, Flood and Drought Management: Storm water management, design of drainage system, flood routing through channels and reservoir, flood control and reservoir operation, case studies on flood damage. Drought Management: Drought assessment and classification, drought analysis techniques, drought mitigation planning.

Course Outcomes:

At the end of the course, students shall be able:

1. To identify causes of soil erosion.
2. Plan and design of soil conservation measures in a watershed.

3. Plan and design water harvesting and groundwater recharge structures.
4. Plan measures for reclamation of saline soils.

Reference:

1. Murthy, V.V.N. and M.K. Jha Land and Water Management, Kalyani Publishers, 2015
2. Watershed Management by Madan Mohan Das and M.D. Saikia, Prentice Hall of India, 2013
3. Watershed Management Muthy, J. V. S., , New Age International Publishers, 1998

Course code	**PEC-CEEL- 417**				
Category	Professional Elective course				
Course title	**River Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	**0**	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- Acquaint the students to basic concepts of rivers and their significance.
- To stimulate the students to think systematically and objectively about contemporary river problems.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Introduction: classification of streams, sediment transport and budgets, River morphology and various classification schemes. River basins; erosion from river catchments and its transportation by rivers; Regimes of Flow: Ripple and dune regime, anti-dune regime, importance of regimes of flow, Bed Load Transport:Bedload equations.

Unit-II

Behaviour of Rivers: River channel patterns, Straight River channels, causes, characteristicsand shapes of meanders and control, cutoff, Braided Rivers, Bed forms, Instability of rivers, Delta formation and control.

Unit-III

Mechanics of Alluvial Rivers, Rivers and restoration structures, Socio-cultural influences and ethics ofstream restoration. Bio-engineering techniques, Classification review, Natural channel design analysis, Time series, Analysisof flow, Sediment and channel geometry data.

Unit IV

Rivertraining and protection works: Classification of River training, Types of training works, Protection for bridges with reduced waterway, Design of guide bank, Embankment andspurs, other river/flood protection work.

Course Outcomes:

After completing this course, students should be able:

- To realize the significance of river engineering in today life.
- To understand the processes involved in Bio-engineering Techniques.
- To appreciate the role of River Training and Protection Works

Recommended Books:

1. River Behaviour Management and Training (Vol. I & II), CBI&P, New Delhi.
2. Irrigation & Water Power Engineering- B. C. Punmia and Pande B. B. Lal.
3. River Engineering by Margeret Peterson.
4. Principles of River Engineering by (The non-tidel alluvial) PH Jameen.

Course code	**PEC-CEEL- 419**				
Category	Professional elective course				
Course title	**Railway and Airport Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:
At the end of this course, the student should be able:

- To impart understanding about the various types of railways,
- To classify different tunnels and its techniques of excavation.
- To understand airport engineering.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module–1: Development of railways in India, Permanent way and railway track components, different gauges in India, conning of wheels, function and types of rails, rail sections, defects in rails, creep of rails, rail joints and welding of rails, sleepers – types, spacing and density, rail fixtures and fastenings, ballast, sub-grade and embankment.
Module–2: Geometric design of railway track: gradients, grade compensation, speed of trains on curves, super elevation, cant deficiency, negative super elevation, curves, widening on curves.

Unit-II

Module– 3: Railway traction and track resistance, stresses in railway track, rails, sleepers, ballast. Points and crossings-turnouts, switches, crossings. Track junctions- types, splits, diamond, gauntlet, scissorcrossovers.
Module– 4: Railway stations: Requirements, classifications, platforms, loops, sidings. Railway yards – types, required equipments in yards. Signaling and control system – objectives, classification, Interlocking of signals and points.

Unit-III

Module–5: Railway track - construction, drainage, maintenance. Recent developments in railways – high speed trains, modernization in track for high speed, Metro rails, Monorail, automation in operation and control, Safety in railways – accidents and remedial measures.
Module–6: Tunnels- Site selection, Classification, Size and shape of a tunnels, Methods and techniques of underground excavation in tunnels, Alignment of a Tunnel, Mucking, Lighting and Ventilation in tunnel, Drainage of tunnels, Safety in tunnel construction.

Unit-IV

Module–7: Airport Classification on the basic of community size, types of services, Aircraft Characterizes, selection of site and factors affecting site selection of airport, Airport layout plan.
Module–8: Geometric design of Runways, Airport capacity, factors effecting runway capacity, Airport markings and lightings.

