COURSE STRUCTURE & DETAILED SYLLABUS

ACE - R22

DEPARTMENT OF CIVIL ENGINEERING

III B.Tech II Sem (2022 Batch)

Course Structure
&
Syllabus

ACE
Engineering College
Ankushapur(V), Ghatkesar(M), Medchal Dist - 501 301
(An Autonomous Institution, Affiliated to JNTUH, Hyderabad)
Department of CIVIL ENGINEERING

B.Tech. in CIVIL ENGINEERING
COURSE STRUCTURE & SYLLABUS (ACE-R22 Regulations)
Applicable from AY 2022-23 Batch

ACE
Engineering College

Ankushapur(V), Ghatkesar(M), Medchal Dist - 501 301

(An Autonomous Institution)

B.TECH. FOUR YEAR DEGREE COURSE

CIVIL ENGINEERING

COURSE STRUCTURE & SYLLABUS

III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1.	CE601PC	Environmental Engineering	3	0	0	3
2.	CE602PC	Foundation Engineering	3	0	0	3
3.	CE603PC	Structural Engineering -II (Steel Structures)	3	0	0	3
4.		Professional Elective – I	3	0	0	3
5.		Open Elective - I	3	0	0	3
6.	CE604PC	Environmental Engineering Laboratory	0	0	2	1
7.	CE605PC	Computer Aided Design Laboratory	0	0	2	1
8.	EN608HS	Advanced English Communication Skills Laboratory	0	0	2	1
9.	CE607PC	Industry Oriented Mini Project/ Internship	0	0	4	2
10.	*MC609	Environmental Science	3	0	0	0
		Total Credits	**18**	**0**	**10**	**20**

Environmental Science in III Yr II Sem Should be Registered by Lateral Entry Students Only.

Professional Elective – I
1. Green Building Technologies
2. Geomatic Applications in Civil Engineering
3. Smart Cities Planning & Management
Professional Elective – II
1.Prestressed Concrete
2.Elements of Earthquake Engineering
3.Advanced Structural Analysis
Professional Elective – III
1.Earth Retaining Structures
2.Ground Improvement Techniques
3.Stability Analysis of Slopes
Professional Elective – IV
1.Design of Hydraulic Structures
2.Advanced Water Resources Engineering
3.Ground Water Hydrology
Professional Elective – V
1.Solid Waste Management
2.Environmental Impact Assessment
3.Air Pollution
Professional Elective – VI
1.Airport, Railways, and waterways
2. Pavement Asset Management
3.Pavement Analysis & Design
Open Electives -I
1. Disaster Preparedness & Planning Management
2. Building Management System
3. Environmental Impact Assessment
Open Electives -II
1.Geographical Information systems
2.Sustainable Infrastructure Development
3.Professional Practice, Law & Ethics
Open Electives -III
1.Energy Efficient Buildings
2.Multi Criterion Decision Making
3.Environmental Pollution and Control

CE601PC: ENVIRONMENTAL ENGINEERING

B.Tech. III Year II Sem. **L T P C**

3 0 0 3

Course Objectives: This subject provides the knowledge of water sources, water treatment, design of distribution system wastewater treatment, and safe disposal methods. The topics of characteristics of wastewater, sludge digestion are also included, basics of Air Pollution & Control.

Course Outcomes: At the end of the course, the student will be able to:

- Assess characteristics of water and wastewater.
- Estimate quantities of water and wastewater and plan conveyance components.
- Design components of water and wastewater treatment plants.
- Be conversant with issues of air pollution and control.

UNIT – I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards: sources of water - Comparison from quality and quantity and other considerations – intakes – infiltration galleries.

UNIT – II

Layout and general outline of water treatment units: Sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices–Design of distribution systems–pipe appurtenances.

UNIT - III

Characteristics of sewage :Waste water collection–Estimation of waste water and storm water – decomposition of sewage, examination of sewage – B.O.D. Equation – C.O.D. Design of sewers – shapes and materials – sewer appurtenances, manholes – inverted siphon – catch basins – flushingtanks – ejectors, pumps and pump houses – house drainage – plumbing requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewagefarming –self-purification of rivers.

