

(U/S 2(f) and 12B of the UGC Act 1956, NAAC Accredited)



DESH BHAGAT UNIVERSITY, MANDI GOBINDGARH

Faculty of Engineering and Applied Sciences

Department of Civil Engineering

Program: M.Tech Construction Technology and Management

Program Outcomes:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, Simulation tools, modern techniques and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Independently carry out research /investigation and development work to solve practical problems related to Construction Technology and Management.

PO3: Design & Development of solutions: To design and develop a system to meet desired needs within social areas such as economics, environmental, and ethics.

PO4: Conduct investigations of complex problems: To work upon unfamiliar problems through investigative studies and research and contribute to the development of technological knowledge and intellectual property.

PO5: Modern tool Usage: Apply appropriate methodology and modern engineering/IT tools to meet the international standards in the area of Construction Technology and Management.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Acquire integrity and ethics of research to execute projects efficiently.

PO9: Individual and Team Work: Recognize the need for lifelong learning & research independently, with a high level of enthusiasm, commitment and accuracy to improve knowledge and competence continuously

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Observe and examine critically the outcomes of one’s actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

PO12: Life-long learning: Design one system for Civil Engineering efficient system and make project report for its concept to implementation based on Construction Techniques.

Semester 1

Course Code: MTCT- 101

Title of Course: Project Planning and Control

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO 1: Understand and apply the knowledge of management functions like planning, scheduling and controlling to construction projects.

CO 2: Understand and exercise the time cost relationship in practices.

CO 3: Implement the safety aspects during the execution of Civil engineering projects.

CO 4: Plan for equipment’s and material requirements.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO’S	Program Outcome (PO’s)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	W	W	W	M	W	S	S
CO2	S	S	M	S	M	W	W	W	W	W	S	S
CO3	S	M	M	S	S	S	W	W	M	W	W	S
CO4	M	M	M	S	S	W	W	W	W	W	M	M

Course Content:

UNIT-I

Construction Planning: Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control. Pre-tender planning; contract planning; planning and scheduling construction jobs by bar charts; Planning and scheduling construction jobs by critical path network techniques; allocation of resources, Planning and decision making Nature of planning, steps in planning, types of planning, levels of planning- planning process, decision making.

UNIT-II

Work-study, work breakdown structure, Time estimates, Applications of CPM/PERT, statical concepts, Man-Material-Machinery-Money optimization, scheduling, monitoring, updating. Cost functions, cost control, time-cost trade off, resource planning-leveling and allocation. Resources - based networks, crashing, master networks, interface activities and dependencies, line of balancing techniques, application of digital computers, Material management purchases management and inventory control, Human Resource.

UNIT-III

Quality control and safety in construction Quality and safety concerns, organizing for quality And safety, work and material specifications, total quality control, Safety: importance of safety, accident-prone situations at construction site i.e, safety measures for excavation, drilling/blasting, scaffolding/formwork, hoisting & erection demolition and hot bituminous work. Fire Safety: Safety record of construction industry, safety campaign.

UNIT-IV

Supervision, Inspection and Quality Control: Supervisor's responsibilities; keeping records; control of field activities handling disputes and work stoppages; storage and protection of construction materials and equipment; testing and quality control. Purpose of inspection: Inspection of various components of construction; reports and records; statistical quality control.

Recommended Books

1. K.K. Chitkara, 'Construction Project Management: Planning Scheduling and Control', Tata McGraw Hill Publishing Company, New Delhi, **1998**.
2. M. Popescu Calin, Chotchal Charoenngam, 'Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications', Wiley, New York, **1995**.
3. Chris Hendrickson and Tung Au, 'Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders', Prentice Hall Pittsburgh, **2000**.
4. J. Moder, C. Phillips and E. Davis, 'Project Management with CPM, PERT and Precedence Diagramming', Van Nostrand Reinhold Company, 3rdEdn., **1983**.
5. E.M. Willis, 'Scheduling Construction Projects', John Wiley & Sons, **1986**.
6. D.W. Halpin, 'Financial and Cost Concepts for Construction Management', John Wiley & Sons. New York.

E-Book :

<https://www.pdfdrive.com/project-management-planning-and-control-seventh-edition-managing-engineering-construction-and-manufacturing-projects-to-pmi-apm-and-bsi-standards-e189574631.html>

<https://www.pdfdrive.com/project-management-planning-and-control-fifth-edition-managing-engineering-construction-and-manufacturing-projects-to-pmi-apm-and-bsi-standards-e156731464.html>

Online Learning

www.nptel.ac.in

www.swayam.gov.in

Course Code: MTCT - 102

Title of Course Name: Construction Engineering and Management

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Understand the objective and functions of material management and store management.

CO2: Explain introduction and characteristics of management, principle and function of management.

CO3: Describe the concepts of safety in construction.

CO4: Understand the concept of time-cost optimization.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	W	M	S	W	W	W	M	W	M	S
CO2	M	M	W	M	M	W	W	W	W	W	M	S
CO3	M	W	W	M	S	S	W	W	M	W	W	S
CO4	M	M	M	S	M	W	W	W	W	W	M	S

Course Content:**UNIT-I**

General Management: Introduction and characteristics of management, Principle and function of management, Scientific management.

Introduction: Definition, functions and scope of construction management; scientific methods of management; construction team.

UNIT-II

Materials Management: Scope, Objective and functions of material management, Procurement and store management, Materials handling management, Inventory control and management, Disposal of Surplus Materials

UNIT-III

Time-cost Optimization: Direct cost, indirect cost, total cost; purpose, stages and methods of cost control techniques of time cost optimization; examples

UNIT-IV

Site Layout: Principles governing site lay out; factors effecting site lay out; preparation of site lay out. Feasibility study; project reports; progress reports; construction activities.

Recommended Books

1. Mahesh Verma, 'Construction Equipment and its Planning and Application'. (2000)
2. R.L. Peuripo, 'Construction Planning Equipment and Methods', Tata McGraw Hill. (2002)
3. Jagman Singh, 'Heavy Construction Planning Equipment and Methods', Oxford. (2006)

E-Books

<https://www.pdfdrive.com/project-management-for-engineering-and-construction-e17358740.html>
<https://www.pdfdrive.com/project-management-planning-and-control-fifth-edition-managing-engineering-construction-and-manufacturing-projects-to-pmi-apm-and-bsi-standards-e156731464.html>

Online Learning:

www.nptel.ac.in
www.swayam.gov.in

Course Code: MTCT - 103

Title of Course: Concrete Construction Technology

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Understand what safety precautions are necessary when working with concrete.

CO2 : Identify precautions that can be taken at a concrete plant in each area of environmental importance.

CO3: Discuss some approaches being used to reduce the environmental impact of concrete and their applicability.

CO4: Understand some of the changes being made or considered in concrete technology to reduce environmental impacts.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	M	S	S	M	W	M	W	W	S
CO2	M	M	S	M	S	S	S	W	W	W	M	S
CO3	M	M	S	M	S	S	S	W	M	W	M	S
CO4	M	M	S	M	S	S	S	W	W	W	M	S

Course Content:

UNIT-I

Introduction of Concrete materials, Admixtures, Fly Ash, Polymers, Early Age Properties, Strength, Permeability & Durability. Principles of Concrete mix design, Concrete Mix Design procedure by: IS/ACI/British Standards.

