

Maulana Abul Kalam Azad University of Technology, West Bengal
(Formerly West Bengal University of Technology)
Syllabus for B. Tech in Civil & Environmental Engineering
(Applicable from the academic session 2023-2024)

SEMESTER VI

PRINCIPLES OF MANAGEMENT

CODE: HU601

CONTACT: 2L

CREDITS: 2

Module-I

1. Basic concepts of management: Definition – Essence, Functions, Roles, Level.
2. Functions of Management: Planning – Concept, Nature, Types, Analysis, Management by objectives; Organisation Structure – Concept, Structure, Principles, Centralization, Decentralization, Span of Management; Organisational Effectiveness.

Module-II

3. Management and Society – Concept, External Environment, CSR, Corporate Governance, Ethical Standards.
4. People Management – Overview, Job design, Recruitment & Selection, Training & Development, Stress Management.
5. Managerial Competencies – Communication, Motivation, Team Effectiveness, Conflict Management, Creativity, Entrepreneurship.

Module-III

6. Leadership: Concept, Nature, Styles.
7. Decision making: Concept, Nature, Process, Tools & techniques.
8. Economic, Financial & Quantitative Analysis – Production, Markets, National Income Accounting, Financial Function & Goals, Financial Statement & Ratio Analysis, Quantitative Methods – Statistical Interference, Forecasting, Regression Analysis, Statistical Quality Control.

Module-IV

9. Customer Management – Market Planning & Research, Marketing Mix, Advertising & Brand Management.
10. Operations & Technology Management – Production & Operations Management, Logistics & Supply Chain Management, TQM, Kaizen & Six Sigma, MIS.

Readings:

1. Principles of Management – Premvir Kapoor, Khanna Publishing House, 2018.
2. Management: Principles, Processes & Practices – Bhat, A & Kumar, A (OUP).
3. Essentials for Management – Koontz, Revised edition, Tata McGraw Hill (TMH)
4. Management – Stoner, James A. F. (Pearson)
4. Management - Ghuman, Tata McGraw Hill(TMH)

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MICROBIAL TECHNOLOGY & FOOD BIOTECHNOLOGY

CODE: FT 604

CONTRACTS: 3L

CREDITS: 3

Module I (10L):

Methods for the microbiological examination of water and foods; Control of Microbiological quality and safety; Food borne illnesses and diseases

Module II (10L):

Microbial cultures for food fermentation, their maintenance, strain development; Production of organic acids (vinegar, lactic acid), alcoholic beverages (beer, wine, and distilled alcoholic beverages such as whiskey, rum, vodka), glycerol

Module III (10L):

Propagation of baker's yeasts; Microbial production of vitamins (B2 and B12), antibiotics (penicillin, streptomycin, tetracycline); Enzymatic production of glucose, fructose, starch, SCP and mushrooms

Module IV (10L):

Basics of microbial genetics – Gene, DNA, RNA; Replication, transcription, transformation, transduction, conjugation; Regulation of gene expression; Application in GM foods.

Revision: 5L

Books:

1. Industrial Microbiology Prescott & Dunn, CBS Publishers
2. Modern Food Microbiology by Jay JM, CBS Publishers
3. Comprehensive Biotechnology by Murray & Mooyoung, Academic press
4. Industrial Microbiology by Casida L.R., New Age International Pvt. Ltd.
5. Food Microbiology; Frazier WC; 4th ed, Tata-McGrawhill Pub.
6. Microbiology by Pelczar, Chan, and Krieg, TMH
7. Fermentation Biotechnology, Principles, Processed Products by Ward OP, Open University Press.

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DESIGN OF STEEL STRUCTURE

CODE: CE602

CONTACT: 3L

CREDITS: 3

Details of Course Content

1 Materials and Specification :-Rolled steel section, types of structural steel , specifications 2L

2 Structure connections: Riveted, welded and bolted including High strength friction grip bolted joints.

i) types of riveted & bolted joints, assumptions, failure of joints ,efficiency of joints, design of bolted ,riveted & welded joints for axial load.

ii) Eccentric connection:- Riveted & bolted joints subjected to torsion & shear, tension & shear, design of riveted, bolted & welded connection. 8L

3 Tension members: Design of tension members, I.S code provisions. Permissible stresses, Design rules, Examples. 3L

4 Compression members: Effective lengths about major & minor principal axes, I.S code provisions. Permissible stresses, Design rules, Design of one component, two components and built up compression members under axial load. Examples. Built up columns under eccentric loading: Design of lacing and batten plates, Different types of Column Bases- Slab Base, Gusseted Base, Connection details 8L

