

SUSTAINABLE BUILDING CONSTRUCTION TECHNOLOGY	
Subject Code: CVOE03	Credits: 3:0:0
Pre requisites: - Nil	Contact Hours: 42L
Course Coordinator: Smt. Lakshmi H S	

Course Content

Unit I

Introduction: Need for sustainable practices in construction- Impact of building industry on energy resources, natural resources and environment. Concept of Green Building and principles, Concept of Embodied energy and calculation. Life cycle assessment. Consideration while selecting material and design for longevity.

- Pedagogy / Course delivery tools:- Chalk and talk, PowerPoint presentations, Videos
- Links: -<https://www.youtube.com/watch?v=JOG4GwSPsY8>
<https://www.youtube.com/watch?v=wmoy27EZ8y0>
- NPTEL Links: -<https://archive.nptel.ac.in/courses/105/102/105102195/>

Unit II

Building materials: Conventional materials and Use of low energy materials - Base materials for RCC and Steel systems. Alternatives to structural systems and building materials. Smart materials. Low energy construction- low energy material, locally sourced material, recycled materials.

- Pedagogy/Course delivery tools:- Chalk and talk, Power point presentation
- Links: -<https://www.youtube.com/watch?v=bsQBSVJoV04> ,
<https://www.youtube.com/watch?v=bsQBSVJoV04&t=10s>
- NPTEL Links: -<https://archive.nptel.ac.in/courses/105/102/105102195/>

Unit III

Building Siting: Orientation of the building. Building form-surface to volume ratio. Use of natural light, solar heat and ventilation. Fenestration and shading. Effective cooling and heating systems-solar passive techniques of heating and cooling in a building design. Methods of minimizing load on Conventional Systems-Landscaping, water bodies.

- Pedagogy/Course delivery tools: Chalk and talk, Power point presentation
- Links: <https://www.youtube.com/watch?v=hRo9k100ye4>
<https://www.youtube.com/watch?v=wOb5RF14i6I>
- NPTEL Links: <https://archive.nptel.ac.in/courses/105/102/105102195/>

Unit IV

Building Finishes, Energy Efficient Systems and Certifications: Glazing and shading systems. Building finishes. Effective electrical systems - photovoltaic systems. Efficient HVAC systems. Efficient lighting system- efficient bulbs, occupancy sensor systems and light sensors. Efficient motors. GRIHA, LEED. Computation of energy demand of building and design of solar panel for given energy load.

- Pedagogy / Course delivery tools: Chalk and talk
- Links: <https://www.usgbc.org/articles/what-green-building-0>
<https://www.youtube.com/watch?v=uaHRsiIBnhs>
<https://youtu.be/MyIOtsx3wDs>
- NPTEL Links: <https://archive.nptel.ac.in/courses/105/102/105102195/>

Unit V

Water Conservation: Water efficient fixtures-flow restrictors, sensors, no water fixtures. Alternatives for secondary uses. Rain water harvesting, solar water heaters and solar cooking. Low flush toilets, grey water recycling. Onsite treatment. Ecofriendly toilets. Reducing irrigation water requirements. Vertical farming. Xeriscaping

- Pedagogy/Course delivery tools: -Chalk and talk, Power point presentation
- Links: -<https://www.youtube.com/watch?v=f-sRcVkZ9yg>
<https://www.youtube.com/watch?v=suYcri3Fzcl>
<https://www.youtube.com/watch?v=hCQHWimJFGM>
- NPTEL Links-<https://archive.nptel.ac.in/courses/105/102/10510219/>

Text Books:

1. Kibert, Charles J. Sustainable construction: green building design and delivery, Wiley, 2008. 2nd Edition

References:

1. Prof. Dr. Michael Bauer, Peter Mösele and Dr. Michael Schwarz (2010) “Green Building – Guidebook for Sustainable Architecture” Springer.
2. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison (2001) “Green Building Handbook” Volume 1-Spon Press.
3. Mili Majumdar, (2002) “Energy-efficient buildings in India” Tata Energy Research Institute.
4. TERI “Sustainable Building Design Manual- Volume I & II” Tata Energy Research Institute.