UNIT-II

Concreting Operations-Practices and Equipment, batching; Mixing; Transporting; Placing and Compacting; curing. Properties and technique of construction for concrete, Fiber reinforced concrete, light weight concrete, Heavy weight concrete, Foam concrete, High performance Concrete.

UNIT-III

Special concrete operations, shot Crete, grouting, Grunting, under water concreting, hot and cold weather concrete, pumpabale concrete. Construction techniques for reinforced concrete elements-materials, Principles and procedures for beams, slabs, columns, Foundations, walls and tanks, design and fabrication of form work for R.C.C. elements.

UNIT – IV

Pre-stressed concrete Construction-Principle, methods, materials, Tools and equipment for the construction of a pre-stressed bridge.

Inspection and Quality Control of Concrete Construction-Stages, Principles, Checklist, Statistical Controls, procedures.

Recommended Books

1. M.L. Gambhir, 'Concrete Technology', McGraw Hill Education.(1982)
2. Neville and Brooks, 'Concrete Technology', Prentice Hall. (1985)
3. M.S. Shetty, 'Concrete Technology', S.Chand. (1998)

E Book:

<https://www.pdfdrive.com/engineered-concrete-mix-design-and-test-methods-modern-concrete-technology-series-e162111412.html>

<https://www.pdfdrive.com/reinforced-concrete-design-theory-examplespdf-e31308899.html>

Course Code : MTCT -104

Title of Course : Software Laboratory- Project Planning

L	T	P	C
0	0	2	1

Course outcomes: After completion of this course, students will be able to

CO1: learn and understand the Concepts of Software Engineering

CO2 : Learn and understand Software Development Life Cycle

CO3: Take Decision in the Construction Engineering Projects.

CO4: Gain knowledge of Inventory Problems in Construction Engineering and software development.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	S	M	S	S	M	W	M	W	W	S
CO2	M	M	S	M	S	S	S	W	W	W	M	S
CO3	M	M	S	M	S	S	S	W	M	W	M	S
CO4	M	M	S	M	S	S	S	W	W	W	M	S

List of Experiments

1. Planning and Scheduling of Multi storied building
2. Planning and scheduling of Road Project
3. Prepare the resource sheet, assign and level the resource
4. Preparing different reports available in Primavera
5. Plot the variance graphs for the given Project

Course Code: MTCT - 105

Title of Course: Computational Techniques

L	T	P	C
3	1	0	4

Course outcomes: After completion of this course, students will be able to

CO1: Understand the solution of linear simultaneous equations by different methods.

CO2: Analyse the finite difference technique.

CO3: Explain Newmark's implicit and explicit solutions.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	W	W	W	M	W	M	S
CO2	S	S	S	S	M	W	W	W	M	W	M	S
CO3	S	M	M	S	M	W	W	W	M	W	M	S

Course Content:

UNIT-I

Equations: Roots of Algebraic, Transcendental equations, Solution of linear simultaneous Equations by different methods using - Elimination, Inversion, Gauss - Jordan methods. Homogeneous Problems and Eigen Value Problems. Nonlinear Equations, Interpolation.

UNIT-II

Finite Difference Technique: Initial and Boundary Value Problems of Ordinary and Partial Differential equations, Solution of Various types of Plates.

UNIT-III

New Marks Method: Solution of determinate and indeterminate Structures by using New Mark's Procedure. Newmark's Implicit and Explicit Solutions for Non Linear Problems and Convergence Criteria.

UNIT-IV

Statistical Methods: Method of Correlation and Regression Analysis. Initial Value Problems: Galerkin's Method of Least Square, Initial Value problem by Collocation points, Runge Kutta Method.

Recommended Books

1. M.K. Jain, S.R.K. Iyenger and R.K. Jain, 'Numerical Methods for Scientific and Engineering Computations', New age International Publication (P)Ltd. (1999)
2. S.S. Sastry, 'Introductory Numerical Methods', Prentice Hall India Ltd. (2001)

3. Erwin Kreyszig , ‘Advanced Engineering Mathematics’ , John Wiley & Sons,INC (1998)
EBook

<https://www.pdfdrive.com/ma6459-numerical-methods-sce-1-civil-engineering-a-course-material-on-numerical-e40102759.html>

Course Code: MTCT - 106

Title of Course: Environment Engineering and Management

L	T	P	C
3	1	0	4

Course outcomes: After completion of this course, students will be able to

CO1: Understand key current environmental problems.

CO2: Select the most appropriate technique to purify and control the emission of pollutants.

CO3: Understand the basis of Environment Impact Assessment.

CO4: Explain the causes of pollution of land resources.

CO/PO mapping (S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	S	S	S	S	W	S	W	M	S
CO2	M	S	S	S	S	S	S	W	S	W	M	S
CO3	M	M	S	S	S	S	S	W	S	W	M	S
CO4	M	M	S	M	S	S	S	W	S	W	M	S

Course Content :

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: Definition and its 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. Environmentpollution.

UNIT-IV

Degradation of Land Resources: Deforestation: Forest land, deforestation and its effects on land 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.

Recommended Books

1. Peavy, Rowe, 'Techobanoglous, Environmental Engg.', Tata McGraw Hill. (1983)
2. Mackenzie L. Davis, 'Environmental Engg.', Tata McGraw Hill. (1992)
3. Baljeet S. Kapoor; 'Environmental Engg. An overview', Khanna Publishers. (1990)
4. Gilbert H. Masters, 'Environmental Engineering and Science', Prentice Hall of India Pvt. Ltd. (1995)
5. G.N. Panday, G.C. Carney Environmental Engineering, Tata McGraw Hill. (2000)
6. P.D. Sharma, Ecology and Environment, Rastogi Publications. (2002)
7. P.A. Ray, Lcances, 'Environmental Impact Assessment', Hand National Environmental Protection Council, Manile. (2005)

E-Book

<https://www.pdfdrive.com/environmental-pollution-and-control-fourth-edition-e162152292.html>

Course Code: MTCT - 107

Title of Course: Maintenance of Building Structures

L	T	P	C
3	1	0	4

Course outcomes: After completion of this course, students will be able to

CO1: Understand design and economic consideration in maintenance.

CO2: Explain remedial measures for building defects in different building component.

CO3: Understand concepts of maintenance management.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong, M-Medium, W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	S	S	M	W	W	W	S	S
CO2	S	S	S	S	S	S	M	W	W	W	S	S
CO3	M	W	S	M	S	S	S	W	W	W	S	S

Course Content:

UNIT-I

Importance of maintenance, deterioration and durability, factors affecting decision to carryout maintenance, maintenance and GNP, agencies causing deterioration, effect of deterioration agencies on materials. Factors to reduce maintenance at design stage, consideration of maintenance aspects in preparing tender document and specifications, sources of error in design which enhances maintenance, importance of working drawings and schedules, provision of access for maintenance and its importance at design stage. Economic consideration in maintenance: physical life, functional life, economic life of different types of buildings, discounting technique for assessment of economic life.

UNIT-II

Maintenance Management: Definition, organization structure, work force for maintenance, communication needs, building inspections, maintenance budget and estimates, property inspections and reports, specification for maintenance jobs, health and safety in maintenance, quality in maintenance, maintenance manual and their importance, Materials for maintenance and durability, types of materials, maintenance specification and application, criteria for selection, use of commercial available materials in maintenance.

UNIT-III

Investigation and Diagnosis for Repair of Structures: Basic approach to investigations, physical inspection, material tests, non-destructive testing for diagnosis, estimation of actual loads and environmental effects, study of design and construction practices used in original construction, retrospective analysis and repair steps. Maintenance Problems and Root Causes: Classification of defects, need for diagnosis, type of defects in building elements and building materials defect location, symptoms and causes.