5 Beams: Permissible stresses in bending, compression and tension. Design of rolled steel sections, plated beams. simple Beam end connections, beam -Column connections. I.S code provisions 4L

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6 Plate girders: Design of webs & flanges, Concepts of curtailment of flanges – Riveted & welded web stiffeners, web flange splices - Riveted, welded& bolted. 6L

7 Gantry Girder: Design gantry girder considering lateral buckling – I.S code provisions. 5L

Text & References:

- 1 Design of Steel structures N. Subramanian Oxford University Press
- 2 Design Of Steel Structures - S.K.Duggal Tata Mc-Graw Hill , New Delhi New Delhi
- 3 Design of steel structures A.S.Arya and J.L.Ajmani Nemchand& Bros.,
- 4 Design of steel structures, Vol. I & II Ramachandra
- 5 Design of steel structures PasalaDayaratnam – A.H.Wheeler& Co Ltd. 1990
- 6 Design of steel structures B.S.Krishnamachar and D.AjithaSinha –Tata McGraw – Hill publishing Co.Delhi.
- 7 Design of steel structures Ramamurtham
- 8 IS 800 – 2007(Latest Revised code) Bureau of Indian Standard
- 9 S.P.: 6(1) – 1964 Structural Steel Sections Bureau of Indian Standard

CONSTRUCTION PLANNING & MANAGEMENT

CODE: CE 603

CONTACT: 3L

CREDITS: 3

1 **Planning:** General consideration, Definition of aspect, prospect, roominess, grouping, circulation privacy, acclusion 2L

2 **Regulation and Bye laws :** Bye Laws in respect of side space, Back and front space, Covered areas, height of building etc., Lavatory blocks , ventilation, Requirements for stairs, lifts in public assembly building, offices 4L

3 **Fire Protection:** Fire fighting arrangements in public assembly buildings, planning , offices, Auditorium 2L

4 **Construction plants & Equipment:** Plants & equipment for earth moving, road constructions, excavators, dozers, scrapers, spreaders, rollers, their uses. Plants &Equipment for concrete construction: Batching plants, Ready Mix Concrete, concrete mixers, Vibrators etc., quality control 8L

5 Planning &Scheduling of constructions Projects:

Planning by CPM &PERT,Preparation of network, Determination of slacks or floats. Critical activities. Critical path, project duration .expected mean time, probability of completion of project, Estimation of critical path, problems. 8L

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6 Management: Professional practice, Definition, Rights and responsibilities of owner, engineer, Contractors, types of contract 4L

7 Departmental Procedures: Administration, Technical and financial sanction, operation of PWD, Tenders and its notification, EMD and SD, Acceptance of tenders, Arbitration 8L

*** Serial 1, 2, 3 are as per National Building Code**

Text & References:

1 Construction Engineering & management, S.V. Deodhar & S.C. Sharma, Khanna Publishing House. (AICTE Recommended – 2018).

2 Construction Planning, Equipments and methods Puerifoy, R.L. McGraw Hill.

3 Management in construction industry P.P.Dharwadkar Oxford and IBH Publishing company New Delhi

4 Construction Management, Critical path Methods in Construction, J.O.Brien Wiley Interscience

5 PERT and CPM L.S. Srinath

6 Project planning and control with PERT and CPM' Construction equipments and its management B.C.Punmia and K.K.Kandelwal S.C.Sharma

7 National Building code BIS

PROFESSIONAL ELECTIVE - I

SOLID & HAZZARDS WASTE TREATMENT

CODE: CVE 601 A

CONTACTS: 3L

CREDITS: 3

Objective of the course: Be familiar with Solid and Hazardous wastes for both national and intl. scenarios and their treatment and management methods

Pre-requisite: Basic Environmental Engineering

Module 1 Definition of Hazardous wastes, National and Intl laws and regs
“Cradle to grave” concept, technology financial constraints,
Indian Scenario [10L]

Module 2 Definition of solid wastes, landfill design, leachate problems
[9L]

Module 3 Biological Treatment of solid and Haz wastes[10L]

Module 4 Physico-chemical treatment of solid and Haz wastes[8L]

Module 5 Innovative Technologies for solid and hazardous wastes[8]

Text & References:

