

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 VIII
THEORY

ORGANISATIONAL BEHAVIOUR

CODE: HU801A

CONTRACTS: 2L

CREDITS: 2

1. Organizational Behaviour: Definition, Importance, Historical Background, Fundamental Concepts of OB, Challenges and Opportunities for OB. [2L]
2. Personality and Attitudes: Meaning of personality, Personality Determinants and Traits, Development of Personality, Types of Attitudes, Job Satisfaction. [2L]
3. Perception: Definition, Nature and Importance, Factors influencing Perception, Perceptual Selectivity, Link between Perception and Decision Making. [2L]
4. Motivation: Definition, Theories of Motivation - Maslow's Hierarchy of Needs Theory, McGregor's Theory X & Y, Herzberg's Motivation-Hygiene Theory, Alderfer's ERG Theory, McClelland's Theory of Needs, Vroom's Expectancy Theory. [4L]
5. Group Behaviour: Characteristics of Group, Types of Groups, Stages of Group Development, Group Decision Making. [2L]
6. Communication: Communication Process, Direction of Communication, Barriers to Effective Communication. [2L]
7. Leadership: Definition, Importance, Theories of Leadership Styles. [2L]
8. Organizational Politics: Definition, Factors contributing to Political Behaviour. [2L]
9. Conflict Management: Traditional vis-a-vis Modern View of Conflict, Functional and Dysfunctional Conflict, Conflict Process, Negotiation – Bargaining Strategies, Negotiation Process. [2L]
10. Organizational Design: Various Organizational Structures and their Effects on Human Behaviour, Concepts of Organizational Climate and Organizational Culture. [4L]

References:

1. Robbins, S. P. & Judge, T.A.: Organizational Behavior, Pearson Education, 15th Edn.
2. Luthans, Fred: Organizational Behavior, McGraw Hill, 12th Edn.
3. Shukla, Madhukar: Understanding Organizations – Organizational Theory & Practice in India, PHI
4. Fincham, R. & Rhodes, P.: Principles of Organizational Behaviour, OUP, 4th Edn.
5. Hersey, P., Blanchard, K.H., Johnson, D.E.- Management of Organizational Behavior Leading Human Resources, PHI, 10th Edn.

Or

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PROJECT MANAGEMENT

CODE: HU801B

CONTRACTS: 2L

CREDITS: 2

1. Project Management Concepts: Concept and Characteristics of a Project, Importance of Project Management. [1]
2. Project Planning: Project Evaluation, Financial Sources, Feasibility Studies. [4]
3. Project Scheduling: Importance of Project Scheduling, Work Breakdown Structure and Organization Breakdown Structure, Scheduling Techniques – Gantt Chart and LOB, Network Analysis – CPM/PERT. [6]
4. Time Cost Trade-off Analysis – Optimum Project Duration. [2]
5. Resource Allocation and Leveling. [2]
6. Project Life Cycle. [2]
7. Project Cost – Capital & Operating Costs, Project Life Cycle Costing, Project Cost Reduction Methods. [2]
8. Project Quality Management: Concept of Project Quality, TQM in Projects, Project Audit. [1]
9. Software Project Characteristics and Management [2]
10. IT in Projects: Overview of types of Softwares for Projects, Major Features of Project Management Softwares like MS Project, Criterion for Software Selection. [2]

References

1. Gopalkrishnan P. and Rama Mmoorthy: Text Book of Project Management, Macmillan
2. Nicholas John M.: Project Management for Business and Technology – Principles and Practice, Prentice Hall India, 2nd Edn.
3. Levy Ferdinand K., Wiest Jerome D.: A Management Guide to PERT/CPM with GERT/PDM/DCPM and other networks, Prentice Hall India, 2nd Edn.
4. Mantel Jr., Meredith J. R., Shafer S. M., Sutton M. M., Gopalan M. R.: Project Management: Core Text Book, Wiley India, 1st Indian Edn.
5. Maylor H.: Project Management, Pearson, 3rd Edn.
6. Nagarajan K.: Project Management, New Age International Publishers, 5th Edn.
7. Kelkar. S.A, Software Project Management: A concise Study, 2nd Ed., PHI