UNIT – IV

Waste water treatment plant : Flow diagram - primary treatment Design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – Biological treatment – trickling filters –ASP– Construction and design of oxidation ponds. Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

UNIT – V

Air pollution: Classification of air pollution– Effects air pollution–Global effects– Meteorological parameters affecting air pollution–Atmospheric stability–Plume behavior – Control of particulates — Gravity settlers, cyclone filters, ESPs–Control of gaseous pollutants– automobile pollution and control.

TEXT BOOKS:

1. Environmental Engineering by H. S Peavy, D. R. Rowe, G. Tchobanoglous, McGraw HillEducation (India) Pvt Ltd, 2014
2. Environmental Engineering by D. P. Sincero and G.ASincero, Pearson 2015.
3. Environmental Engineering, I and II by BC Punmia, Std. Publications.
4. Environmental Engineering, I and II by SK Garg, Khanna Publications.
5. Environmental Pollution and Control Engineering CS Rao, Wiley Publications

REFERENCE BOOKS:

1. Water and Waste Water Technology by Steel, Wiley
2. Wastewater engineering by Metcalf and Eddy, McGraw Hill, 2015.
3. Water and Waste Water Engineering by Fair Geyer and Okun, Wiley, 2011
4. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr. Wiley, 2007.
5. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, NewJersey.
6. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan, Thompson /Brooks/Cole; Second Edition 2008.
7. Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill Publication

CE602PC: FOUNDATION ENGINEERING

B.Tech. III Year II Sem. **L T P C**

3 0 0 3

Prerequisite – Geotechnical Engineering Course

Course Objectives:

- To Plan and execute the Soil exploration program for civil Engineering Projects.
- To analyse the stability of slopes.
- To determine the lateral earth pressures and design retaining walls.
- To determine the Bearing capacity of Soils.
- To design pile foundation.

Course Outcomes: At the end of the course the student will able to

- understand the principles and methods of Geotechnical Exploration
- assess the stability of slopes
- calculate lateral earth pressures and check the stability of retaining walls
- analyse and design the shallow and deep foundations

UNIT – I

Soil Exploration: Need – methods of soil exploration – boring and sampling methods – penetration tests – plate load test– planning of soil exploration programme, Bore logs and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish slip circle method, method of slices, Bishop's Simplified method of slices

— Taylor's Stability Number- stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure Theories: Active, Passive and at rest soil pressures Rankine's theory of earth pressure

— earth pressures in layered soils – Coulomb's earth pressure theory.

Retaining Walls: Types of retaining walls – stability of gravity and cantilever retaining walls against overturning, sliding and, bearing capacity, filter material for drainage.

UNIT – IV

Shallow Foundations - Types - choice of foundation – location and depth - safe bearing capacity – shear criteria – Terzaghi's, and IS code methods - settlement criteria – allowable bearing pressurebased on SPT N value and plate load test – allowable settlements of structures.

UNIT - V

Pile Foundation: Types of piles – load carrying capacity of piles based on static pile formulae – dynamic pile formulae – Pile Capacity through SPT results - pile load tests –Pile under lateral loading - load carrying capacity of pile groups in sands and clays – Settlement of pile groups – negative skin friction.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & A. S. R. Rao, New age InternationalPublishers, 2016.
2. Soil Mechanics and Foundation Engineering by V. N. S. Murthy, CBS Publishers and Distributors, 2007.
3. Bowles, J.E., (2001) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
4. Principals of Foundation Engineering by Braja, M. Das, Cengage Learning Publishers, 8th Edition, 2016

REFERENCE BOOKS:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company PvtLtd (1998).
2. Geotechnical Engineering by S. K. Gulhati & Manoj Datta — Tata McGraw Hill Publishingcompany New Delhi. 2005.
3. Poulos, H. G. & Davis, E. H. - Pile Foundation Analysis and Design john Wiley & sons inc (1980)
4. Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indianedition, 2012.

CE603PC: STRUCTURAL ENGINEERING – II (STEEL STRUCTURES)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course is to

- Explain the mechanical properties of structural steel, plasticity, yield.
- **Describe** the salient features of Limit State Method of design of Steel structures.
- **Identify** and **explain** the codal provisions given in IS. 800.
- **Analyze** the behaviour of steel structures under tension, compression and flexure.
- **Design** the tension, compression, flexural members and plate girder
- Design the connection in steel structure, build - up member and (bolted and welded).

