



List of Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework

Department : *Civil Engineering*

Programme Name : *B.Tech. in Civil Engineering*

Academic Year : 2023-24

Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework:

Sr. No.	Course Code	Name of the Course
01.	PEUALS2	Sports and Yoga
02.	CEUBTH2	Human Values and Ethics
03.	NSUBLS1	NSS
04.	CE203THS03	Professional Practice, Law & Ethics
05.	CE204TPC03	Engineering Economics
06.	CE207TPE02B	Air and Noise Pollution and Control
07.	CE207TPE02C	Solid and Hazardous Waste Management
08.	CE207TPE02E	Environmental Impact Assessment and Life Cycle Analysis
09.	CE07TOE02A	Green Building and Sustainable Materials
10.	CE208TPE06A	Low Cost Housing Techniques



Scheme and Syllabus

SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)

Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

I-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering												
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits		
			Theory Lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks			
											L	T
1	AMEUAT06	Engineering Mathematics - A	3	1	-	03	40	60	100	4		
2	CYUAT09	Engineering Chemistry	3	-	-	03	40	60	100	3		
3	ECUAT04	Basic Electrical and Electronics Engineering	3	-	-	03	40	60	100	3		
4	PCUAT02	Environmental Science and Ecology	2	-	-	03	40	60	100	2		
5	CUAT05	Computer Programming	3	-	-	03	40	60	100	3		
6	LAIAT01	Indian Constitution	1	-	-	01	50	-	50	1		
7	CYUAT03	Engineering Chemistry Laboratory	-	-	2	03	25	25	50	1		
8	CUAT03	Computer Programming Laboratory	-	-	2	03	25	25	50	1		
9	IPUAT02	Engineering Workshop Practices	-	-	2	03	25	25	50	1		
10	NSUAT01	Sports and Yoga	-	-	2	-	25	25	50	1		
Total			15	1	08	25	350	400	750	28		
Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, PO: Postory, LA: Law, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory.												
BASIC SCIENCE (B)			ENGINEERING SCIENCE (E)			SKILL ENHANCEMENT COURSE (L)		HUMANITIES SCIENCE (H)		MANDATORY COURSE (C)		EXTRA-CURRICULAR ACTIVITIES (S)
1. Mathematics - A 2. Physics 3. Chemistry 4. Mathematics - B			1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering			1. Engineering Graphics 2. Engineering Workshop Practices		1. English for communication 2. Human Values and Ethics		1. Indian Constitution 2. Environmental Science & Ecology		1. NSS 2. Sports and Yoga

SCHOOL OF STUDIES OF ENGINEERING AND TECHNOLOGY

Scheme of Teaching and Evaluation 2022-2023 (As per NEP-2020)
Choice Based Credit System (CBCS) and Outcome Based Education (OBE)
(Effective from the Academic Year 2022-2023)

II-SEMESTER BTech Mechanical/IP/Chemical/Civil Engineering													
S.N.	Course Code	Course Title	Teaching Hours/week			Examination				Credits			
			Theory Lectures	Tutorial	Practical/ Drawing	Examination in Hours	CIA Marks	SEA Marks	Total Marks				
											L	T	P
1	AMUBTB4	Engineering Mathematics-B	3	1	-	03	40	60	100	4			
2	PPUBTB2	Engineering Physics	3	1	-	03	40	60	100	4			
3	ITUBTE2	Introduction to Information Technology	3	-	-	03	40	60	100	3			
4	ELUBTH1	English for Communication	3	-	-	03	40	60	100	3			
5	CEUBTE1	Engineering Mechanics	3	-	-	03	40	60	100	3			
6	ME UBTH2/CH UBTH2/ IP UBTH2/CEUBTH2	Human Values and Ethics	1	-	-	02	50	-	50	1			
7	PPUBLE2	Engineering Physics Laboratory	-	-	2	03	25	25	50	1			
8	CEUBLE1	Engineering Mechanics Laboratory	-	-	2	03	25	25	50	1			
9	MEUBLE1	Engineering Graphics	1	-	3	03	25	25	50	3			
10	NSUBLE3	NSS	-	-	2	01	25	25	50	1			
Total			17	2	09	27	350	400	750	24			
Note: AM:Mathematics, PP:Physics, ME: Mechanical Engineering, IP: Industrial & Production Engineering, CE: Civil Engineering, CS: Computer Sc. & Engg., IT: Information Technology, PE: Physical Education, NS: NSS, U: Undergraduate, T: Theory, L: Laboratory.													
BASIC SCIENCE (B)			ENGINEERING SCIENCE (E)			SKILL ENHANCEMENT COURSE (L)		HUMANITIES SCIENCE (H)		MANDATORY COURSE (C)		EXTRA-CURRICULAR ACTIVITIES (S)	
1. Mathematics - A 2. Physics 3. Chemistry 4. Mathematics - B			1. Engineering Mechanics 2. Introduction to Information Technology 3. Basic Electrical Engineering 4. Basic Electrical and Electronics Engineering 5. Computer Programming 6. Basic Communication Engineering			1. Engineering Graphics 2. Engineering Workshop Practices		1. English for communication 2. Human Values and Ethics		1. Indian Constitution 2. Environmental Science & Ecology		1. NSS 2. Sports and Yoga	