Course Outcomes:

After completing this course, students should be able:

- To realize the significance of Railways and tunnels in today life.
- To understand the processes involved in railway and tunnel maintenance.
- To realize the significance of Airports in today life.
- To understand the processes involved design of airports

Recommended Books:

1. Highway Engineering – S.K.Khanna&C.J.Justo, Nemchand& Bros., 7th Edition (2000).
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali&Dr.N.B.Lal – Khanna publishers – (2003).
3. G.V. Rao Airport Engineering, Tata McGraw Hill Pub. Co., New Delhi
4. Airport Engineering Planning and design, Subhash C. Saxena

Course code	**PEC-CEEL- 421**				
Category	Professional elective course				
Course title	**Traffic Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- Acquaint the students to basic concepts of Traffic and their significance.
- To stimulate the students to think systematically and objectively about various traffic problems

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Traffic Characteristics: Importance of traffic characteristics. Road user characteristics. Vehicular characteristics. Max dimensions and weights of vehicles allowed in India. Effects of traffic characteristics on various design elements of the road.

TrafficStudies: Traffic volume study, speed study and origin and destination study. Speed and delay study. Use of photographic techniques in traffic surveys.

Unit-II

Traffic Accidents: Accident surveys. Causes of road accidents and preventive measures, Capacity and Level of Service: Fundamental diagram of traffic flow, Relationship between speed, volume and density, Level of service, PCU, Design service volume, Capacity of non-urban roads. IRC recommendations, Brief review of capacity of urban roads.

Unit-III

Traffic Control Devices: Signs, Signals, markings and islands. Types of signs, Types of signals, Design of Signal, Intersections at grade and grade separated intersections. Types of grades separatedintersections, Parkingsurveys: On street parking, off street parking.

Unit-IV

Road safety audit, RSA team, RSA Report, Elements of RSA, Detrimental effects of traffic. Vehicular air pollution and Situation in India, Motor vehicle act, Vehicular emission norms in India and abroad. Alternate fuels. Factors affecting fuel consumption.

Course Outcomes:

After completing this course, students should be able:

- To realize the significance of traffic engineering in today life.
- To understand the processes involved in traffic studies.
- To appreciate the role of Traffic regulations.

Recommended Books:

1. Principles of Transportation Engineering by Chakroborty& Das, Prentice Hall, India.

2. Highway Engg by S.K.Khanna& C.E.G. Justo, Nem Chand Bros., Roorkee.
3. Traffic Engg and Transport Planning by L.R.Kadiyali, Khanna Publishers, Delhi.
4. Principles of Transportation and Highway Engineering by G.V.Rao, Tata McGraw-HillPublishingCo. Ltd. N.Delhi.

Course code	**PEC-CEEL- 423**				
Category	Professional elective course				
Course title	**Bridge Engineering**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives

- To understand the load-carrying capacity of various types of bridges, upon learning the structural responses to different kinds of loads.
- To design short and medium span bridges, with confidence using existing codes of practice, taking into account of the structural strength, service life and durability.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module 1: Introduction

Component and classification of bridge, Historical bridges (in India and overseas), short history of bridge development, importance of bridge Investigation: Need for investigations, selection of bridge site, preliminary data to be collected, design discharge and its determination, linear waterway, economical span, vertical clearance above HFL, scour depth, choice of bridge type. Site selection-Soil Exploration for site importance of Hydraulic factors in Bridge Design.

Module 2: Planning and layout of bridges

Hydraulic design - Geological and geotechnical considerations, Standard Specifications: For road bridges, I.R.C. loadings and code provisions for standard specifications. Railway bridges, Railway bridge code. General arrangement drawing. Design aids using computer software systems.

Unit-II

Module 3:Concrete bridges

Bridge deck and approach slabs, Slab design methods, Design of bridge deck systems, Slab-beam systems (Guyon-Massonet and Hendry Jaeger methods), Box girder systems- analysis, design and detailing.

Module 4: Steel and composite bridges

Advantages and disadvantages, Orthotropic decks, Box girders, Composite steel-concrete bridges, Truss bridges- analysis and design.

Unit-III

Module 5: Sub-structure

Piers, Columns and towers,Caissons, Abutments and retaining walls, Analysis and design - Shallow and deep foundations

Module 6: Bridge appurtenances

Expansion joints, Design of joints, Types and functions of bearings, Design of elastomeric bearings, Railings, Drainage system and lighting.