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

- Analyze the tension members, compression members.
- Design the tension members, compression members and column bases and joints and connections.
- Analyze and Design the beams including built-up sections and beam and connections.
- Identify and Design the various components of welded plate girder including stiffeners.

UNIT – I

Materials – Types of structural steel – Mechanical properties of steel – Concepts of plasticity – yield strength - Loads and Stresses – Local buckling behavior of steel. Concepts of limit State Design – Different Limit States – Load combinations for different Limit states - Design Strengths - deflection limits serviceability – stability check.

Design of Connections– Different types of connections – Bolted connections – Design strength – efficiency of joint– prying action - Welded connections – Types of welded joints – Design requirements - Design of Beam- column connections - Eccentric connections - Type I and Type II connection.

UNIT – II

Design of tension members –Simple and built up members - Design strength – Design procedure forsplicing - lug angle.

Design of compression members – Buckling class – slenderness ratio – Design of simplecompression members laced – battened columns – splice – column base – slab base.

UNIT – III

Plastic Analysis; Plastic moment – Plastic section modulus - Plastic analysis of continuous beams Design of Flexural Members — Design of laterally supported beams - Bending and shear strength/buckling – Built-up sections - Beam splice

UNIT – IV

Design of welded plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffeners - bearing stiffener– intermediate stiffeners – Design ofweb splice and flange splice.

UNIT – V

Design of Industrial Structures; Types of roof trusses - loads on trusses – wind loads - Purlin design

— truss design.

TEXT BOOKS:

1. Design of steel structures by S.K. Duggal, Tata McGraw-Hill publishers, 2000, 2nd Edition.
2. Design of steel structures by N. Subramanian, Oxford University press, 2008.
3. Design of steel structures by K.S. Sairam, Pearson Educational India, 2nd Edition, 2013.

REFERENCE BOOKS:

1. Design of steel structures by Edwin H. Gayrold and Charles Gayrold, Tata McGraw hill publishers, 1972
2. Design of steel structures by L.S. Jaya Gopal, D. Tensing, Vikas Publishing House.

CE611PE: GREEN BUILDING TECHNOLOGIES (PE – I)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives

- To learn about the environmental Implications of building construction materials.
- To learn about suitable Industrial waste materials including Biomass materials that can be usedas construction material for various Infra Projects.
- To understand Thermal characteristics and heat flow characteristics of building materials.
- To study about the non-conventional energy resources like solar energy and different case studies.
- To learn about management of water, solid and sewage.

Courses Outcomes:

- Relate safety to Green Technology.
- Identify Renewable Energy systems.
- Understand the impact of continued use of non-renewable energy resources.
- Investigate renewable energy systems.
- Understand energy consumption, efficiency & waste management.

UNIT- I

Introduction

Environmental implications of buildings energy, carbon emissions, water use, waste Disposal. Buildingmaterials: sources, methods of production and environmental Implications. Green cover and built environment.

UNIT- II

Implications of Resources

Implication of resources for Building Materials and alternative concepts. Recycling of Industrial and Building Wastes. Biomass Resources for buildings.

UNIT- III

Comforts in Building

Comforts in Building: Thermal Comfort in Buildings-Issues; Heat Transfer Characteristics of Building Materials and Building Techniques.
Incidence of Solar Heat on Buildings.

UNIT- IV

Energy Conservation

Utility of Solar energy is buildings concepts of Solar Passive Cooling and Heating of Buildings. Low Energy Cooling.
Case studies of Solar Passive Cooled and Heated Buildings.

UNIT- V

Green Composites for Buildings & Waste Management

Green Composites for buildings. Concepts of Green Composites. Water Utilization in Buildings. Waste Management: Low Energy Approaches to Water Management, Management of Solid Wastes, Management of Sullage water and Sewage.

TEXT BOOKS:

1. K.S. Jagadish, B.U. Venkatarama Reddy and K.S. Nanjundarao. Alterative Building Materialsand Technologies. New Age International, 2007.
2. Michael Bauer, Peter Mosle and Michael Schwarz "Green Building-Guide book for SustainableArchitecture "Springer, 2010.