SPORTS & YOGA

SYLLABUS	(SEMESTER-I)	Periods/Week	INTERNAL ASSESSMENT (IA)	ES Assessment	Grand total	Credits
Subject Code:	PEUALS2	L T P	Attendance Activities TOTAL			
Subject:	SPORTS AND YOGA	- - 2	5 20 25	25	50	01

Course Objectives:

- To make the students understand the importance of sound health and fitness principles as they relate to better health.
- To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health, and fitness.
- To create a safe, progressive, methodical, and efficient activity-based plan to enhance improvement and minimize risk of injury.
- To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Physical Fitness Tests

- AAHPER youth fitness test
- Cooper's 12 Minute run-walk test

General Introduction of games and sports

Fundamental skills, history and development of the following games and sports:

- Athletics
- Badminton
- Basketball
- Cricket
- Football
- Hockey
- Handball
- Kabaddi
- Kho-kho
- Volley-ball
- Yoga

Note:

- Each student will have to clear one of the physical fitness tests by the end of the semester.
- One project is to be prepared by the students at least for two games.

References:

- Barron H.M, McGhee R. (1997) A Practical Approach to Measurement in Physical Education.
- Kansal D K. (1996), Test and Measurement in sports and physical education, New Delhi, D V S Publication

Course Outcomes:

On completion of the course, the student will be able to:

1. Apply warming up and warming down exercises in daily physical fitness activities
2. Apply stretching rotation and flexibility exercises in daily physical fitness activities.
3. Make use of acquired yoga asanas skill and pranayama method in daily lifestyle.
4. Utilize the acquired weight training skills for the development of muscular strength and development. Utilize the acquired skills in playing sports and games.



SYLLABUS	(SEMESTER-II)	Periods/Week			Internal Assessment (IA)				ESE	Grand Total	Credits
Subject Code:	MEUBTH2 (for Mech) CHUBTH2 (for Chem) IPUBTH2 (for IPE) CEUBTH2 (for Civil)	L	T	P	CT-1	CT-II	Attendance & Assignments	TOTAL	-	50	01
Subject:	HUMAN VALUES AND ETHICS	1	-	-	20	20	10	50			

COURSE OBJECTIVE:

- To create an awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.

COURSE OUTCOME:

On completion of this course, the students will be able to

- Understand the significance of value inputs in a classroom and start applying them in their life and profession
- Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
- Understand the role of a human being in ensuring harmony in society and nature.
- Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

COURSE CONTENT:

UNIT I: Introduction to Value Education

- Value Education, Definition, Concept and Need for Value Education.
- The Content and Process of Value Education.
- Basic Guidelines for Value Education.
- Self exploration as a means of Value Education.
- Happiness and Prosperity as parts of Value Education.

UNIT II: Harmony in the Human Being

- Human Being is more than just the Body.
- Harmony of the Self ('I') with the Body.
- Understanding Myself as Co-existence of the Self and the Body.
- Understanding Needs of the Self and the needs of the Body.
- Understanding the activities in the Self and the activities in the Body.

UNIT III: Harmony in the Family and Society and Harmony in the Nature

- Family as a basic unit of Human Interaction and Values in Relationships.
- The Basics for Respect and today's Crisis: Affection, Guidance, Reverence, Glory, Gratitude and Love.
- Comprehensive Human Goal: The Five Dimensions of Human Endeavour.
- Harmony in Nature: The Four Orders in Nature.
- The Holistic Perception of Harmony in Existence.