UNIT-IV

Remedial Measures for Building Defects: Preventive maintenance and special precautions - considerations, preventive maintenance for floors, joints, wet areas, water supply and sanitary systems, termite control, common repair techniques, common methods of crack repair.

- Repair of existing damp proofing systems in roofs, floors and wet areas.
- Protection, repair and maintenance of RCC elements.
- Repair, maintenance of foundations, basements and DPC
- Repair of finishes.
- Repair of building joints.
- Repair of water supply and sanitary systems, underground and overhead tanks.
- Common strengthening techniques
- Maintenance of Industrial Floors

Maintenance of Multi-storey Buildings: Special features for maintenance of multi-storeyed buildings, including fire protection system, elevators booster pumps, generator sets.

Recommended Books

1. A.C. Panchdari, 'Maintenance of Buildings', New Age International (P) Limited Publishers. (1996)
2. R. Chudley, 'Building Finishes, Fittings and Domestic Services', Longman Technical Services. (1998)
3. G. Szechy, D. SC; 'Foundation Failures', Concrete Publications Limited, 14 Dartmouth Street, London. (1997)
4. Whitney Clark Huntington Probert E. Mickadeit; Building Construction materials and types of construction Allan Hancock College H.J. Eidridge, Common Defects in Buildings, Her Majesty's Stationery Office, London. (1999)
5. W.H. Ransom, 'Building Failures: Diagnosis and Avoidance', New Age Publications (P) Ltd. (1990)
6. Housing Defects Reference Manual, The Building Research Establishment E. & F.N. SPON. (1985)

E-Book

<https://www.pdfdrive.com/building-maintenance-guidebook-e33432511.html>

<https://www.pdfdrive.com/green-building-guidelines-meeting-the-demand-for-low-energy-resource-efficient-homes-e188304040.html>

Course Code: MTCT -108

Title of Course: Composite Materials

L	T	P	C
3	1	0	4

Course outcomes: After completion of this course, students will be able to

CO1: Students will have knowledge of weakness of plain concrete, and understand the latest development in trend in concrete composites

CO2: Students will understand advanced applications of composite materials.

CO3: Students will understand manufacturing and properties of concrete composites such as fibre reinforced concrete, ferrocement, silica fume concrete and polymer concrete

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	M	M	W	S	W	M	S
CO2	S	S	S	S	S	M	M	W	S	W	M	S
CO3	S	S	S	S	S	M	M	W	S	W	S	S

Course Content:

UNIT-I

Fibre Reinforced Concrete: Properties of Constituent Materials, Mix Proportions, Mixing and Casting Procedures, Properties of Freshly mixed FRC, Mechanics and properties of Fibre reinforced concrete, Composite Material approach, Application of fibre reinforced concrete.

Fly Ash Concrete: Classification of Indian Flashes, Properties of Fly ash, Reaction Mechanism, Proportioning of Fly ash concretes, Properties of Fly ash concrete in fresh and hardened state, Durability of fly ash concrete.

UNIT-II

Polymer Concrete: Terminology used in polymer concrete, Properties of constituent materials, Polymer impregnated concrete, Polymer modified concrete, Properties and applications of polymer concrete and polymer impregnated concrete.

Ferro Cement: Constituent materials and their properties, Mechanical properties of ferro cement, Construction techniques and application of ferro cement.

UNIT-III

High Performance Concrete: Materials for high performance concrete, Supplementary cementing materials, Properties and durability of high performance concrete, Introduction to silica fume concrete, Properties and applications of silica fume concrete.

UNIT-IV

Sulphur concrete and sulphur infiltrated concrete: Process technology, Mechanical properties, Durability and applications of sulphur concrete, Sulphur infiltrated concrete, Infiltration techniques, Mechanical properties, Durability and applications of sulphur infiltrated concrete. Light Weight Concrete: Properties of light weight concretes, Pumice concrete, Aerated cement mortars, No fines concrete, Design and applications of light weight concrete.

Recommended Books

1. P.K. Mehta, and P.J.M. Monterio, 'Concrete, its Properties and Microstructure', McGraw-Hill Education. (1997)
2. B.K. Paul, and R.P. Pama, 'Ferrocement by International Ferrocement Information Center', Asian Institute of Technology. (1998)
3. Bentur and Mindess, 'Fibre Reinforced Concrete', CRC Press. (2004)
4. Malhotra and Ramezani pour, 'Fly ash in Concrete', CANMET Natural Resources Canada. (2010)

E-Book

<https://www.pdfdrive.com/composite-materials-e29586293.html>

<https://www.pdfdrive.com/composite-materials-engineering-volume-1-fundamentals-of-composite-materials-e182437865.html>

Course Code: DBSS-101

Title of the Course: Soft Skills-I

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: To groom students to be Resilient and to be better equipped to cope with the unfamiliar circumstances, to manage disappointments and deal with conflicts.

CO2: To enable the students to connect and work with others to achieve a set task.

CO3: The course will train the students to gain Leadership skills and be a Leader who can assess and identify the strengths within the team and utilize the diverse skills of the group to achieve the set objectives

CO4. To cause a basic awareness about the significance of soft skills in professional and interpersonal communications and facilitate an all-round development of personality

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	W	S	M	M	W	M	S	S	M	S
CO2	M	M	M	S	S	M	W	S	S	S	S	S
CO3	M	M	M	M	S	S	M	M	S	S	S	S
CO4	S	M	M	W	S	W	M	M	S	S	S	S

Unit	Course Outlines	Hour(s)
Unit-I	<p>Introduction to Communication Skills in English</p> <p>A) The Importance of Communication and the Process of communication-Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context.</p> <p>B) Everyday Conversations.</p> <p>C) Barriers to Communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional Barriers.</p>	8
Unit-II	<p>Team Work & Leadership Skills</p> <p>A) Broader Meaning of a Leader, Traits of a Leader. A Leader's Commitment to Mission and Vision of an Organisation. Managers versus Leaders.</p> <p>B) Developing Leadership Skills. Addressing Ethics in Leadership Skills.</p>	8
Unit-III	<p>Written English Communication</p> <p>A) Progression of thoughts and ideas.</p> <p>B) Structure of Paragraph and Essay.</p> <p>C) Formal and Informal Letter Writing</p> <p>D) Corporate Communication</p>	8
Unit-IV	Etiquettes & Manners – Social & Business	8

	A) Communication Etiquettes B) Principles of Trust C) Disability Etiquettes D) Gadget Etiquettes	
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Reference Books:

1. Klaus, Peggy (2009).The Hard Truth about Soft Skills. Harper Collins Publishers.
2. Fleming, Kerrie (2016).The Leader’s Guide to Emotional Agility. Pearson Education Limited.
3. Riggio&Sherylle J, Tan (2014). Leader Interpersonal and Influence Skills. Routledge.
4. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.
5. Kumar, Sanjay (2011). Communication Skills. Oxford University Press.
6. Robbins, Stephen.P (2013).Organizational Behaviour. Pearson.
7. Gill, Hasson (2011). Brilliant Communication Skills.Pearson.
8. Ramesh, GopalaSwamy (2013).The Ace of Soft Skills: Attitude, Communication and Etiquette for Success. Pearson.