Unit-IV

Module 7: Long span bridges

Design principles of continuous box girders, Curved and skew bridges, Cable stayed and suspension bridges, Seismic resistant design, Seismic isolation and damping devices.

Module 8: Construction techniques

Cast in-situ, Prefabricated, Incremental launching, Free cantilever construction, Inspection, Maintenance and rehabilitation, Current design and construction practices.

Course Outcomes:

At the end of the course, the students will be able to:

- Understand the fundamentals and codes of practice of bridge design.
- Design the bridge deck and box girder systems using appropriate method.
- Devise the steel truss and composite steel-concrete bridges.
- Propose the sub-structure components such as pier, abutments and bridge bearings.
- Design the various types of long span bridges, curved and skew bridges.

Referenced Books:

1. Krishna and Raju “Bridge Engineering”.
2. Wai-Fah Chen LianDuan, "Bridge Engineering Handbook", CRC Press, USA, 2000.
3. R.M. Barker and J.A. Puckett, “Design of Highway Bridges”, John Wiley & Sons, New York, 1997.
4. P.P. Xanthakos, "Theory and Design of Bridges", John Wiley & Sons, New York, 1994.
5. D.J. Victor, “Essentials of Bridge Engineering,” Oxford & IBH Publishing, New Delhi, 2001.

Course code	OEC-ME-410				
Category	Open Elective Courses (OEC)				
Course title	**QUALITY ENGINEERING**				
Scheme and Credits	L	T	P	**Credits**	Semester-VII
	3	0	0	3	
Objectives:	To understand the concept of QualityEngineering which emphasizes growth, creativity, and analytical thinking.				
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Section A

Basic Concepts of Quality: Definitions of Quality and its importance in industry, Quality function, Quality Characteristics, Quality process, Quality Traits, Applications of Quality Concept, Introduction to quality control, Computer aided quality control, Total quality control(TQC) and its implementation, Elements of TQC, Quality Circle, Objectives of quality circle, Role of management in quality circle, Quality in service organizations, characteristics of a service organization, Important service dimensions, Design of service quality.

Section B

Basic Statistical Concepts: The Concept of variation, Distinction between variables and attributes data, The frequency distribution, graphical representation of frequency distribution, Quantitative description of distribution, the normal curve, concept of probability, laws of probability, probability distributions, hyper geometric distribution, binomial distribution, The Poisson distribution.

Section C

Quality systems: Quality systems, Need for quality System, Need for standardization, History of ISO:9000 series standards and its features, steps to registration, India and ISO:9000, Automated inspection systems technologies, Different forms of Inspection, Industrial inspection,

Section D

Total Quality Management: IntroductionTQM, Concepts, Characteristics of TQM, Relevance of TQM, Approaches to TQM Implementation, TQM philosophies, Taguchi Philosphy, JIT, Kaizen, Six Sigma approach, 5-S approach

Course Outcomes: Upon completion of this course the student will be able to:

CO1 - Attain the basic techniques of quality improvement, fundamental knowledge of statistics and probability

CO2 - Use control charts to analyze for improving the process quality.

CO3 - Describe different sampling plans

CO4 - Acquire basic knowledge of total quality management

CO5 - Understand the modern quality management techniques

Text Books:

1. Quality planning and Analysis, Juran and Gryna, TMH, New Delhi

2. Quality Management, Kanishka Bed, Oxford University Press, New Delhi
3. Introduction to SQC, Montgomery DC, 3e, Wiley, New Delhi
4. Fundamentals of quality control and improvement, A Mitra, Mcmillan pub. Company, NY

Reference Books:

1. Fundamentals of Applied Statistics, Gupta and Kapoor, Sultan Chand and Sons, New Delhi.

Course code	**OEC-CE- 416**				
Category	Open elective course				
Course title	**Solid and Hazardous Waste Management**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Course Objectives:

- To understand the sources of solid and hazardous wastes.
- To understand methods of solid and hazardous waste disposal.
- To gain knowledge of E-Waste management.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit-I

Module:1 Sources and Composition of Municipal Solid Waste

Introduction, Sources and Types of solid waste, Composition of Solid Waste and its Determination, Properties of Municipal Solid Waste

Module:2 Solid Waste Generation and Collection

Quantities of Solid Waste, Measurements and methods to measure solid waste quantities, Solid waste generation and collection, Factors affecting solid waste generation rate, Quantities of materials recovered from MSW.

Unit-II

Module:3 Handling, Separation and Processing of Solid Waste

Material separation by pick in, screens, float and separator magnets and electromechanical separator and other latest devices at site; Waste handling, separation and processing of solid waste at residence, Commercial and industrial site.