UNIT IV: Social Ethics

- The Basics for Ethical Human Conduct.
- Defects in Ethical Human Conduct.
- Holistic Alternative and Universal Order.
- Universal Human Order and Ethical Conduct.
- Human Rights violation and Social Disparities.

UNIT V: Professional Ethics

- Value based Life and Profession.
- Professional Ethics and Right Understanding.
- Competence in Professional Ethics.
- Issues in Professional Ethics – The Current Scenario.
- Vision for Holistic Technologies, Production System and Management Models.

TEXT BOOKS

- I.A.N.Tripathy, New Age International Publishers, 2003.
- Bajpai, B. L., New Royal Book Co, Lucknow, Reprinted, 2004
- Bertrand Russell Human Society in Ethics & Politics

REFERENCE BOOKS

- Corliss Lamont, Philosophy of Humanism
- Gaur, R.R., Sangal, R., Bagaria, G.P., A Foundation Course in Value Education, Excel Books, 2009.
- Gaur, R.R., Sangal, R., Bagaria, G.P., Teachers Manual Excel Books, 2009.
- I.C. Sharma : Ethical Philosophy of India Nagin & co Jalandhar
- Mortimer, J. Adler, - Whatman has made of man
- William Lilly Introduction to Ethic Allied Publisher

Course Outcomes and their mapping with Programme Outcomes: HUMAN VALUES AND ETHICS (MEUBTH2 (for Mech), CHUBTH2 (for Chem), IPUBTH2 (for IPE) and CEUBTH2 (for Civil))

CO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								3	3						
CO2								3	3						
CO3								3	3						
CO4								3	3						

Weightage: 1-Slightly, 2-Moderately, 3-Strongly



DEPARTMENT OF CIVIL ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2021-22

SYLLABUS	(SEMESTER-III)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE203THS03	L	T	P	CT-I	CT-II	TOTAL			
Subject:	Professional Practice, Law & Ethics	2	0	0	15	15	30	70	100	02

Course Objectives:

- To know about roles of various stakeholders in formulating standards of practice and to learn about ethical values in professionalism.
- To study general principles of contracts management and practice involving tender proposal.
- To understand ADR mechanism like arbitration, conciliation, Lok Adalat in judicial system.
- To learn legal aspect of labour engagement and other construction related law in civil engineering.
- To understand law and policy related to Intellectual property, Copyright, Trademarks, Patents and Piracy.

Course Content

UNIT 1: Professional Practice – Respective roles of various stakeholders: Government (constituting regulatory bodies and standardization organizations, prescribing norms to ensure safety of the citizens); Standardization Bodies (ex. BIS, IRC) (formulating standards of practice); professional bodies (ex. Institution of Engineers (India), Indian Roads Congress, IAI/COA, ECI, Local Bodies/Planning Authorities) (certifying professionals and offering platforms for interaction); Clients/owners (role governed by contracts); Developers (role governed by regulations such as RERA); Consultants (role governed by bodies such as CEAI); Contractors (role governed by contracts and regulatory Acts and Standards); Manufacturers/Vendors/Service agencies (role governed by contracts and regulatory Acts and Standards).

Professional Ethics – Definition of Ethics, Professional Ethics, Business Ethics, Corporate Ethics, Engineering Ethics, Personal Ethics; Code of Ethics as defined in the website of Institution of Engineers (India); Profession, Professionalism, Professional Responsibility, Professional Ethics; Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistleblowing, protected disclosures.

UNIT 2:

General Principles of Contracts Management: Indian Contract Act, 1972 and amendments covering General principles of contracting; Contract Formation & Law; Privacy of contract; Various types of contract and their features; Valid & Voidable Contracts; Prime and sub-contracts; Joint Ventures & Consortium; Complex contract terminology; Tenders, Request For Proposals, Bids & Proposals; Bid Evaluation; Contract Conditions & Specifications; Critical "Red Flag" conditions; Contract award & Notice To Proceed; Variations & Changes in Contracts; Differing site conditions; Cost escalation; Delays, Suspensions & Terminations; Time extensions & Force Majeure; Delay Analysis;

Liquidated damages & Penalties; Insurance & Taxation; Performance and Excusable Non-performance; Contract documentation; Contract Notices; Wrong practices in contracting (Bid shopping, Bid fixing, Cartels); Reverse auction; Case Studies; Build-Own-Operate & variations; Public-Private Partnerships; International Commercial Term.