Course Code: MTCT - 201

Title of Course: Construction Laws and Contract Management

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to:

CO1: Analyse the legal aspects in construction projects

CO2: Explain various laws pertaining to construction projects

CO3: Make informed decisions about contract strategies and procurement methods

CO4: Explain the legislative context of contracts

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	M	W	S	W	W	S	W	S	S
CO2	M	M	M	M	W	S	W	W	S	W	S	S
CO3	M	M	S	M	W	S	W	W	S	W	S	S
CO4	M	M	M	M	W	S	W	W	S	W	S	S

Course Content:

UNIT-I

Indian Contracts Act, Elements of Contracts, Types of Contracts- features- suitability, Design of Contract Documents, International Contract Document, Standard Contract Document, Tort Law.

UNIT-II

Prequalification, Bidding, Accepting, Evaluation of tender from technical, contractual and commercial point of view, contract formation and interpretation, potential contractual problems, world bank procedures and guidelines.

UNIT-III

Insurance and Bonding, Laws Governing sale- purchase and use of urban and rural land, Land Revenue Codes, Tax Laws, Income tax, Sales tax, Excise and Custom duties and their influence on construction costs, Legal requirements for planning, Property Laws agency law, Local Government Laws for Approval, Statutory Regulations.

UNIT-IV

Social Security, Welfare Regulations, Laws related to Wages, Bonus and Industrial disputes, Labour Administration, Insurance and safety regulations, Workmen's compensation Act, Indian Factory Act, Punjab Factory Act, Child Labour Act, other labour laws.

Recommended Books

1. G.T. Gajaria, 'Laws Relating to Building and Engineering Contracts of India'. (2005)
2. Jimmie Hinze, 'Construction Contracts', McGraw Hill, **2001**

EBook:

<https://www.pdfdrive.com/contract-for-design-construction-and-construction-management-services-e21304725.html>

<https://www.pdfdrive.com/construction-contracts-law-and-management-fourth-edition-e10740399.html>

<https://www.pdfdrive.com/construction-contracting-a-practical-guide-to-company-management-e187272590.html>

Course Code: MTCT - 202

Title of Course: Building Cost and Quality Management

L	T	P	C
2	1	0	3

Course outcomes: Upon completion of this course, students will be able to:

CO1: To understand the concept of Quality

CO2: Prepare the estimation of building services

CO3 : Analyse the rates for multi storeyed building works

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	W	M	M	W	M	W	W	S	W	S	S
CO2	M	W	M	S	W	S	W	W	S	W	S	S
CO3	M	W	M	S	W	S	W	W	S	W	S	S

Course Content:

UNIT 1

Estimation of Quantities for Excavation, Earthwork, D.P.C., R.C.C. work, flooring and roofing, plastering, pointing, wood work, white washing etc. for construction works- Buildings, Roads, Bridges etc.

UNIT II

Estimation of Building Services – Plumbing - Water Supply, Electrification, Sanitary Fitting, Mechanical- HVAC etc., and their cost analysis.

UNIT III

Analysis of rates for various building works – Brick work in foundations and Superstructure, P.C.C, R.C. C., Plastering, Flooring, Timber work etc.

UNIT IV

Checking of Construction Quality – Bricks, Cement, Concrete, Aggregates, and Steel as per IS codes.

Recommended Books

1. B.N. Dutta, 'Estimating and Costing'. (2008)
2. G.S. Birdie, 'Estimating and Costing'. (2005)
3. Chakaraborty, 'Estimating and Costing'. (2000)

EBook

<https://www.pdfdrive.com/fundamentals-of-quality-control-and-improvement-e183814569.html>

<https://www.pdfdrive.com/construction-cost-estimating-guide-for-civil-works-e24955981.html>

<https://www.pdfdrive.com/construction-cost-estimating-guide-for-civil-works-e47398307.html>

Course Code: MTCT- 203

Title of Course: Quality assurance and quality control laboratory

L	T	P	C
0	0	2	1

Course Outcomes: After the completion of the course students should be

CO1 : Make use of this knowledge for the organization and formulate the system responsibilities and construction teams

CO2: Implement the standards and preparation of documents in real situation.

CO3: Use all the relevant codes and standards, codes of quality, quality policy, methods in construction industry, based on the above to attain highest level of customer satisfaction in projects.

CO4 : Get Wide knowledge which will help to solve numerous problems on the way and able to take early decisions to achieve the ultimate aim of the organization.

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S	M	M	M	S	S	W	S	M	W	S
CO2	S	S	M	M	M	S	S	W	S	M	W	S
CO3	S	S	M	M	M	S	S	W	S	M	W	S
CO4	S	S	M	M	M	S	S	W	S	M	W	S

List of Experiments

1. CEMENT
 - a) Sampling procedures and sample collections
 - b) Test for cement
2. AGGREGATE
 - a) Sampling Procedures and Sample Collections
 - b) Test for Fine Aggregate(Sand)
 - c) Test for Coarse Aggregate
3. BRICKS
 - a) Sampling Procedures and Sample Collections
 - b) Test for Bricks IS: 1077-1992
4. CONCRETE
 - a) Sampling Procedures and Sample Collections
 - b) Test of Cement Concrete
5. STEEL
 - a) Sampling Procedures and Sample Collection
 - b) Test of Steel for Reinforcement IS: 1786 –2008
6. PIPES
 - a) Sampling Procedures and Sample Collections
7. WATER FOR CONSTRUCTIONPURPOSES
 - a) Sampling of Water
8. BRICK BALLAST IS: 3068-1986 and IS: 3182-1986
9. CHECKS AND TESTS OF FINISHED WORKS

Course Code: MTCT - 204

Title of Course: Construction Costing and Financial Management

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to:

CO1: Understand different components of costing for projects

CO 2 : Understand the concept of funds requirement for a construction

CO 3: Explain the Objectives and Scope of Material Management

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	W	M	W	S	S	W	W	S	W	S	S
CO2	W	W	M	W	S	S	W	W	S	W	S	S
CO3	W	W	M	W	S	M	W	W	M	W	S	S

Course Content :

UNIT 1

Costing of construction Works, different methods of costing, cost elements in a projects, analysis of rates, non-scheduled items of work, cost estimation for a small construction job, purpose, methods and stages of cost control, cost monitoring, cost forecasting methods, variations in individual items of work and their effect on total contract price, valuation of variations.

UNIT II

Determining the funds required for a construction job, preparing cash flow statements; cash inflow and outflow during contract period, Precautions in custody of cash, imprest account and temporary advance; maintenance of temporary advance; and advance account; different types of payment, first, running, advance and final payments.

UNIT III

Objectives and Scope of Material Management classification, Codification, ABC Analysis, Standardization and Substitution, introduction to inventory control, Stores Management, Organization and Lay out, Receipt, Inspection and Issue, care and safety store records and store accounting.

UNIT IV

Meaning and Scope, Financial Statement Analysis, Funds Flow, analyses, capital budgeting.