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PROFESSIONAL ELECTIVE IV

ENVIRONMENTAL POLLUTION AND CONTROL

CODE: CVE 801A

CONTACT: 2L

CREDITS: 2

1. **Introduction:** Environment. Pollution, Pollution control 2L
2. **Air Pollution:** Air Pollutants: Types, Sources, Effects; Air Pollution Meteorology: Lapse Rate, Inversion, Plume Pattern; Air Pollution Dispersion Model: Point Source Gaussian Plume Model, Stability Classes, Stability Charts, Design of Stack Height. 8L
3. **Air pollution Control:** Self cleansing properties of the environment; Dilution method; Engineered Control of Air Pollutants: Control of the particulates, Control of Gaseous Pollutants, Control of Air pollution from Automobiles. 8L
4. **Noise Pollution:** Definition; Sound Pressure, Power and Intensity; Noise Measurement: Relationships among Pressure, Power and Intensity, Levels, Frequency Band, Decibel Addition, Measures of community Noise i.e. LN, Leq, Ldn,, LNP; Sources, ; Effects; Control. 4L
5. **Water pollution:** Pollution Characteristics of Typical Industries, Suggested Treatments. 4L
6. **Global Environmental Issues:** Ozone Depletion, Acid Rain, Global Warming-Green House Effects 4L
7. **Administrative Control on Environment:** Functions of Central and State Pollution Control Boards; Environmental Clearance Process for Industries and Infrastructural Projects 4L
8. **Environmental Laws:** Water Act, Air Act, Motor Vehicle Act 2L

References:

1. Elements of Environmental Pollution, O.P. Gupta, Khanna Publishing House (AICTE Recommended – 2018)
2. Introduction to Environmental Engineering and Science G. Masters, W. Ela
PHI 2 Environmental Engineering: A Design Approach A. Sincero, G. Sincero
PHI
3. Environmental Engineering P. V. Rowe TMH
4. Environmental Engineering, S.K . Garg, Khanna Publishers 5 Air Pollution
Rao and Rao TMH
5. Water Supply, Waste Disposal and Environmental Pollution Engineering, ,
A.K.Chatterjee Khanna Publishers.
- 6.Environmental Engineering, Vol.II, P. N. Modi,
- 7.Environmental Modelling, , Rajagopalan Oxford University Press.

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WATER RESOURCES MANAGEMENT & PLANNING

CODE: CVE 801B

CONTACT: 2L

CREDITS: 2

1 Planning and analysis of Water Resource Systems: Introduction, System Analysis, Engineers and Policymakers 3L

2 Methods of Analysis: Introduction, Evaluation of Time streams of Benefits and Costs. Plan formulation, Planning models and solution procedures, Lagranges Multipliers, Dynamic Programming, Recursive equations, Bellmans' principle of optimality. Curse of dimensionality of discrete dynamic programming. Examples 8L

3 Reservoir Operation: Sequential process, single Reservoir problem - with release as decision variable, with storage as decision variable (deterministic approach). Examples, Related Computer Programming. Multi-reservoir problems (Deterministic approach) 6L

4 Water Resources Planning under Uncertainty: Introduction, probability concepts and Methods – Random variable and Distributions, Univariate probability Distributions, properties of Random variable – Moment and Expectation (Univariate Distributions) , Moment Generating Functions, Measures of Central tendency, Measures of Dispersion, Measures of symmetry (Skewness), measures of peakedness (kurtosis), examples 10L

5 Stochastic River Basin Planning Model: Introduction, Reservoir operation, Stochastic, Dynamic programming, Operating Model, Probability Distribution of Storage volumes and Releases, examples 6L

6 Water quality Management: Prediction and Simulation, Water quality Management Modeling 3L

References:

1 Applied Hydrology V.T. Chow

2 Hydrology Raudkivi

3 Stochastic Hydrology Jayarami Reddy

4 Water Resources Engg. M.C. Chaturvedi

5 Water Resources Systems Planning & Analysis Ddenice P Loucks, Jery R Stedinger& Douglas A Heinth Prentice Hall, Inc New Jersy.