UNIT 3:

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Award including Form and content, Grounds for setting aside an award, Enforcement, Appeal and Revision; Enforcement of foreign awards – New York and Geneva Convention Awards; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalat.

UNIT 4:

Engagement of Labour and Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece-rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other Construction Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017

UNIT 5:

Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Design, Secrets; Law relating to Copyright in India including Historical evolution of Copyright Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of



DEPARTMENT OF CIVIL ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2021-22

infringement, Piracy in Internet - Remedies and procedures in India; Law relating to Patents under Patents Act, 1970 including Concept and historical perspective of patents law in India, Patentable inventions with special reference to biotechnology products, Patent protection for computer programs, Process of obtaining patent - application, examination, opposition and sealing of patents, Patent cooperation treaty and grounds for opposition, Rights and obligations of patentee, Duration of patents - law and policy considerations, Infringement and related remedies.

Text Book/ References:

1. B.S. Patel, Legal Aspects of Building and Engineering Contracts, 1974.
2. The National Building Code, BIS, 2017.
3. RERA Act, 2017.
4. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset.
5. Neelima Chandramani (2000), The Law of Contract: An Outline, 2nd Edn. Arinash Publications Mumbai.
6. Atkinson (2002), Law of Contract, Eastern Book Co.
7. Dutt (1994), Indian Contract Act, Eastern Law House.
8. Anson W.R. (1979), Law of Contract, Oxford University Press.
9. Kwaara G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration.
10. Wadhwa (2004), Intellectual Property Rights, Universal Law Publishing Co.
11. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House.
12. Bare text (2005), Right to Information Act.
13. O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers.
14. K.M. Datta (1946), The Industrial Employment (Standing Orders) Act.
15. Rustamji R.F., Introduction to the Law of Industrial Disputes, Asia Publishing House.
16. Vee, Charles & Skitmore, Martin (2003) Professional Ethics in the Construction Industry, Engineering Construction and Architectural management, Vol.10, Iss2, pp117-127, MCB UP Ltd.
17. American Society of Civil Engineers (2011) ASCE Code of Ethics - Principles Study and Application.
18. Ethics in Engineering- M.W.Martin & R.Schinzinger, McGraw-Hill.
19. Engineering Ethics, National Institute for Engineering Ethics, USA.
20. www.isindia.org
21. Engineering ethics: concepts and cases - C. E. Harris, M.S. Pritchard, M.J.Rabins.
22. CONSTRUCTION CONTRACTS, <http://www.juonmanstark.com/contract.htm>
23. Internet and Business Handbook, Chap 4, CONTRACTS LAW, <http://www.ladapress.com/ladapress/contractlaw1.html>
24. Contract & Agreements, <http://www.tco.ac.in/law/English/agreements/General/Contract%20Law/C.htm>
25. Contracts, <http://206.127.69.152/jgwtch/cj/211/ch7.ppt>
26. Business & Personal Law: Chapter 7, "How Contracts Arise", <http://yucaipahigh.com/schriestensen/lawweb/lawch7.ppt>
27. Types of Contracts, <http://cmsv2.cmu.edu/public/classes/rahm/mainerv.com.ppt>
28. IV. TYPES OF CONTRACTS AND IMPORTANT PROVISIONS, <http://www.worldbank.org/html/cpr/consult/guidetext/types.html>
29. Contract Types/Pricing Arrangements Guideline- 1.4.G (11/04/02), <http://www.sandia.gov/policy/14g.pdf>

Course Outcomes:

At the end of the course student will be able to

- CO 1 To describe respective roles of regulatory bodies and ethical practice to be followed by engineering professionals.
- CO 2 To define principle of tender filing and contract management.
- CO 3 To distinguish between ADR mechanism and formal judicial proceedings for dispute resolution.
- CO 4 To explain role of labour and other construction-related laws in civil engineering.
- CO 5 To identify law and policy related to Intellectual property, Copyright, Trademarks, Patents and Piracy.