Recommended Books

1. F.W. Mueller, 'Integrated cost and schedule control for construction projects' (2006)
2. Gobourne, 'Cost control in the construction industry' (2007)
3. Chris Hendrickson and Tung Au, 'Project Management for Construction'. (2002)
4. Datta, 'Material Management Procedures, Text and Cases', Prentice Hall. (2001)
5. P. Gopalakrishnan, M. Sundaresan, 'Material Management. (2005)

EBook

<https://www.pdfdrive.com/a-guide-to-the-project-management-body-of-knowledge-pmbokr-e49899893.html>

<https://www.pdfdrive.com/project-management-body-of-knowledge-pmbok-guide-th5-edition-e5642107.html>

Course Code: MTCT - 205

Title of Course: Project Safety Management

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Relate safety management in different project phases

CO2: Describe the causes and factors of accidents during constructional operation

CO3: Analyse problems areas and understand the importance of safety programs

CO4: Explain the role of supervisor and manager in safety management

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	W	M	S	S	W	W	W	W	S	S
CO2	M	S	M	S	S	S	W	W	M	W	S	S
CO3	M	S	M	S	S	S	W	W	M	W	S	S
CO4	M	M	M	M	S	S	W	W	M	W	S	S

Course Content:

UNIT-I

Safety in construction- Safety Concerns, Importance of Safety, Factors affecting safety: Psychological and Technological, Planning for safety provisions, Safety consideration during construction, demolition and during use of equipment.

UNIT-II

Accidents and their causes, Human factors in construction safety, cost of construction injuries, occupational and safety hazard assessment, legal implications.

UNIT III

Problems areas in construction safety, Elements of an effective safety programs, job site safety assessment, safety meetings, safety campaigns and safety incentives

UNIT IV

Safety culture, safe workers, Safety and first line supervisors, safety and middle managers, top management practices, company activities and safety, safety personal, workers compensations, project coordination and safety procedures.

Recommended Books

1. Tim Howarth and Paul Watson, 'Construction Safety Management', John Wiley & Sons, **2008**.
2. Phil Hughes, Ed Ferrett, 'Introduction to Health and Safety in Construction: The Handbook for Construction Professionals and Students on Neboosh and Other Construction Courses', 3rd Edn, Routledge, **2008**.

EBook

<https://www.pdfdrive.com/construction-project-safety-management-best-practices-handbook-e20588220.html>

<https://www.pdfdrive.com/project-management-planning-and-control-managing-engineering-construction-and-manufacturing-projects-to-pmi-apm-and-bsi-standards-e170290667.html>

Course Code: MTCT - 206

Title of Course: Foundation Design And Construction

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Explain General principle of foundation Design

CO2: Describe Concepts related to Shallow Foundations

CO3: Solve Problem related to Pile Foundations

CO4: Analyse Code of practice for design and construction

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	M	W	W	W	W	S	S
CO2	S	S	S	M	S	M	W	W	M	W	S	S
CO3	S	S	S	S	S	M	W	W	M	W	S	S
CO4	S	S	S	M	M	M	W	W	W	W	S	S

Course Content:

UNIT-I

Shallow Foundation: Design of footing e.g. isolated footing in B.B.C. and steel grillage, combined footings of rectangular, Trapezoid cantilever types. Mat or raft foundation for dry and saturated soil, floating foundations

UNIT-II

Deep Foundation: Design of Piles, Pile caps and pile foundations buildings, design of retaining structures.

UNIT-III

Earth Retaining Structures: Design of retaining walls for dry and saturated back fills with surcharge loads. Retaining walls resting on piles, Design of bridge abutments, Design of sheet piles used for coffer dams, Design of sheeting bracing in excavation trenches, Special Structures

UNIT-IV (12 Hrs.)

Design of foundation for transmission, Design of basement walls, Bridges structures Analysis and Design: Design of walls foundation and caissons of different types, Design of bridge piers resting on piles.

Recommended Books

1. Pillai & Mennon, 'Advanced RCC Design', Tata McGrawHill. 2005
2. P.C. Varghese, 'Limit state Design of Reinforced Concrete', Prentice-Hall of India. 2010
3. N. Krishna, 'Advanced Reinforced Concrete Design', CBS Publisher Publication, **2013**.

E book

<https://www.pdfdrive.com/foundation-design-and-construction-e8246775.html>

<https://www.pdfdrive.com/limit-state-design-of-reinforced-concrete-by-pc-varghese-e40144865.html>

<https://www.pdfdrive.com/limit-states-design-of-concrete-structures-reinforced-with-fedo-e6591251.html>

Course Code : MTCT -207

Title of Course: Rural Construction Technology

L	T	P	C
2	1	0	3

Course outcomes: After the completion of the course students should be

CO1: Awareness related to concepts of Planning and Organizing

CO2: Knowledge about transportation planning and construction for rural area

CO3: Awareness about Rural Sanitation system and designing

CO/PO mapping

(S/M/W indicates strength of correlation)

S- Strong , M-Medium , W- Weak

CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	M	M	M	S	W	S	M	W	S
CO2	S	S	S	M	M	M	S	W	S	M	W	S
CO3	S	S	S	M	M		S	W	S	M	W	S

Course Content:

UNIT 1

Rural Development Planning- Concept of Appropriate Technology, Scope, Development Plans; Various approaches to rural development planning Concept of Appropriate technology; Role of Civil Engineering in Rural Development; Organizational structures & management rural development programmes/projects.

UNIT II

Rural Housing: Low cost construction materials for housing and Roofing Housing designs-architectural considerations for individual and group housing ; composite material-Ferro cement & fly ash, Autoclaved Calcium silicate bricks and soil-stabilized unburnt brick; Plinth protection of Mud Walls; Design Consideration and Construction of: Non-erodible Mud Plaster, water-proof and fire-retardant roof treatment for thatch roofs, Precast stone Masonry Block walling scheme; rat-trap bond for walls; Prefab Brick Panels for roof, Ferro cement flooring /roofing units, Precast R.C. Channel Unit for flooring/roofing scheme, Precast R.C. cored unit for flooring/roofing scheme, Precast R.C. Plank flooring/roofing scheme, L-Pan roofing scheme; Glued Plywood WebBeams anels; manual & Power Scaffold hoist, lifting device for prefab components; solar passive building design; Building economics and management.

UNIT III

Water Supply and Rural Sanitation: Epidemiology sources of standards. Quality, Storage and distribution for rural water supply principles of treatment-Low Cost water treatment technologies; installation operation, and maintenance of Mark-II hand pumps; Conservation of water; Rainwater, Harvesting; Drainage in rural areas, Design of low cost waste disposal systems; Design and constructions of low cost latrines: 2 pit pour flush water seal VIP latrines, septic tank etc.; Biogas technology: Low cost community & individual Garbage disposal systems, Recycling of organic/agricultural wastes: Development of village ponds; Ferro cement water storage tanks & latrines. Cattle shed management; Sewage farming-standards for disposal and use for irrigation. water, BIS & WHO water

UNIT IV

Low Cost Roads and Transport: Low cost pavement materials-testing suitability criteria processing materials; factors affecting pavement thickness & composition of various layers; CRRI Design for rural roads-Traffic Index, strength Index, CBR curve Intermediate Technology & Technology options for specify areas. Labour intensive techniques of road construction Mechanical stabilization; lime stabilization; water bound Macadam Construction; utilization of waste in rural construction one/two coat surface dressing; bitumen premix carpet; low cost improved transport system rural areas.