REFERENCE BOOKS:

1. Osman Attmann Green Architecture Advanced Technologies and Materials. McGraw Hill, 2010.
2. Michael F. Ashby Materials and the Environment, Elsevier, 2009.
3. Jerry Yudelson Green building Through Integrated Design McGraw Hill, 2009.
4. Mili M.Ajumdar (Ed) Energy Efficient Building in India. Teri and Mnes, 2001/2002
5. Low Energy Cooling for Sustainable Buildings John Wiley and Sons Ltd. 2009.
6. Green My Home': 10 Steps to Lowering Energy Costs and Reducing Your Carbon Footprint byDennis.
7. C. Brewer, ISBN: 97814227798411, Publisher: Kaplan Publishing. Publications Date
8. B. Givoni Man, Climate and Architecture Elsevier, 1969.
9. T. A Markus and E. N. Morris Buildings Climate and Energy. Pitman, London Arvindkishan etal (Ed)

CE612PE: GEOMATIC APPLICATIONS IN CIVIL ENGINEERING (PE – I)

B.Tech. III Year II Sem. **L T P C**

3 0 0 3

Course Objectives:

- Know the concepts of Remote Sensing, its interpreting Techniques and concepts of Digitalimages.
- Know the concept of Geographical Information System (GIS), coordinate system GIS Data andits types
- Understand the students managing the spatial Data Using GIS.
- Understand Implementation of GIS interface for practical usage.

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

- **Describe** different concepts and terms used in Remote Sensing and its data.
- Understand the Data conversion and Process in different coordinate systems of GIS interface.
- **Evaluate** the accuracy of Data and implementing a GIS.
- **Understand the applicability of** RS and GIS for various applications.

UNIT - I:

Concepts of Remote Sensing Basics of remote sensing: Elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology & units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors. Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT- II:

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life, The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Co- ordinate systems, Map projections, Map transformation, Geo-referencing.

UNIT- III:

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization.

Data models and data structures: Introduction, GIS Data model, vector data structure, raster data structure, attribute data, geo-database and metadata.

UNIT- IV:

Spatial Data input and Editing: Data input methods — keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS. **Spatial Analysis:** Introduction, topology, spatial analysis, vector data analysis, Network analysis, raster data analysis, Spatial data interpolation techniques.

UNIT- V:

Applications: Land use and landcover mapping determination of crop characteristics, ground water potential identification, pollutant mapping, snow mapping, rainfall runoff modelling, soil erosion, soil classification, water shed prioritization, solid waste collection, water supply.

TEXT BOOKS:

1. Remote Sensing and GIS by Basudeb Bhatta, Oxford University Press, 2nd Edition, 2011.
2. Introduction to Geographic Information systems by Kang-tsung Chang, McGraw-Hill Education(Indian Edition), 7th Edition, 2015.
3. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, WileyPublishers, 2012.

REFERENCE BOOKS:

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand and Ralph W. Kiefer, WileyPublishers, 7th Edition, 2015.\
2. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication,3rd Edition, 2010.
3. Advanced Surveying: Total Station, GIS and Remote Sensing by Satheesh Gopi, R. SathiKumar, N. Madhu, Pearson Education, 1st Edition, 2007.
4. Textbook of Remote Sensing and Geographical Information systems by M. Anji Reddy.

CE613PE: SMART CITIES PLANNING AND MANAGEMENT (PE – I)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives:

- To introduce students on smart city basic concepts, global standards and Indian context ofsmart cities.
- To understand smart community, smart transportation and smart buildings.
- To understand Energy demand, Green approach to meet Energy demand and their capacities.
- To identify Smart Transportation Technologies in cities and concepts towards smart city.

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

- Recognize smart city concepts and their international and national standards.
- Recognize smart community, transportation and building concepts.
- Develop and calibrate energy demand and their capacity limits.
- Predict the various smart urban transportation systems and the transition from existing citytowards a smart city.

UNIT – I: **Introduction to Smart Urban Infrastructures and Smart Cities**: Introduction to City Planning - Understanding Smart Cities - Dimensions of Smart Cities - Global Experience of Smart Cities Smart Cities – Global Standards and Performance Benchmarks, Practice Codes -Indian scenario - India"100 Smart Cities" Policy and Mission.