DEPARTMENT OF CIVIL ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2021-22

SEMESTER-IV

SYLLABUS	(SEMESTER-IV)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE204TPC03	L	T	P	CT-I	CT-II	TOTAL			
Subject:	Engineering Economics	3	0	0	15	15	30	70	100	03

Course Objectives:

1. To learn about the basics of economics and elements of cost in engineering
2. To study about the value engineering and interest formulae
3. To understand various alternative methods of cost comparison analysis
4. To know about replacement and maintenance involved in engineering components.
5. To understand depreciation of a product.

Course Content:

UNIT 1: Introduction to Economics: Flow in an economy, Law of supply and demand, **Concept of Engineering Economics** – Engineering efficiency, Economic efficiency, Scope of engineering economics- Element of costs, **Margin cost**, Marginal Revenue, Sunk cost, Opportunity cost, Break-even analysis- V ratio, Elementary economic Analysis. Material selection for product Design selection for a product, Process planning.

UNIT 2: Value Engineering: Make or buy decision, Value engineering – Function, aims, Value engineering procedure. Interest formulae and their applications – **Time value of money**, Single payment compound amount factor, Single payment present worth factor, Equal payment series sinking fund factor, Equal payment series payment Present worth factor, equal payment series capital recovery factor-Uniform gradient series annual equivalent factor, Effective interest rate, Example in all the methods.

UNIT 3: Cash Flow: Methods of comparison of alternatives – present worth method (Revenue dominated cash flow diagram), Future worth method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), Annus equivalent method (Revenue dominated cash flow diagram, cost dominated cash flow diagram), rate of return method. Examples in all the methods.

UNIT 4: Replacement and Maintenance Analysis: Replacement and Maintenance analysis – Types of maintenance types of replacement problem, determination of economic life of an asset, **Replacement of an asset with a new asset**, capital recovery with return and concept of challenger and defender, Simple probabilistic model for items which is completely.

UNIT 5: Depreciation: Depreciation- Introduction, Straight line method of depreciation, declining balance method, depreciation-Sum of the years digits method of depreciation, sinking fund method of depreciation/ Annuity method, depreciation, **service output method of depreciation-Evaluation of public alternatives-** introduction, Examples, Inflation adjusted decisions – procedure to adjust inflation, Examples on comparison of alternatives and determination of economic life of asset.

TEXT BOOKS:

1. Pannas Selvam, R. –Engineering Economics, Prentice Hall of India Ltd, New Delhi, 2001.
2. Suma Damodaran, – Managerial economics, Oxford university press 2006.
3. Chan S.Park, –Contemporary Engineering Economics, Prentice Hall of India, 2002.

Course Outcome: At the end of the course students shall be able to:

- CO 1. Explain the basics of engineering economics and elements of costs.
- CO 2. Describe value engineering and can make use of various interest formulae for real life computations
- CO 3. Observe and identify the best alternative for cost comparison
- CO 4. Determine between replacement and maintenance needed by an asset.
- CO 5. Compute the depreciation cost and determine the economic life of a product.



DEPARTMENT OF CIVIL ENGINEERING & TECH. FOURTH YEAR SYLLABUS W.E.F 2023-24

SYLLABUS								
Subject Code:	CE207TPB02X	CREDITS: 3			SESSIONAL - TA			ESE
Subject:	Professional Elective -2X	L	T	P	CT-I	CT-II	TOTAL	70
		3	0	0	15	15	30	
Professional Elective-2A or Professional Elective-2B or Professional Elective-2C or Professional Elective-2D or Professional Elective-2E		Any one subject to be Selected from the Professional Electives Group-2						
Professional Electives Group -2								
CE207TPB02A		Environmental Geo-technology						
CE207TPB02B		Air and Noise Pollution and Control						
CE207TPB02C		Solid and Hazardous Waste Management						
CE207TPB02D		Urban Hydrology and Hydraulics						
CE207TPB02E		Environmental Impact Assessment and Life Cycle Analysis						

DEPARTMENT OF CIVIL ENGINEERING & TECH. FOURTH YEAR SYLLABUS W.E.F 2023-24

SYLLABUS	(SEMESTER VII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE207TPB02B	L	T	P	CT-I	CT-II	TOTAL	70	100	3
Subject:	Air and Noise Pollution and Control	3	0	0	15	15	30			

Course Learning Objectives:

- To comprehend the essential concepts of Air and Noise pollution Learning
- To understand, measure and evaluate the character & behaviour of air and noise pollutants
- To understand the measurement techniques and strategies to control their presence in the ambient atmosphere.