Recommended Books

1. A.G. Madhov Rao, D.S. Ramachandra Murthy, 'Apprority Technologies for Low Cost Housing', Oxford and IBH Pblishing Co. Pvt.Ltd.
2. CBRI, 'Roorkee Advances in building Materials Construction'.
3. C. Satyanarayan Murthy, 'Design of Minor Irrigation and Canal Structures', Wiley Eastern Ltd.
4. K. Park, 'Preventive and Social Medicine', Banarsi Bhnot.
5. Yash Pal Bedi, 'A Hand Book of Preventive and Soc Medicine', Atama Ram & Sons, Delhi.
6. Document on Rural Road Development in India Volume Central Road Research Institute, NewDelhi.
7. S.B. Watt, 'Ferrocement Water Tanks and their Construction', Intermediate Technology Publications Ltd,London.
8. Ariane Van Bureu, 'A Chinese Biogas Manual', Publications, London.
9. K.C. Khandelwal and S.S. Mahdi, 'Biogas Technology-A Practice Handbook', Volume 1 & 2, Tata McGraw Hil Publishing Com Ltd. NewDelhi.

Online Learning:

www.nptel.ac.in

Course Code: MTCT - 208

Title of Course: Disaster Reduction and Management

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Knowledge about Disaster risk management

CO2: Explain the various steps for disaster preparedness

CO3: Describe the different types of natural and manmade disasters

CO4: Understand the role of different government and non-government organisations for disaster management

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	S	M	S	S	M	W	S	W	S	S
CO2	M	S	S	M	S	S	M	W	M	W	S	S
CO3	W	M	S	M	S	S	M	W	M	W	M	S
CO4	M	M	S	M	S	S	M	W	S	W	S	S

Course Content:

UNIT- I

Disaster Reduction:

Earthquake resistant design of structures, Response spectra and design earthquake parameters, Principles and philosophies, Codal provisions, Factors affecting damage to structures, Enforcement of codal provisions, Strong motion instrumentation and data processing, Effective rescue operation, General planning and design aspects, Conventional earthquake resistant design, Seismic base isolation method, retrofitting, Training and lecturing at various levels, Preparedness to meet earthquake disaster, Programmes for public awareness, demonstrations and exhibitions, Information management (Safety, emergencies, management and planning, design, response, user experience problems and case studies), Proper land use practices, long term disaster preparedness measures. Precautions after a major earthquake, Preparedness for medical supply Emergency care (First aid, Home remedies), Disposal of dead bodies (Human and Cattle) , Care for old and orphans.

UNIT- II

Indirect Damages

Damage due to ground failures, Landslides, rockslides, liquefaction, fire, floods, tsunamis, release of hazardous material like poisonous gas, nuclear radiation.

UNIT- III

Disaster Management

Management cell, Central crisis management core group, damage reconnaissance, Management of relief and rehabilitation (Infrastructure rehabilitation, Housing rehabilitation, Social rehabilitation), Role of volunteers, Emergency operation centres, Information system, Danger zone restrictions, Cooperation with local authority, Coordination for international relief, Role of government, NGO's, Business and donors, Role of remote sensing in relief operations, Information management and related technologies in engineering and disaster management. The design and management of Disaster Information Resource Network, Asian Disaster Preparedness Centre, Regional data base, Contacts and Sources, CD - ROM Library for Natural Disaster Management, Regional Disaster Documentation Centre, Non Governmental Organisations.

Books Recommended:

1. Disaster Mitigation Experiences & Reflections by Pardeep Sahni, Alka Dhameja, and Uma Medury.(2008)
2. Disaster Management Report by Department of Agriculture and Cooperation, Govt. of India(2003)

EBook

<https://www.pdfdrive.com/disaster-risk-reduction-e35440953.html>

Course Code: MTCT - 209

Title of Course: Environmental Impact Assessment

L	T	P	C
2	1	0	3

Course outcomes: After completion of this course, students will be able to

CO1: Knowledge about Environmental Impact Assessment tools and methodologies

CO2: Methodology for the assessment of soil and ground water

CO3: Describe the concept of auditing and documentation of Environmental Impact Assessment

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	W	M	M	S	S	S	S	W	M	W	M	S
CO2	W	M	M	S	S	S	S	W	W	W	W	S
CO3	W	W	M	S	S	S	S	W	M	W	M	S

Course Content:

UNIT – I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

E I A Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – II

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – III

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report.

UNIT-IV

Post Audit activities, The Environmental pollution Act, The water Act, Water Cess Act, The Air (Prevention & Control of pollution Act.), Mota Act, Wild life Act.

Case studies and preparation of Environmental Impact assessment statement for various Industries.

Recommended Books:

- 1.Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, Hyderabad.(2002)
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers (1999)
3. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania & Sons Publication., New Delhi. (2003)

E-Books

<https://www.pdfdrive.com/environmental-impacts-of-wind-energy-projects-e157575062.html>

<https://www.pdfdrive.com/environmental-impact-assessment-environmental-clearances-e13937714.html>

<https://www.pdfdrive.com/handbook-of-environmental-impact-assessment-vol-2-environmental-impact-assessment-in-practice-impact-and-limitations-e183815591.html>

Course Code: DBES-100

Title of the Course: Environmental Studies

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: Articulate the interdisciplinary context of environmental issues.

CO2: Identify and justify key stakeholders in humanities and social sciences that need to be a part of sustainable solutions.

CO3: Formulate an action plan for sustainable alternatives that integrate science, humanist, and social perspectives.

CO4: Students will be able to explain why chemistry is an integral activity for addressing social, economic, and environmental problems.

CO/PO mapping												
(S/M/W indicates strength of correlation) S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	S	W	W	S	M	S	M
CO2	S	S	M	M	S	M	M	W	W	S	M	S
CO3	S	M	S	M	S	W	S	M	S	W	S	S
CO4	S	S	M	W	S	S	W	W	S	M	S	M

Unit	Course Outlines	Hour(s)
1	<p>The Multidisciplinary Nature of Environmental Studies Definition, scope and importance Need for public awareness. Natural Resources Renewable and Non-renewable Resources:</p> <ul style="list-style-type: none"> Natural resources and associated problems. <ul style="list-style-type: none"> (a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. (b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. (c) Mineral resources: Use and exploitation, environmental effects of 	8

	<p>extracting and using mineral resources, case studies.</p> <p>(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, Case studies.</p> <p>(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies.</p> <p>(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.</p> <ul style="list-style-type: none"> • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles. 	
2	<p>Ecosystems</p> <ul style="list-style-type: none"> • Concept of an ecosystem. • Structure and function of an ecosystem. • Producers, consumers and decomposers. • Energy flow in the ecosystem. • Ecological succession. • Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: <p>(a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Unit</p> <p>Biodiversity and Its Conservation</p> <ul style="list-style-type: none"> • Introduction, definition: genetic, species and ecosystem diversity. • Biogeographical classification of India. • Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. • Biodiversity at global, National and local levels. • India as a mega-diversity nation. • Hot-spots of biodiversity. • Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. • Endangered and endemic species of India. • Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity 	10

3	<p>Environmental Pollution</p> <ul style="list-style-type: none"> • Definition • Causes, effects and control measures of <p>(a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards</p> <ul style="list-style-type: none"> • Solid waste management: Causes, effects and control measures of urban and industrial wastes. • Role of an individual in prevention of pollution. • Pollution case studies. • Disaster management: Floods, earthquake, cyclone and landslides. <p>Social Issues and the Environment</p> <ul style="list-style-type: none"> • From unsustainable to sustainable development. • Urban problems related to energy. • Water conservation, rain water harvesting, watershed management. • Resettlement and rehabilitation of people; its problems and concerns. Case studies. • Environmental ethics: Issues and possible solutions. • Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. • Wasteland reclamation. • Consumerism and waste products. • Environment Protection Act. • Air (Prevention and Control of Pollution) Act. • Water (Prevention and Control of Pollution) Act. • Wildlife Protection Act. • Forest Conservation Act. • Issues involved in enforcement of environmental legislation. • Public awareness. Common UGC Syllabus for Environmental Studies <p>xiii</p>	12
4	<p>Human Population and the Environment</p> <ul style="list-style-type: none"> • Population growth, variation among nations. • Population explosion—Family Welfare Programme. • Environment and human health. • Human rights. • Value education. • HIV/AIDS. • Women and Child Welfare. • Role of Information Technology in environment and human health. • Case Studies. <p>Field Work</p> <ul style="list-style-type: none"> • Visit to a local area to document environmental assets—river/forest/grassland/hill/mountain. • Visit to a local polluted site—Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds. 	15