UNIT – II: **Smart Cities Planning and Development**: Introduction to Smart Community - Smart community concepts: Concept of Smart Community - Smart Transportation - Smart Building and Home Device - Smart Health - Smart Government - Smart Energy and Water — Cyber Security, Safety, and Privacy - Internet of Things, Block chain, Artificial Intelligence, Alternate Reality, Virtual Reality.

UNIT – III: **Smart Urban Energy Systems** — I: Conventional vs. Smart, City components, Energy demand, Green approach to meet Energy demand, Index of Indian cities towards smartness — a statistical analysis -Meeting energy demand through direct and indirect solar resources - Efficiency of indirect solar resources and its utility, Capacity limit for the indirect solar resources - Effectiveness in responsive environment in smart city; Smart communication using green resources.

UNIT – IV: **Smart Urban Energy Systems** – II: Introduction to PV technology - PV of various scale forsmart city applications - Energy efficiency - Policies of Solar PV in smart domains (RPO, REC, Carbon credit, etc.) Definition - Structure of Smart Grid - Indian Perspective - Advantage & limitation - Definition, Structure of Smart Grid- Indian Perspective Advantage & limitation.

UNIT – V: **Smart Urban Transportation Systems**: Smart Transportation Technologies - Driverless and connected vehicles - ride sharing solutions - The "improve" pathway - The "shift" pathway – SmartRoads and Pavement systems.

TEXT BOOKS:

1. Internet of Things in Smart Technologies for Sustainable Urban Development, G. R. Kanagachidambaresan, R. Maheswar,
2. V. Manikandan, K. Ramakrishnan, Springer, 2020 2. Society 5.0: A People-centric Super-smartSociety, Hitachi-UTokyo Laboratory (HUTokyo Lab), Springer, 2020
3. The Routledge Companion to Smart Cities, Katharine S. Willis, Alessandro Aurigi, RoutledgeInternational Handbooks, 2020

REFERENCE BOOKS:

1. Smart Cities in Asia: Governing Development in the Era of Hyper-Connectivity YuminJoo, Yu-Min Joo, Teck- Boon Tan, Edward Elgar Pub, 2020.
2. Urban Systems Design: Creating Sustainable Smart Cities in the Internet of Things Era, Yoshiki Yamagata, Perry P. J. Yang, Elsevier, 2020.
3. Smart Cities and Artificial Intelligence: Convergent Systems for Planning, Design, and Operations, Christopher Grant Kirwan, Zhiyong Fu, Elsevier. 2020.

CE611OE: DISASTER PREPAREDNESS & PLANNING MANAGEMENT (OE - I)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are

- To Understand basic concepts in Disaster Management.
- To Understand Definitions and Terminologies used in Disaster Management.
- To Understand Types and Categories of Disasters.
- To Understand the Challenges posed by Disasters.
- To understand Impacts of Disasters Key Skills.

Course Outcomes: The student will develop competencies in

- The application of Disaster Concepts to Management.
- Analyzing Relationship between Development and Disasters.
- Ability to understand Categories of Disasters.
- Realization of the responsibilities to society.

UNIT - I

Introduction - Concepts and definitions: disaster, hazard, vulnerability, resilience, risks severity, frequency and details, capacity, impact, prevention, mitigation, disaster phenomena, events-globalNational & Regional.

UNIT - II

Disasters- Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, Covid 2019 in India , mountain and coastal areas, ecological fragility, coping with disaster- strategies , safety norms & survival kits.

UNIT - III

Disaster Impacts- Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters, capacity building —concepts, assessment –structural & nonstructural measures, legislative support.

UNIT - IV

Disaster Risk Reduction (DRR) - Disaster management cycle — its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post disaster environmental response (water, sanitation, food safety, waste management, disease control, security, communications); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

UNIT - V

Disasters, Environment and Development- Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, landuse changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

TEXT BOOKS:

1. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
2. Singh B.K., 2008, Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication.
3. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.
4. Manual on Natural Disaster Management plans.
5. Disaster Management in India, Rajendra Kumar Pandey, SAGE Publications, TEXTS.

REFERENCE BOOKS:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).
2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
3. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003.
4. Inter-Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health andPsychosocial Support in Emergency Settings. Geneva: IASC.