Course Contents:

Unit I: Air pollution: composition and structure of atmosphere, global implications of air pollution, classification of air pollutants: particulates, hydrocarbon, carbon monoxide, oxides of sulphur, oxides of nitrogen and photochemical oxidants. Indoor air pollution. Effects of air pollutants on humans, animals, property and plants.

Unit II: Air pollution chemistry, meteorological aspects of air pollution dispersion; temperature lapse rate and stability, wind velocity and turbulence, plume behaviour, dispersion of air pollutants, the Gaussian Plume Model, stack height and dispersion.

Unit III: Ambient air quality and standards, air sampling and measurements; Ambient air sampling, collection of gaseous air pollutants, collection of particulate air pollutants, stack sampling. Control devices for particulate contaminants: gravitational settling chambers, cyclone separators, wet collectors, fabric filters (Bag-house filter), electrostatic precipitators (ESP).

Unit IV: Control of gaseous contaminants: Absorption, Adsorption, Condensation and Combustion, Control of sulphur oxides, nitrogen oxides, carbon monoxide, and hydrocarbons. Automotive emission control, catalytic converter, Euro-I, Euro-II and Euro-III specifications, Indian specifications.

Unit V NOISE POLLUTION: Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure level; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psycho-acoustics and noise criteria, effects of noise on health, annoyance rating schemes; special noise environments: Infra-sound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices.

Text Books:

1. Peavy, Rowe and Tchobanoglous: Environmental Engineering.
2. Martin Crawford: Air Pollution Control Theory.
3. Wark and Warner: Air Pollution: Its Origin and Control.
4. M.N.Joshi: H.V.N. Rao, Air Pollution, Tata McOmrow-Hill Publishing Company Limited, New Delhi.
5. Environmental Pollution Control Engineering- CS Rao, Wiley Eastern Ltd., New Delhi, 1996.
6. Environmental Noise Pollution – PJ. Carruff, McOmrow Hill, New York, 1987
7. Myrozek, McKenna and Theodore: Handbook of Air Pollution Control Engineering and Technology.
8. Saxena and Crawford: W.H.O. Manual on Urban Air Quality Management

Course Outcomes-

After studying the course, the students will be able to

- CO1: Identify the major sources, effects and monitoring of air and noise pollutants.
- CO2: Understand the key transformations and meteorological influence on air and noise.
- CO3: Understand the behaviour of air pollutants in atmosphere.
- CO4: Relate and analyse the pollution regulation on its scientific basis.
- CO5: Application of various control equipment's for the abatement of air and noise.
- CO6: Evaluate the engineering solutions for industrial and vehicular air & noise pollution problems.



DEPARTMENT OF CIVIL ENGINEERING & TECH. FOURTH YEAR SYLLABUS W.E.F 2023-24

Syllabus	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE207/TPB02C	L	T	P	CT-I	CT-II	TOTAL			
Subject:	Solid and Hazardous Waste Management	3	0	0	15	15	30	70	100	3

Course Learning Objectives:

- To define and characterize municipal solid wastes from technical and regulatory points of view.
- To provide comprehensive ways of collection, transportation and management of different types of solid wastes.
- To classify the waste and remove hazardous wastes, apply different methods of management.
- To introduce the most common techniques for hazardous waste disposal.
- To use laboratory tests in sampling & characterization of solid wastes.

Course Content:

UNIT-1: Municipal Solid Waste Management

Legal and Organizational foundation: Definition of Solid Waste, Waste Generation Technological Society, Major Legislation, Monitoring Responsibility, Sources and Types of Solid Waste, Sampling and Characterization – Determination of Composition of MSW, Storage and Handling of Solid Waste Future Changes in Waste Composition.

UNIT-2: Collection and Transport of Solid Waste

Collection of Solid Waste: Type of Waste Collection Systems, Analysis of Collection System, Alternative Techniques for Collection System, Separation, Processing and Transformation of Solid Waste: UNIT Operations for Separation and Processing, Materials Recovery Facilities, Waste Transformation through Combustion and Anaerobic Composting, Anaerobic Methods for Materials Recovery and Treatment, Energy Recovery.