O.P. Gupta, Solid Waste Hazardous Management, Khanna Publishing House (AICTE Recommended – 2018)

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INDUSTRIAL WASTE TREATMENT

CODE: CVE 601 B

CONTACTS: 3L

CREDITS: 3

Objective of the course: Application of Environmental Treatment technologies to specific industrial wastes

Pre-requisite: Basic knowledge of Physico-chemical and Biological Treatment

Detailed Course Outlines:

- | | |
|----------|--|
| Module 1 | Source and characteristics of Industrial wastes[10L] |
| Module 2 | Pre and Primary treatment[9L] |
| Module 3 | Biological and Physico-chemical processes for industrial wastes-Equalisation, Neutralization, Reverse Osmosis, Chemical Precipitation ,Adsorption[10L] |
| Module 4 | Case studies[8L] |
| Module 5 | Innovative processes for industrial treatment[8L] |

Text & References:

O.P. Gupta, Elements of Water Pollution Control, Khanna Publishing House (AICTE Recommended – 2018)

FREE ELECTIVE – I

OPERATION RESEARCH

CODE: CVE 602 A

CONTACT: 3L

CREDITS: 3

Module I

Linear Programming Problems (LPP):

Basic LPP and Applications; Various Components of LP Problem Formulation.

Solution of Linear Programming Problems:

Solution of LPP: Using Simultaneous Equations and Graphical Method;

Definitions: Feasible Solution, Basic and non-basic Variables, Basic Feasible Solution,

Degenerate and Non-degenerate Solution, Convex set and explanation with examples. **5L**

Solution of LPP by Simplex Method; Charnes' Big-M Method; Duality Theory. Transportation Problems and Assignment Problems. **12L**

Module II

Network Analysis:

Shortest Path: Floyd Algorithm; Maximal Flow Problem (Ford-Fulkerson); PERT-CPM (Cost Analysis, Crashing, Resource Allocation excluded). **6L**

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Inventory Control:

Introduction to EOQ Models of Deterministic and Probabilistic ; Safety Stock; Buffer Stock.

3L

Module III

Game Theory:

Introduction; 2-Person Zero-sum Game; Saddle Point; Mini-Max and Maxi-Min Theorems (statement only) and problems; Games without Saddle Point; Graphical Method; Principle of Dominance.

5L

Module IV

Queuing Theory:

Introduction; Basic Definitions and Notations; Axiomatic Derivation of the Arrival & Departure (Poisson Queue). Poisson Queue Models: (M/M/1): (∞ / FIFO) and (M/M/1: N / FIFO) and problems.

5L

Text Books:

1. H. A. Taha, "Operations Research", Pearson
2. P. M. Karak – "Linear Programming and Theory of Games", ABS Publishing House
3. Ghosh and Chakraborty, "Linear Programming and Theory of Games", Central Book Agency
4. Ravindran, Philips and Solberg - "Operations Research", WILEY INDIA

References:

1. KantiSwaroop — "Operations Research", Sultan Chand & Sons
2. Rathindra P. Sen—"Operations Research: Algorithms and Applications", PHI
3. R. Panneerselvam - "Operations Research", PHI
4. A.M. Natarajan, P. Balasubramani and A. Tamilarasi - "Operations Research", Pearson
5. M. V. Durga Prasad – "Operations Research", CENGAGE Learning
6. J. K. Sharma - "Operations Research", Macmillan Publishing Company

HUMAN RESOURCE MANAGEMENT (HSS)

CODE: CVE 602 B

CONTACT: 3L

CREDITS: 3

Introduction : HR Role and Functions, Concept and Significance of HR, Changing role of HR managers - HR functions and Global Environment, role of a HR Manager.

Human Resources Planning : HR Planning and Recruitment: Planning Process - planning at different levels - Job Analysis - Recruitment and selection processes - Restructuring strategies - Recruitment-Sources of Recruitment-Selection Process- Placement and Induction-Retention of Employees.

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Syllabus for B. Tech in Civil & Environmental Engineering

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Training and Development : need for skill upgradation - Assessment of training needs - Retraining and Redeployment methods and techniques of training employees and executives - performance appraisal systems.

Performance Management System : Definition, Concepts and Ethics-Different methods of Performance Appraisal- Rating Errors-Competency management.

Industrial Relations : Factors influencing industrial relations - State Interventions and Legal Framework - Role of Trade unions - Collective Bargaining - Workers' participation in management.

Case study.