6 Elements of Water Pollution Control Engineering, Khanna Publishing House (AICTE Recommended Textbook – 2018)

7 Water Resources Engineering Larry W Mays John Wiley & Sons(Asia)

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REMOTE SENSING AND GIS

CODE: CVE 801C CONTACT:

2L

CREDITS: 2

Details of Course Content Hours Total

1 Introduction: Definition and types of remote sensing, Tacheometry (Planimetry/ altimetry), Triangulation (Frame work / adjustment), Trilateration (EDM/ Total Station), Geodetics (physical/ geometrical geodesy), Error Analysis (causes / law of weights), Numerical example
7L

2 Photogrammetry: Camera System (phototheodolite/ aircraft), Ground photograph (oblique/orthogonal stereophoto), Aerial photograph (perspective scale/ flight planning), distortion (relief / tilt), Geometrix (parallax / mapping), application (topographics / interpretation), Numerical Examples
7L

3 Satellite survey: Satellite Sensing (Sensors / platforms), energy sources (electromagnetic / atmospheric interaction), visual interpretation (Band width), digital processing (imageries / enhancement), data integration (multi-approach / GIS), microwave imaging (active system / radars), applications
7L

4 Astronomy: Celestial sphere (star-coordinates / transformation), field astronomy (azimuth, solar and polar method), 3D computation (local vs global), spherical trigonometry, Multilateration, Observation, Corrections in astronomy, Correlation of low, medium, remote objects, Global Positioning Systems
7L

5 Geoinformatics: GIS concept (Introduction/ definition), planning and management, spatial data model, database and DBMS, linking of attributes, geospatial analysis, modern trends
8L

References:

- 1 Surveying (Volume 2): Duggal S.K. Tata McGraw Hill
- 2 Remote Sensing & GIS: Bhatta B. Oxford Univ Press
- 3 Geographic Information System: Tor Bern Herdgen Wiley
- 4 Surveying: Bannister, Raymond & Baker Pearson Education
- 5 Remote Sensing & Image Interpretation: Lilesand, Kiefer and Chipman Wiley
- 6 Surveying (Volume 2): Kanetker.&Kulkarni
- 7 Remote Sensing & Geographical information System Reddy M.A. (BS publication).
- 8 Advanced Surveying Rampal K.K.
- 9 Principles of Geoinformatics, P.K. Garg, Khanna Publishing House (AICTE Recommended Textbook 2018)
- 10 Fundamantals of Geographic Information System: Demers M.N. (Wiley)

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PROFESSIONAL ELECTIVE V

FINITE ELEMENT METHOD

CODE: CVE 802A CONTACT:

2L

CREDITS: 2

- 1 Introduction to Finite Element Analysis: Introduction, Basic Concepts of Finite Element Analysis, Steps in Finite Element Analysis, Fundamental concepts of Elasticity 4L
- 2 Finite Element Formulation Techniques: Virtual Work and Variational Principle, Galerkin Approach, Displacement Approach, Stiffness Matrix and Boundary Conditions 4L
- 3 Element properties: Concepts of shape functions: Natural Coordinates, one dimensional, Triangular, Rectangular Elements, Lagrange and Serendipity Elements Isoparametric Formulation: Isoparametric Elements, Stiffness Matrix of Isoparametric Elements, Numerical Integration: One Dimensional, Two Dimensional 8L
- 4 Formation of stiffness matrices and analysis of Truss, Continuous Beam and Simple Plane Frame 6L
- 5 FEM for two dimensional analysis: Constant Strain Triangle, Linear Strain Triangle, Rectangular Elements, Numerical Evaluation of Element Stiffness, Computation of Stresses 6L
- 6 FEM for Plates : Introduction to Plate Bending Problems, Finite Element Analysis of Thin Plate 4L
- 7 Introduction to application of standard FEM software in civil Engineering 4L