Incinerators Transfer and Transport

Need for Transfer Operation, Transport Means and Methods, Transfer Station Types and Design Requirements, Landfills, Site Selection, Design and Operation, drainage and Leachate Collection Systems, Requirements and Technical solution, Designated Waste Landfill Remediation, Integrated Waste Management Facilities.

UNIT-3: Hazardous Waste Management

Definition and Identification of Hazardous Wastes-Sources and Characteristics, Hazardous Wastes in Municipal Waste, Hazardous Waste Regulations, Minimization of Hazardous Waste-Compatibility, Handling and Storage of Hazardous Waste-Collection and Transport, e-waste Sources, Collection, Treatment and Reuse Management.

UNIT-4: Hazardous waste treatment and Design

Hazardous Waste Treatment Technologies, Design and Operation, Facilities for Physical, Chemical and Thermal Treatment of Hazardous Waste –Solidification, Chemical Fixation and Encapsulation, Incineration, Hazardous Waste landfill: Site Selection, Design and Operation, Remediation of Hazardous Waste Disposal Sites.

UNIT-5: Laboratory Practice: Sampling and Characterization of Solid Wastes, TCLP Tests and Leachate Studies.

Text Books:

- Integrated Solid Waste Management by George Tchobanoglous et al, McGraw-Hill Publication, 1993.
- Hazardous Waste Management by Charles A. Wentz, McGraw Hill Publication, 1995.

Reference Books:

- Solid and Hazardous Waste Management by S.C. Hattis, Atlantic Publishers, Edition (1 December 2007).
- Solid and Hazardous Waste Management by M.N Rao & Rania Sultana, JSS Publications, Second Edition (2020).

Course Outcomes- At the end of the course completion, the students shall be able to:

- CO1: Ability to characterize municipal solid wastes from technical view.
- CO2: Learn ways of collection, transportation and management of different types of solid wastes.
- CO3: Apply different methods of managements for hazardous wastes.
- CO4: Develop most suitable techniques for disposal of hazardous wastes.
- CO5: Learn different laboratory tests for solid wastes.



SYLLABUS (SEMESTER-VII)						
Subject Code:	CE207TOB02	CREDITS:3		SESSIONAL - TA		ESE
Subject:	Open Elective	L	T	P	CT-I	CT-II
		3	-	-	15	15
						30
CE207TOB02	Green Building and Sustainable Materials					

SYLLABUS	(SEMESTER VII)	Periods/Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE207TOB02A	L	T	P	CT-I	CT-II	TOTAL			
Subject:	Green Building and Sustainable Materials	3	0	0	15	15	30	70	100	3

Course Learning Objectives:

- To understand the basics of Green Buildings.
- To learn the concept of site selection and planning.
- To study the use of efficient energies.
- To understand the types of sustainable building materials.
- To learn about maintenance of Indoor environmental quality.

Course Content:

UNIT-I

Green Buildings: Introduction, Definition, sustainable development, typical features of green buildings, benefits, key Requisites for Constructing a Green Building, Green building rating systems – GRIHA, IGBC and LEED.

UNIT-II

Site selection and building planning: Criteria for site selection, preservation of landscape, soil erosion control, minimizing urban heat island effect, maximize comfort by proper orientation of building facades, daylighting, ventilation, etc.

Water conservation and efficiency: Rainwater harvesting methods for roof & non-roof, water demand, water efficient plumbing systems, water metering, waste water disposal, recycle and reuse systems.

UNIT-III

Energy Efficiency: Environmental impact of building constructions, Concepts of embodied energy, operational energy and life cycle energy. Methods to reduce operational energy: energy efficient buildings envelopes, efficient lighting technologies, energy efficient appliances for heating and air conditioning systems in buildings, zero ozone depleting potential (ODP) materials, wind and solar energy harvesting energy metering and monitoring concept of net zero buildings. Optimism Energy Efficiency. Typical Energy Saving Approaches in Buildings Use of Renewable Energy Sources

UNIT-IV

Sustainable Building materials: local building materials, natural and renewable materials like bamboo, timber,

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rammed earth, stabilized mud blocks, materials with recycled content such as blended cements, pozzolana cements, fly ash bricks, vitrified tiles, materials from agro and industrial waste. Reuse of waste and salvaged materials

UNIT-V

Indoor Environmental Quality for Occupant Comfort and Wellbeing: Daylighting, air ventilation, exhaust systems, low VOC paints, materials & adhesives, building acoustics. Codes related to green buildings: NBC, ECBC, ASHRAE, UVC etc. Rapidly renewable building materials and furniture: Environment Quality And Occupational Health: Air conditioning, air quality, Sick building syndrome, Tobacco smoke control, Minimum fresh air requirements avoid use of asbestos in the building, improved fresh air ventilation, Measure of IAQ, Reasons for poor IAQ, Measures to achieve Acceptable IAQ levels.