CE612OE: BUILDING MANAGEMENT SYSTEMS (OE – I)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to

- Understand the concepts and applications of Building management systems.
- Understand the fundamentals of fire alarm, access control and security systems.
- Understand the concepts and methods of energy management in buildings.

Course Outcomes: After learning the course the students should be able to:

- Analyze current philosophy, technology, terminology, and practices used in building automation
- Evaluate different fire standards, FAS Components.
- Select hardware and software for HVAC system.
- Evaluate energy management system.

UNIT - I

Introduction: Concept and application of Building Management System (BMS) and Automation, requirements and design considerations and its effect on functional efficiency of building automation system, architecture and components of BMS.

UNIT - II

Fire Alarm System Fundamentals: What is Fire? Fire modes, History, Components, and Principles ofOperation. FAS Components: Different fire sensors, smoke detectors and their types, Fire control panels, design considerations for the FA system. Field Components, Panel Components.

UNIT - III

Access Control System: Access Components, Access control system Design. CCTV: Camera: Operation & types, Camera Selection Criteria, Camera Applications, DVR Based system, DVM, Network design, Storage design. Components of CCTV system like cameras, types of lenses, typical types of cables, controlling system. CCTV Applications: CCTV Applications.

UNIT - IV

Security Systems Fundamentals: Introduction to Security Systems, Concepts. Perimeter Intrusion: Concept, Components, Technology, Advanced Applications. Security Design: Security system designfor verticals.

Concept of automation in access control system for safety, Physical security system with components,RFID enabled access control with components, Computer system access control – DAC, MAC, RBAC.

UNIT - V

Energy Management Building Management System : ASHRAE Symbols Energy Management: Energy Savings concept & methods, Lighting control, Building Efficiency improvement, IBMS (HVAC, Fire & Security) project cycle, Project steps BMS. Verticals: Advantages & Applications of BMS.

TEXT BOOKS:

1. Intelligent Building Systems by Albert Ting-Pat So, WaiLok Chan, Kluwer Academic publisher
2. HVAC Controls and Systems by Levenhagen, John I. Spethmann, Donald H., McGraw-Hill Pub.

REFERENCE BOOKS:

1. Smart Buildings by Jim Sinopoli, Butterworth-Heinemann imprint of Elsevier,
2. Understanding Building Automation Systems by Reinhold A. Carlson, Robert A. Di iandomenico, pub. By R.S. Means Company.
3. Design of Special Hazards and Fire Alarm Systems by Robert Gagnon, Thomson DelmarLearning;
4. Process Control- Instrument Engineers Handbook by Bela G. Liptak, Chilton book co
5. HVAC Control in the New Millennium by Hordeski, Michael F, Fairmont press.

CE613OE: ENVIRONMENTAL IMPACT ASSESSMENT (OE – I)

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to

- Define and Classify Environmental Impacts and the terminology.
- Understands the environmental Impact assessment procedure.
- Explain the EIA methodology.
- List and describe environmental audits.

Course Outcomes: At the end of the course the student will be able to

- Identify the environmental attributes to be considered for the EIA study.
- Formulate objectives of the EIA studies.
- Identify the methodology to prepare rapid EIA.
- Prepare EIA reports and environmental management plans.

UNIT- I

Introduction: The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measure and EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process. Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT- II

EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions -Construction Stage Impacts, post project impacts.

UNIT- III

Environmental Management Plan: EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the conditions, Monitoring Methods, Pre- Appraisal and Appraisal.

UNIT- IV

Environmental Legislation and Life cycle Assessment: Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for controlof noise, loss of biodiversity, solid and Hazardous waste management rules.
Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria-case studies.

UNIT- V

Case Studies: Preparation of EIA for developmental projects-Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, nuclear fuel complex, Highway project, Sewage treatment plant, Municipal Solid waste processing plant, Air ports.

TEXT BOOKS:

1. Anjaneyulu. Y and Manickam. V., Environmental Impact Assessment Methodologies, B. S.Publications, Hyderabad, 2007
2. Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers 2002

REFERENCE BOOKS:

1. Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand ReinholdCo., New York, 1991.
2. Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., NewYork, 1996.