References:

- 1 Finite Element Method with Applications in Engineering Y. Desai et. al Pearson
- 2 Introduction to Finite Element in Engineering Chandrapatla & Belegundu Pearson Education
- 3 A First Course in Finite Element Method D. L. Logan Thomson
- 4 Surveying: Bannister, Raymond & Baker Pearson Education
- 5 Concepts and Applications of Finite Element Analysis R. D. Cook et. al Wiley India
- 6 Finite Element Analysis – Theory and Programming C. S. Krishnamoorthy Tata McGraw Hill
- 7 Matrix, Finite Element, Computer and Structural Analysis M. Mukhopadhyay Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi, India
- 8 Finite Element Procedures K. J. Bathe PHI, New Delhi, India

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PAVEMENT DESIGN

CODE: CVE 802B

CONTACT: 2L

CREDITS: 2

1 Principles of Pavement Design : Types of Pavements, Concept of pavement performance, Structural and functional failure of pavement, Different types of pavement performance, Different pavement design approaches 6L

2 Traffic Consideration in Pavement Design : Vehicle types, Axle configurations, Contact shapes and contact stress distribution, Concept of standard axle load, Vehicle damage factor, Axle load surveys, Estimation of design traffic 6L

3 Pavement Material Characterization : Identification of different type of materials Field and laboratory methods for characterization of pavement materials 8L

4 Analysis and Design of Flexible Pavements : Selection of appropriate theoretical model for flexible pavements, Analysis of different layers of flexible pavements based on linear elastic theory, Different methods of design of flexible pavements, IRC guidelines (IRC-37) 6L

5 Analysis and Design of Rigid Pavements : Selection of appropriate theoretical models for rigid pavements, Analysis of wheel load stresses, curling, temperature differential, Critical stress combinations, Different methods of design of rigid pavements, IRC guidelines (IRC-58) 6L

6 Pavement Overlay Designs : Overlay design as per Indian Roads Congress guidelines (IRC-81) Overlay design as per AASHTO-1993 guidelines 4L

References:

- 1 Principles of Pavement Design E.J. Yoder and M.W. Witczak Wiley
- 2 Pavement Analysis and Design Y. H. Huang Prentice- Hall
- 3 Highway Engineering Khanna and Justo Nem Chand
- 4 IRC-37, IRC-58, IRC-73, IRC-81, IRC-106 and other relevant IRC codes Indian Roads Congress

NATURAL ENERGY RESOURCES: RENEWABLE AND NON-RENEWABLE RESOURCES

CODE: CVE 803

CONTACT: 2L

CREDITS: 2

1. Land resources and land use change; Land degradation, soil erosion and desertification.
2. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
3. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
4. Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies. Concept of hybridization; Biogas; Biodiesel; Hydrogen Cell.

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References:

O.P. Gupta, Energy Technology, Khanna Publishing House, (AICTE Recommended Textbook -2018)

COST EFFECTIVE EFFLUENT TREATMENT

CODE: CVE 804

CONTACT: 2L

CREDITS: 2

1. Solid waste management, Energy from MSW.
2. Liquid waste management
3. Control measures of urban and industrial waste
4. Pollution case studies.
5. Bio-remediation
6. Phyto-remediation

PRACTICAL

PROJECT PART II

CODE: CVE881

CONTACTS: 12

CREDITS: 4

Objective of the course: To develop problem solving skills for open-ended problems related to Civil and Environmental Engineering

Pre-requisite: Complete all prior courses in the programme

Detailed Course Outlines: One final project report has to be submitted

GRAND VIVA

CODE: CVE 882

CONTACTS: 0

CREDITS: 2

Objective of the course: To assess the student for overall understanding of Civil and Environmental Engineering with the help of external examiners following WBUT rules. es :
Plate girder bridges 12