Books :

1. Gary Dessler, Human Resource Management - (8th ed.,) Pearson Education, Delhi
2. Decenzo & Robbins, Personnel / Human Resource Management, 3rd ed., John Wiley & Sons (Pvt.) Ltd.
3. Biswajeet Patanayak, Human Resource Management, PHI, New Delhi
4. Luis R. Gomez, Mejia, Balkin and Cardy, Managing Human Resources PHI, New Delhi.

MATERIALS HANDLING

CODE: CVE 602 C

Contacts: 3L

Credits- 3

1 Introduction: Definition, importance and scope of materials handling (MH); classification of materials; codification of bulk materials ; utility of following principles of MH – (i) materials flow, (ii) simplification, (iii) gravity, (iv) space utilization, (v) unit size, (vi) safety, (vii) standardization, (viii) dead-weight, (ix) idle time, (x) motion. 4L

2A Unit load: Definition; advantages & disadvantages of unitization; unitization by use of platform, container, rack, sheet, bag and self contained unit load; descriptive specification and use of pallets, skids, containers, boxes, crates and cartons; shrink and stretch wrapping. 3L

2B Classification of MH Equipment: Types of equipment –

(i) industrial trucks & vehicles, (ii) conveyors, (iii) hoisting equipment, (iv) robotic handling system and (v) auxiliary equipment; Independent equipment wise sub classification of each of above type of equipment. 3L

3 Industrial trucks & vehicles : Constructional features and use of the following equipment – (i) wheeled hand truck, (ii) hand pallet truck, (iii) fork lift truck; Major specifications, capacity rating and attachments of fork lift truck. 5L

4 Conveyors: Use and characteristics of belt conveyor, constructional features of flat and troughed belt conveyor; Use and constructional features of Flg. types of chain conveyors – (i) apron, car and trolley type; Construction of link-plate chains; Dynamic phenomena in chain

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Syllabus for B. Tech in Civil & Environmental Engineering

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drive; Use and constructional features of roller conveyors; Gravity and powered roller conveyor; Pneumatic conveyor-use and advantages; Positive, negative and combination system of pneumatic conveyors; constructional feature, application and conveying capacity of screw conveyor. 8L

5 Hoisting Equipment: Advantage of using steel wire rope over chain; constructional features of wire ropes; Rope drum design; Pulley system-simple vs. multiple pulley; Load handling attachments : hooks, grabs, tongs, grab bucket; Arrangement of hook suspension with cross piece and pulleys (sheaves); Use and constructional features of (i) hand operated trolley hoist , (ii) winch; (iii) bucket elevator, (iv) Jib crane, (v) overhead traveling crane and (vi) wharf crane; Level luffing system of a wharf crane; Utility of truck mounted and crawler crane. 8L

6A Robotic handling: Materials handling at workplace; Major components of a robot; Applications of robotic handling. 2L

6B Auxiliary Equipment: Descriptive specification and use of – (i) Slide and trough gates, (ii) belt, screw and vibratory feeders, (iii) Chutes, (iv) positioners like elevating platform, ramps, universal vise; (v) ball table. 3L

Books Recommended:

1. S. Ray, Introduction to Materials Handling, New Age Int. Pub.
2. T. K. Ray, Mechanical Handling of Materials, Asian Books Pvt. Ltd.
3. T.H. Allegri, Materials Handling: Principles and Practices, CBS Publishers and Distributors.
4. J.A. Apple, Material Handling System Design, John Wiley & Sons.

PRACTICAL

ENVIROMENTAL CHEMISTRY LAB

CODE: CVE 691

CONTACTS: 3P

CREDITS: 2

Objective of the course: Develop hands on experience in environmental analysis

Pre-requisite: Introduction to Environmental Engineering

Module 1	pH and alkalinity, titration curves, buffers
Module 2	COD measurement
Module 3	DO and BOD
Module 4	Heavy metals, Fe and Mn
Module 5	Volatile acids, sulfate, gas measurements Microbial analysis

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MICROBIAL TECHNOLOGY LAB

CODE: FT 692

CONTACTS: 4P

CREDITS: 2

1. Alcohol fermentation
2. Organic acid fermentation – Vinegar / citric / lactic acid production
3. Propagation of baker's yeast
4. Fermented dairy products
5. Production of antibiotics
6. Enzyme preparation
7. Amino acid production
8. Vitamin B12 production

SEMINAR

CODE: CVE 681

CONTACTS: 3P

CREDITS: 2