CE604PC: ENVIRONMENTAL ENGINEERING LABORATORY

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Course Objectives: The objectives of the course are to

- **Perform** the experiments to determine water and waste water quality.
- **Understand** the water & wastewater sampling, their quality standards.
- **Estimate** quality of water, wastewater, Industrial water.

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

- Understand about the equipment used to conduct the test procedures.
- Perform the experiments in the lab.
- Examine and Estimate water, waste water, air and soil Quality.
- Compare the water, air quality standards with prescribed standards set by the local governments.
- Develop a report on the quality aspects of the environment.

Practical Work: List of Experiments

1. Determination of pH
2. Determination of Electrical Conductivity
3. Determination of Total Solids (Organic and inorganic)
4. Determination of Acidity
5. Determination of Alkalinity
6. Determination of Hardness (Total, Calcium and Magnesium Hardness)
7. Determination of Chlorides
8. Determination of optimum coagulant Dosage
9. Determination of Dissolved Oxygen (Winkler Method)
10. Determination of COD
11. Determination of BOD
12. Determination of Residual Chlorine
13. Total count
14. Noise level measurement

TEXT/REFERENCE BOOKS:

1. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, NewJersey.
2. Introduction to Environmental Engineering by P. Aarne Vesilind, Susan M. Morgan, Thompson / Brooks/ Cole; Second Edition 2008.
3. Peavy, H. s, Rowe, D. R, Tchobanoglous, G. Environmental Engineering, Mc-Graw - Hill International Editions, New York 1985.
4. Met Calf and Eddy. Wastewater Engineering, Treatment, Disposal and Reuse, Tata McGraw-Hill, New Delhi.
5. Manual on Water Supply and Treatment. Ministry of Urban Development, New Delhi.
6. Plumbing Engineering. Theory, Design and Practice, S. M. Patil, 1999
7. Integrated Solid Waste Management, Tchobanoglous, Theissen& Vigil. McGraw Hill Publication
8. Manual on Sewerage and Sewage Treatment Systems, Part A, B and C. Central Public Health and Environmental Engineering Organization, Ministry of Urban Development.

CE605PC: COMPUTER AIDED DESIGN LABORATORY

B.Tech. III Year II Sem.

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Pre-Requisites: Computer Aided Civil Engineering Drawing Principles –Excel- Structural Engineering -1 & 2

Course Objectives: The objectives of the course are to

- Learn the usage of any fundamental software for design.
- Create geometries using pre-processor.
- Analyse and Interpret the results using post processor.
- Design the structural elements.

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

- Model the geometry of real-world structure Represent the physical model of structural element/structure
- Perform analysis.
- Interpret from the Post processing results.
- Design the structural elements and a system as per IS Codes.

List Of Experiments

1. Analysis & Design determinate structures using a software
2. Analysis & Design of fixed & continuous beams using a software
3. Analysis & Design of Plane Frames
4. Analysis & Design of space frames subjected to DL & LL
5. Analysis & Design of residential building subjected to all loads (DL, LL, WL, EQL)
6. Analysis & Design of Roof Trusses
7. Design and detailing of built-up steel beam
8. Developing an excel template for foundation design
9. Detailing of RCC beam and RCC slab
10. Detailing of RCC column and RCC footing

EN608HS: ADVANCED ENGLISH COMMUNICATION SKILLS LABORATORY

B.Tech. III Year II Sem. **L T P C**

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1. Introduction

The introduction of the Advanced English Communication Skills Lab is considered essential at the B.Tech 3rd year level. At this stage, the students need to prepare themselves for their career which may require them to listen to, read, speak and write in English both for their professional and interpersonalcommunication in the globalised context.

The proposed course should be a laboratory course to enable students to use appropriate English and perform the following:

1. Gathering ideas and information to organise ideas relevantly and coherently.
2. Making oral presentations.
3. Writing formal letters.
4. Transferring information from non-verbal to verbal texts and vice-versa.
5. Writing project/research reports/technical reports.
6. Participating in group discussions.
7. Engaging in debates.
8. Facing interviews.
9. Taking part in social and professional communication.

2. Objectives:

This Lab focuses on using multi-media instruction for language development to meet the followingtargets:

- To improve the students' fluency in English, with a focus on vocabulary
- To enable them to listen to English spoken at normal conversational speed by educated English speakers
- To respond appropriately in different socio-cultural and professional contexts
- To communicate their ideas relevantly and coherently in writing
- To prepare the students for placements.