	<ul style="list-style-type: none"> • Study of simple ecosystems—pond, river, hill slopes, etc. • (Field work equal to 5 lecture hours) 	
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Total -45

Recommended Books

1. “ Environmental Science” by Miller T G.
2. “ Introduction to Environmental Engineering and Science” by Gilbert M Masters.
3. “ The Biodiversity of India” by Bharucha Erach.
4. “ Essentials of Ecology” by Townsend C and Michael Begon.
5. <https://nptel.ac.in/courses/122102006/>
6. https://swayam.gov.in/nd2_cec19_bt03/preview
7. <https://www.pdfdrive.com/environmental-science-e12033451.html>

Course Code: MTCT -301

Title of Course: Research Methodology

L	T	P	C
4	0	0	4

Course Outcomes:

CO1: Able to select and define appropriate research problem and Parameters.

CO2: Able to select the data from different methods.

CO3: Able to organize and conduct research in a more appropriate manner.

CO4: Able to understand and apply statistical.

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	M	M	S	M	M	M	W	W	M	S	M
CO2	S	S	S	S	M	M	M	W	W	M	S	M
CO3	S	S	M	S	M	M	M	W	W	M	S	M
CO4	S	S	M	S	S	M	M	W	W	M	S	M

Course Content:

UNIT I

Motivation and objectives – Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis

UNIT II

Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables. Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT,SPSS for student t-test, ANOVA, etc.), hypothesis testing.

UNIT III

Meaning of Interpretation, Technique of Interpretation, Precaution in Interpretation, Significance of Report Writing, Different Steps in Writing Report, Layout of the Research Report, Reports, Oral Presentation, Mechanics of Writing a Research Report, Precautions for Writing Research Reports, Conclusions.

UNIT IV

Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Engineering, Impact factor of Journals, When and where to publish. Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism

Recommended Books:

1. R.I. Levin and D.S. Rubin, 'Statistics for Management', 7th Edn., Pearson Education New Delhi.
2. N.K. Malhotra, 'Marketing Research–An Applied Orientation', 4th Edn., Pearson Education New Delhi.
3. Donald Cooper, 'Business Research Methods', Tata McGraw Hill, NewDelhi.
4. Sadhu Singh, 'Research Methodology in Social Sciences', HimalayaPublishers.
5. Darren George & Paul Mallery, 'SPSS for Windows Step by Step', Pearson Education NewDelhi.
6. C.R. Kothari, 'Research Methodology Methods & Techniques', 2nd Edn., New Age InternationalPublishers.
7. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th Edition, by John W. Creswell.

E-Books and online learning material

1. <https://www.pdfdrive.com/>
2. modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf
3. <https://www.free-ebooks.net/>
4. <http://e-library.net/free-ebook.htm>

Course Code: MTCT- 302

Title of Course: Seminar

L	T	P	C
0	0	4	2

Course Outcomes:

CO1: Defines the subject and determines the contents

CO2: carry out academic and scientific research in related fields, using quantitative methods

CO3: develop problem-solving skills

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	S	M	W	M	W	S	S
CO2	S	S	S	S	S	S	S	W	M	W	S	S
CO3	S	S	S	S	S	S	M	W	M	W	S	S

Course Content :

This is open-ended course where under the overall supervision of a faculty member of his discipline. Each student must submit a seminar report as a culmination of his Endeavour and investigation. The course will aim to evaluate student's actual ability to use the fundamentals of knowledge and to meet new unknown situations as demonstrated by the students' interaction with the teachers

Course Code: MTCT - 303

Title of Course: Project

L	T	P	C
0	0	12	6

Course Outcomes:

CO1: Use statistical techniques to model and solve real-life problems

CO2: Relates the causes and outcomes of the subject

CO3: Analyse the results of a research

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	S	S	M	W	M	W	S	S
CO2	S	S	S	S	S	S	S	W	M	W	S	S
CO3	S	S	S	S	S	S	M	W	M	W	S	S

Projects Description

- 1. Lab Oriented Projects:** These include projects involving Laboratory investigation or Laboratory development in the students' discipline or interdisciplinary areas. It must co-terminate with a project report.
- 2. Study Oriented Projects:** These include projects which are oriented towards readings from published literature or books about new frontiers of development or analysis of available data base. It must co-terminate with a project report.
- 3. Computer Oriented Projects:** These are intended to impart practical training to students in the areas of computer software and hardware. The projects would be student-oriented, individually supervised by a project guide. It must co-terminate with a project report.
- 4. Projects on Organizational Aspects:** These involve projects related to thrust areas where students are expected to get involved with planning, organization, and execution of new ideas and concepts. It must co-terminate with a project report.

Course Code: MTCT -304

Title of Course: Advanced structure design and detailing

L	T	P	C
3	1	0	4

Course Outcomes: After completion of the course, students should be able to:

CO1: Knowledge about structural systems

CO2 : Determine the loads and design frames of structures

CO3: Design aspects related to lateral loading systems of structures

CO/PO Mapping (S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
Cos	Programme Outcomes (Pos)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	S	M	S	M	W	S	W	S	S
CO2	S	S	S	S	M	S	M	W	S	W	S	S
CO3	S	S	S	S	M	S	M	W	S	W	S	S

Course Content:

UNIT I

Introduction to limit state method of design, provisions in the Indian standard codes for loading wind loads and seismic loads, design and detailing of concrete structures.

UNIT II

BIS Handbook for design, Examples of design using handbook.

Design of Structures as per I.S. 1893 for Earthquake Resistant Design Construction

UNIT III

Design and Detailing Requirements as per 4326-1993.

Design and Detailing of Earthen Buildings as per 13827-1993.

Design and Detailing of Masonry Structures as per I.S. 13828-1993

UNIT IV

Design and Ductile Detailing of R.C.C. Structures as per I.S. 13920-1993

Repair and Seismic Strengthening of Buildings as per I.S. 13935-1993.