Module:4 Disposal of Municipal Solid Waste

Landfill: Classification, planning, sitting, permitting, landfill processes, landfill design, landfill operation, use of old landfill.

Unit-III

Module:5 Hazardous Waste Management

Identification and classification of hazardous solid waste. The magnitude of the problem; Hazardous waste: Risk assessment, Environmental legislation, Characterization and site assessment.

Module:6 Biological Treatment of Solid and Hazardous Waste

Composting; bioreactors; anaerobic decomposition of solid waste; principles of biodegradation of toxic waste; oxidative and reductive processes.

Unit-IV

Module:7 Radioactive Waste Management

Fundamentals Sources, measures and health effects; nuclear power plants and fuel production; waste generation from nuclear power plants; disposal options.

Module:8 Electronic waste management

E waste- Definition, composition; environmental and human health issues, recovery of metals from E waste, E waste management,

Course Outcomes:

After completing this course, students should be able:

- To realize the significance of solid and hazardous waste management in today life
- To understand the processes involved in solid and hazardous waste management
- To comprehend the techniques for various waste management
- To appreciate the role of common/integrated waste management plants

Suggested Books:

1. Basics of Solid and Hazardous Waste Mgmt. Tech. by KantiL.Shah 1999, Prentice Hall.
2. Solid And Hazardous Waste Management 2007 by S.C.Bhatia Atlantic Publishers & Dist.
3. John Pichtel Waste Management Practices CRC Press, Taylor and Francis Group 2005.

Course code	**OEC-ECE-451**				
Category	**Open Elective Course**				
Course title	**Electronic Principles**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	3	**0**	0	**3**	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	3 Hours				

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Course Objective:

1. Study the basic principles of electronic systems.
2. Understand working of Digital electronics.
3. Understand the working of Display devices.

UNIT 1 SEMICONDUCTOR DIODE: P-N junction and its V-I Characteristics, P-N junction as a rectifier, Switching characteristics of Diode. Diode as a circuit element, the load-line concept, half -wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

UNIT 2 ELECTRONIC DEVICES: LED, Zener Diode as voltage regulator, BJT, UJT, MOSFET, Thyristor, DIAC, TRIAC.

UNIT 3 DISPLAY DEVICES: LED, LCD, Seven Segment, Sixteen Segment.

UNIT 4 DIGITAL ELECTRONICS: Binary, Octal and Hexadecimal number system and conversions, Boolean Algebra, Truth tables of logic gates (AND, OR, NOT) NAND, NOR as universal gates, Difference between combinational circuits and sequential circuits, Introduction to flipflops (S-R & J-K).

TEXT BOOK:

1. 1.Integrated Electronics: Millman&Halkias ;McGrawHill
2. 2.Modren Digital Electronics: R.P. Jain; McGraw-Hill

REFERENCE BOOKS:

1. 1.Electronics Principles: Malvino ;McGrawHill
2. 2.Electronics Circuits: Donald L. Schilling & Charles Belove;McGrawHill
3. 3.Electronics Devices & Circuits: Boylestad&Nashelsky ; Pearson.

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

1. Understand the working of electronic components.
2. Understand the Digital System and various displays.

Coursecode	**OEC-CSE-430**				
Category	Open Elective Course				
Coursetitle	**Computer Communication**				
Scheme and Credits	L	T	P	Credits	
	3	0	0	3	
Class work	25 Marks				
Exam	75 Marks				
Total	100 Marks				
Duration of Exam	03 Hours				

Course Objective:

1. To Build an understanding of the fundamental concepts of computer networking and familiarizing the student with the basic taxonomy and terminology of the computer networking and data communication.
2. To outline various models, topologies and devices of Computer Networks.
3. To explain the functions of various layers in Network Reference Model.
4. To apply different network concepts in various network communication protocols.

Note: Examiner will set nine questions in total. Question one will be compulsory. Question one will have 6 parts of 2.5 marks each from all units and remaining eight questions of 15 marks each to be set by taking two questions from each unit. The students have to attempt five questions in total, first being compulsory and selecting one from each unit.