3. Syllabus:

The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

1. **Activities on Listening and Reading Comprehension:** Active Listening — Development of Listening Skills Through Audio clips - Benefits of Reading – Methods and Techniques of Reading
   – Basic Steps to Effective Reading – Common Obstacles – Discourse Markers or Linkers - Sub- skills of reading - Reading for facts, negative facts and Specific Details- Guessing Meanings from Context, Inferring Meaning - Critical Reading — Reading Comprehension – Exercises for Practice.
2. **Activities on Writing Skills**: Vocabulary for Competitive Examinations - Planning for Writing – Improving Writing Skills - Structure and presentation of different types of writing – Free Writing andStructured Writing - Letter Writing –Writing a Letter of Application –Resume vs. Curriculum Vitae
   – Writing a Résumé – Styles of Résumé - e-Correspondence – Emails – Blog Writing - (N)etiquette – Report Writing – Importance of Reports – Types and Formats of Reports– Technical

Report Writing– Exercises for Practice.

3. **Activities on Presentation Skills -** Starting a conversation – responding appropriately and relevantly – using the right language and body language – Role Play in different situations including Seeking Clarification, Making a Request, Asking for and Refusing Permission, Participating in a Small Talk – Oral presentations (individual and group) through JAM sessions- PPTs – Importance of Presentation Skills – Planning, Preparing, Rehearsing and Making a Presentation – Dealing with Glossophobia or Stage Fear – Understanding Nuances of Delivery - Presentations through Posters/Projects/Reports – Checklist for Making a Presentation and Rubrics of Evaluation
4. **Activities on Group Discussion (GD):** Types of GD and GD as a part of a Selection Procedure - Dynamics of Group Discussion- Myths of GD - Intervention, Summarizing - Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas – Do's and Don'ts - GD Strategies
   – Exercises for Practice.
5. **Interview Skills**: Concept and Process - Interview Preparation Techniques - Types of Interview Questions – Pre-interview Planning, Opening Strategies, Answering Strategies - Interview ThroughTele-conference & Video-conference - Mock Interviews.

4. Minimum Requirement:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- One PC with latest configuration for the teacher
- T. V, a digital stereo & Camcorder
- Headphones of High quality

5. Suggested Software: The software consisting of the prescribed topics elaborated above should beprocured and used.

- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **Oxford Advanced Learner's Dictionary**, 10th Edition
- **Cambridge Advanced Learner's Dictionary**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech

6. Books Recommended:

1. Rizvi, M. Ashraf (2018). *Effective Technical Communication*. (2nd ed.). McGraw Hill Education(India) Pvt. Ltd.
2. Suresh Kumar, E. (2015). *Engineering English.* Orient BlackSwan Pvt. Ltd.
3. Bailey, Stephen. (2018). Academic *Writing: A Handbook for International Students.* (5th Edition). Routledge.
4. Koneru, Aruna. (2016). *Professional Communication*. McGraw Hill Education (India) Pvt. Ltd.
5. Raman, Meenakshi & Sharma, Sangeeta. (2022). *Technical Communication, Principles andPractice.* (4TH Edition) Oxford University Press.
6. Anderson, Paul V. (2007). *Technical Communication***.** Cengage Learning Pvt. Ltd. New Delhi.

7. McCarthy, Michael; O'Dell, Felicity & Redman, Stuart. (2017). *English Vocabulary in Use* Series. Cambridge University Press
8. Sen, Leela. (2009). *Communication Skills.* PHI Learning Pvt Ltd., New Delhi.
9. Elbow, Peter. (1998). *Writing with Power.* Oxford University Press.
10. Goleman, Daniel. (2013). *Emotional Intelligence*: *Why it can matter more than IQ.* BloomsburyPublishing.

*MC609: ENVIRONMENTAL SCIENCE

B.Tech. III Year II Sem. **L T P C**

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Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations.

Course Outcomes: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn help in sustainable development.

UNIT - I

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure, and function ofan ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefitsand problems. **Mineral resources:** use and exploitation, environmental effects of extracting and usingmineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situconservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions /Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act-1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedicalwaste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio- economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA),Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL LearningPrivate Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHILearning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.