Recommended Books

1. P. Dayaratnam, 'Reinforced Concrete Structure' (1992)
2. A. K. Jain, 'Reinforced Concrete, Limit State Method of Design'. (1999)
3. B.C. Punmia, 'Reinforced Concrete Structures', Vol II (1998)
4. Jain and Jai Krishna, 'Plain and Reinforced Concrete' Vol II. (2002)
5. P. Dayaratnam, 'Design of Steel Structures' (2004)
6. S.K. Duggal, 'Design of Steel Structures' (1989)
7. B.I.S. Codes 1893, 4326, 13827, 13828, 13920, 13935

EBook

<https://www.pdfdrive.com/handbook-of-structural-steel-connection-design-and-details-e158139633.html>

Course Code: MTCT - 305

Title of Course: Pavement Design, Construction and Maintenance

L	T	P	C
3	1	0	4

Course outcomes: Upon completion of the course, students will be able to:

CO1: Explain the functions of different pavement components and design of flexible and rigid pavement

CO2 : Knowledge about designing of pavement for different modes of transportation

CO3 : Understand design methodologies of different types of pavements

CO4: Understand the cause of failure of pavements and their remedial measures

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	S	M	W	W	M	W	S	S
CO2	S	M	S	S	S	M	W	W	M	W	S	S
CO3	S	M	S	S	S	M	W	W	M	W	S	S
CO4	S	S	S	S	S	S	M	W	M	W	M	S

Course Content:

UNIT I

Types of pavement structure. Functions of pavement components, Factors affecting pavement design. Design wheel load, Strength characteristics of pavement materials. General design considerations, Methods for design of flexible pavements; Group Index method, California Bearing Ratio (CBR) method, California Resistance Value method, Triaxial Test method, Burmister method, McLeod's method.

UNIT II

General design considerations, Methods for design of rigid pavements; Westergard's method, F.A.A. method, IRC recommendations for design of concrete pavements, method, Types of joints and their design in cement concrete pavements. Thickness design for Airport pavement, LCN system of pavement design, design of airport pavement overlays.

UNIT III

Types of highway construction and their selection, materials for construction, construction procedure of different highways: Earth roads, Gravel roads, WBM roads, bituminous pavements, cement concrete pavements, low cost roads, introduction to various equipment used for highway construction.

UNIT IV

Need for highway maintenance, Pavement failures their causes and remedial measures, Typical flexible and rigid pavement failures, Types of highway maintenance: Routine, periodic and special type, materials used for maintenance of different pavements, Strengthening of existing pavements, Maintenance management system.

Recommended Books

1. E.J. Yoder, 'Principals of Pavement Design'. (1990)
2. Khanna and Justo, 'Highway Engineering'. (1983)
3. S.K. Sharma, 'Principles, Practice and Design of Highway Engineering'. (2001)
4. M.G.L., 'Handbook of Road Technology'. (1995)
5. Yang and Huang, 'Pavement Analysis and Design'. (1990)
6. D. Croney and P. Croney, 'The Design and Performance of Road Pavements'. (1993)
7. Horenjeff, 'Planning and Design of Airports'. (2002)

Ebook

<https://www.pdfdrive.com/pavement-design-a-guide-to-the-structural-design-of-road-pavements-e58122325.html>

<https://www.pdfdrive.com/highway-engineering-pavements-materials-and-control-of-quality-e175918849.html>

Course Code: DBSS-102

Title of the Course: Soft Skills-II

L	T	P	Credits
1	0	2	2

Course Outcomes:

CO1: The course will skill the student to learn Effective Communication, writing skills in English and Listening Skills.

CO2: to address various challenges of communication as well as behavioral skills faced by individual at work place and organizations.

CO3: This course will help the student gain Emotional maturity and Emotional health.

CO4: to enhance the employability of the students.

CO/PO Mapping												
(S/M/W indicates strength of correlation) S – Strong, M – Medium, W – Weak												
COs	Programme Outcomes (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	M	W	S	M	M	W	M	S	S	M
CO2	M	S	M	M	S	S	M	W	S	S	S	S
CO3	M	M	M	M	M	S	S	M	M	S	S	S
CO4	S	S	M	S	W	S	W	M	M	S	S	S

Unit	Course Outlines	Hour(s)
Unit-I	<p>Introduction to Non-verbal Communication Skills in English</p> <p>A) Non- Verbal Communication and Body Language. Basic Elements of Body Language, Kinesics.</p> <p>B) Basic Listening Skills: Becoming an Active Listener</p> <p>C) Basic Writing Skills: Fundamentals of Grammar, Letter Writing & Paragraph Writing</p>	6
Unit-II	<p>Management Skills</p> <p>A) Time Management – Program Evaluation Review Technique (PERT), The Pareto Principle, The Law of the Three, The Important Versus the Urgent.</p> <p>B) Anger Management – What is Anger, Effects of Anger, Types of Anger, 1-2-3 Turtle Rule, Anger Management.</p> <p>C) Stress Management- Signs & Symptoms, Sources of Stress, Practicing the 4 A's.</p> <p>D)</p>	6
Unit-III	<p>Social & Organisational Well-Being</p> <p>A) Emotional Intelligence- Traits, Self-Awareness, Self-Regulation, Motivation, Empathy, EQ vs. IQ, Spiritual Intelligence, Whole Brain Training (IQ+EQ+SQ= 3Q).</p> <p>B) Business Dress and Dining Etiquette – Why a Dress Code, Business and Casual Dress Code, Table Manners.</p> <p>C) Netiquette- What is Netiquette, Why Netiquette, Netiquette Norms,</p>	10

	E-Mail Etiquette.	
Unit-IV	Interview Skills, Presentation Skills & Group Discussion A)Curriculum Vitae and Resume Writing, Do's and Don'ts of an Interview B) Planning and Structuring your Presentation. Techniques of Delivering a Presentation like a Pro. C) Group Discussion- Do's & Don'ts of a GD. How to Ace a GD.	10

Total-32

Reference Books:

1. Klaus, Peggy (2009).The Hard Truth about Soft Skills. Harper Collins Publishers.
2. Fleming, Kerrie (2016).The Leader's Guide to Emotional Agility. Pearson Education Limited.
3. Butterfield, Jeff (2010).Problem Solving& Decision Making, Course Technology.Cengage Learning.
4. Pellerin, Charles. J. (2009). How NASA Builds Teams: Mission Critical Soft Skills for Scientists, Engineers, and Project Teams. John Wiley & Sons. Inc.
5. Riggio&Sherylle J, Tan (2014). Leader Interpersonal and Influence Skills. Routledge.
6. Rutherford, J. Andrea (2000). Basic Communication Skills for Technology. Pearson Education.

Course Code: MTCT- 401

Title of Course: Dissertation

L	T	P	C
0	0	32	16

Course outcomes:

CO1: plan, and engage in, an independent and sustained critical investigation and evaluation of a research area

CO2: understand and apply ethical standards of conduct in the collection and evaluation of data and other resources

CO3: communicate research concepts and contexts clearly and effectively both in writing and orally

CO/PO mapping												
(S/M/W indicates strength of correlation)												
S- Strong , M-Medium , W- Weak												
CO'S	Program Outcome (PO's)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	M	S	S	S	M	W	W	M	W	S	S
CO2	S	M	S	S	S	M	W	W	M	W	S	S
CO3	S	M	S	S	S	M	W	W	M	W	S	S

Course Content:

- (a) A student enrolled for M.Tech. degree shall have to work on a Dissertation. The Dissertation work involves in-depth study and critical review of the topic and the creation of new knowledge in the area either through development of new techniques, instruments, experimental facility and new experimental findings and/or theoretical and fundamental insight or by reinterpretation of the existing facts to propound new theory.
- (b) A PG student shall normally carry out his dissertation in the Institute. However, he may be allowed to carry it out in other organizations provided he/she has completed all courses except dissertation.

Unfair means and Plagiarism

- (a) In case a student is found lifting of some other's work(s) and inserting it in his/her project, seminar and dissertation etc. without proper acknowledgement, credit and reference or plagiarizing the dissertation /project report etc., such penal action shall be taken by the Institute as may be necessary to up hold the sanctity, integrity and the credibility of the Institute.

All the students are required to follow the PG Ordinances & Regulations of the Institute