Unit 1

Introduction to Data Communication: Need, components, Data representations communication model, Characteristics of an effective Communication system, Transmission modes: Simplex, Half Duplex and Full Duplex. Serial and parallel transmission. Unicasting, Multicasting, Broadcasting, Amplitude Modulation (AM), Frequency Modulation (FM), Phase Modulation (PM), Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying,
MULTIPLEXING: FDM, WDM, TDM, packet switching and circuit switching.
Transmission Media: Copper cable, Twisted-Pair Cable, Coaxial Cable, Fiber-Optic Cable. Introduction to Computer Network: applications, benefits and problems, Types of Networks: PAN, LAN, MAN and WAN.

Unit 2

Network Topologies: Introduction to Computer Network Topologies: Mesh Topology, Bus Topology, Star Topology, Ring Topology, Tree Topology, Hybrid Topology, Irregular – Topology.
OSI and TCP/IP Model: Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer

Unit 3

Media Access Control, Random Access: ALOHA, CSMA and CSMA/CD. Controlled Access: Reservation, Polling and Token Passing. Channelization: FDMA, TDMA and CDMA
Ethernet: Features and types of LANs, Types of Ethernets- Thicknet, Thinnet, Fast Ethernet and Gigabit and 10G Ethernet etc. Concept of Carrier Sense Multiple Access (CSMA)/CD in Ethernet,
Network addressing: Physical addressing, logical addressing and port addressing, MAC addressing in Ethernet, IP V4 addressing: concept of subnet, network and host address, IP address Classes- A, B, C, D and E classes. Introduction to classless addressing.

Unit 4

LAN interconnecting devices: Repeater, Hubs, Switches, Bridges, Routers, Gateways.

Internet and E-mail: Concept of Internet, Advantages of Internet, Security issues in using internet. Application of Internet in various fields: Scientific, Business, Research, Sports, Medicine & Health Care, Engineering, Teaching. HTTP and FTP
Email :concept, Protocols: SMTP, POP, IMAP.

Text Book:

1. Andrew S Tanenbaum, Computer Networks, 5th Edition, Pearson publications, 2010.
2. Forouzan, Data Communication and networking ,5th Edition, Tata McGrawHill, 2012.
3. William Stalling, Data & Computer Communication 6th edition, LPE Pearson Education, 2013.

Reference Books:

1. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
2. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2 Edition
3. Computer Networking – ED Tittel, 2002, T.M.H.

Learning Outcomes: By the end of the course the students will be able to:

1. Independently understand basic computer network technology.
2. Understand and explain Data Communications System and its components.
3. Identify the different types of network topologies and protocols.
4. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
5. Identify the different types of network devices and their functions within a network

Course code	**MC-317**				
Category	Mandatory courses (non-credit)				
Course title	**Constitution of India**				
Scheme and Credits	**L**	**T**	**P**	**Credits**	**Semester 7th**
	2	**0**	0	**0**	
Class work	-				
Exam	-				
Total	-				
Duration of Exam	-				

Course Objectives:
Students will be able to:

- Understand the premises informing the twin themes of liberty and freedom from a civil rightsperspective.
- To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional roleand entitlement to civil and economic rights as well as the emergence of nationhood in the earlyyears of Indian nationalism.
- To address the role of socialism in India after the commencement of the Bolshevik Revolution in1917 and its impact on the initial drafting of the Indian Constitution.

*__Note: 1. MC-317__ is a mandatory non-credit course in which the students will be awarded gradesA, B, C, F as per their performance. A: Excellent, B: Good, C: Satisfactory, F: Not Satisfactory. A student who is awarded 'F' grade is required to repeat course**.**

Module– I
Philosophy of Indian Constitution: Salient features of Indian Constitution, Preamble, and Nature ofIndian Constitution, Procedure for amendment of the Constitution.

Module – II
Federal structure and distribution of legislative and financial powers between the Union and the States.

Module – III
Organs of Governance: President – Qualification and Powers of the President,Governor Qualification and Powers of Governor, Parliament: Composition, Qualifications andDisqualifications, Judiciary: Appointment, Tenure and Removal of Judges.

Module – IV
Fundamental Rights: Origin and development of Fundamental rights, Need for fundamental rights, Introduction to Right to equality, Right to freedom, Right against exploitation, Right to freedom ofreligion, Cultural and Education rights and Fundamental duties.

Course Outcomes: Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrivalof Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptutilizationof social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] underthe leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct electionsthrough adult suffrage in the Indian Constitution.

- Discuss the passage of the Hindu Code Bill of 1956.

References:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S.N. Busi, Dr. B.R. Ambedkar framing of Indian Constitution, latest Edition
3. M.P. Jain, Indian Constitution Law, Lexis Nexis, latest edition
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