Text Books

- IGBC Green Homes Rating System, Version 2.0, Abridged reference guide, 2013, Indian Green Building Council Publishers.
- GRIHA version 2015, GRIHA rating system, Green Rating for Integrated Habitat Assessment.
- Alternative building materials and technologies by K.S. Jagadish, B.V. Venkataratna Reddy and K.S. Narasimha Rao.
- Non-Conventional Energy Resources by G. D. Rai, Khanna Publishers.
- Sustainable Building Design Manual, Vol.1 and 2, TIERI, New Delhi 2004.
- Mike Montoya, Green Building Fundamentals, Pearson, USA, 2010.
- Charles J. Kibert, Sustainable Construction – Green Building Design and Delivery, John Wiley & Sons, New York, 2008.
- Rogina Leffers, Sustainable Construction and Design, Pearson / Prentice Hall, USA, 2009.

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

- CO1:** To apply the knowledge of Green Building in handling any physical projects.
- CO2:** To conduct a site selection process with respect to green buildings.
- CO3:** To make use of technologies with efficient energies.
- CO4:** To select and work with various sustainable materials.
- CO5:** To apply the knowledge in maintaining the indoor environmental quality.



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SYLLABUS		(SEMESTER-VIII)						
Subject Code:	CE208TP606X	CREDITS: 3			SESSIONAL - TA			ESE
Subject:	Professional Elective -6	L	T	P	CT-I	CT-II	TOTAL	
		3	-	-	15	15	30	70
Professional Elective-6A or Professional Elective-6B or Professional Elective-6C or Professional Elective-6D or Professional Elective-6E		Any one subject to be Selected from the Professional Electives Group-6						
Professional Electives Group -6								
CE208TP606A		Low Cost Housing Techniques						
CE208TP606B		Water and Air Quality Modelling						
CE208TP606C		Repair and Rehabilitation of Structures						
CE208TP606D		Finite Element Analysis						
CE208TP606E		Urban Hydrology and Hydraulics						

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SYLLABUS	(SEMESTER-VIII)	Periods/ Week			Internal Assessment (IA)			ESE	Grand Total	Credits
Subject Code:	CE208TP606A	L	T	P	CT-I	CT-II	TOTAL			
Subject:	Low Cost Housing Techniques	3	0	0	15	15	30	70	100	03

Course Learning Objectives:

- To introduce various housing technique adopted in different zones in country.
- To study various uses of cost effective Technologies.
- To learn needs and innovations of building techniques for low cost construction.
- To learn space norms for low cost construction.
- To learn about building materials and costing of low cost construction.

Course Content:

UNIT-1As introduction to the subject to understand the various building techniques adopted in different climatic zones of the country, which resulting in varied vernacular expressions.

UNIT-2Use of cost effective technologies through the use of local materials, up gradation of traditional technologies, prefabrication etc.

UNIT-3 Need for low cost construction, both in the rural and the urban sectors. Innovations of building techniques for low cost construction.

UNIT- 4 Analysis of space norms for low cost buildings. Study of usage pattern of low cost buildings by the habitants.

UNIT- 5Comparative analysis of building materials and costing.Works of Laurie Baker, Hassan Fathy and other prominent architects.

Text Books:

- "Building Systems for Low Income Housing", Ashok Kumar Jain, Management Publishing House, 1992
- "Low Cost Housing in Developing Countries", Gurs Chaman Mathur, For Centre for Science & Technology of the Non-Aligned and Other Developing Countries, Oxford & IBH Publishing Company, 1993

Course outcomes:

Upon completion of this course students will be able to

- CO1:** To classify various housing techniques adopted in different zones in country.
- CO2:** To identify various uses of cost effective Technologies.
- CO3:** To understand needs and develop innovations of building techniques for low cost construction.
- CO4:** To explain space norms for low cost construction.
- CO5:** To analysis about building materials and costing of low cost construction.