Web links and Video Lectures (e-Resources):

1. <https://www.youtube.com/watch?v=QohffVIj-TQ>
2. <https://www.youtube.com/watch?v=bsQBSVJoV04&t=15s>
3. <https://www.youtube.com/watch?v=nFBvLlFFqI>
4. <https://www.youtube.com/watch?v=WShyn98a8mY&list=PLXCfO3gR tpRw w b6wpfkArLRWIojsyiB&index=1>
5. <https://www.youtube.com/watch?v=3Ww2TP tU7o>

Course Outcomes (COs):

At the end of the course, students will be able

1. Demonstrate the knowledge of sustainable building concepts. (PO -1,4,6,7)
2. Analyze different alternative building materials based on specific climate and with environmentally responsibility. (PO -1,4,6,7,8,10, 12)
3. Demonstrate different sustainable building design techniques using passive techniques. (PO -1,4,6,7,8,9,10, 12)
4. Design the building reducing energy and resource consumption. (PO -1,4,6,7,8,9, 10,12)
5. Apply water conservation principles in buildings. (PO -1,4,6,7,8,10, 12)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	Marks	Course out comes mapped
Internal Test-I	30	CO1, CO2 & CO3
Internal Test-II	30	CO4 & CO5
Average of the two internal tests shall be taken for 30 marks		
Other components		
Assignment – MCQ, Quiz, Group presentation	10	CO1, CO2, CO3
Presentation and Report	10	CO1, CO2, CO3, CO4 & CO5
Semester End Examination (SEE)	100(Scale down to 50)	CO1, CO2, CO3, CO4, CO5

ENVIRONMENTAL POLLUTION CONTROL TECHNOLOGIES	
Subject Code: CVOE04	Credits: 3:0:0
Pre requisites: - Nil	Contact Hours: 42L
Course Coordinator: Dr. A Lavanya	

Course Content

Unit I

Domestic Wastewater

Introduction, description of hydrologic cycle, various sources and types of wastewater. Management of wastewater within the building: different types of plumbing system-one pipe and two pipe systems. Conventional flow diagram of wastewater treatment. Concept of BOD and COD. BOD kinetics and problems, general standards for discharge of environmental pollutants. Working principles: Rotating biological contractor (RBC), moving bed biological reactor (MBBR).

- Pedagogy/Course delivery tools:-Chalk and talk, Power point presentation
- Links: -<https://www.youtube.com/watch?v=sBnrwhYKbEg>
<https://www.youtube.com/watch?v=z-59Og-CbgQ>
<https://www.youtube.com/watch?v=SPUa7A5hRCc>
- NPTEL Links: -<https://www.youtube.com/watch?v=4-SRMmqH2s4&t=8s>
<https://www.youtube.com/watch?v=TZlA-6tHqTo>

Unit II

Industrial Wastewater

Introduction, water usage in Industry, Industrial wastewater treatment - Theories and Practices: Volume Reduction: classifying wastes; conserving wastewater; changing production to decrease wastes; reusing both industrial and municipal effluents as raw water supplies and eliminating batch or slug discharges of process wastes. Concentration Reduction: process changes, equipment modifications, segregation of wastes, equalization of wastes, by-product recovery and proportioning wastes. Pre-treatment of Industrial wastewater –Neutralization: Mixing of wastes and chemical treatment. Equalization and Proportioning: objectives and methods.

- Pedagogy/Course delivery tools:-Chalk and talk, Power point presentation, videos
- Links:<https://youtu.be/SRvRFY-c5U?list=PL4SPMn8HFBYBhLHBY8D7iCNek9sWGWPcX>
<https://youtu.be/QO5X0iaq2S8?list=PL4SPMn8HFBYBhLHBY8D7iCNek9sWGWPcX>

- NPTELLinks:https://youtu.be/8FjhsODW1q4?list=PLLy_2iUCG87Cr__rs9sS1zSaR62imd0uB
- https://youtu.be/Ar04qG1P8Es?list=PLLy_2iUCG87Cr__rs9sS1zSaR62imd0uB

Unit III

Solid Waste Management

Introduction, classification and characteristics of solid wastes, Stages in municipal solid waste management. Composting and its methods. Landfills: factors for landfill site selection, Landfill design approach, Leachate and gas collection system. Solid waste management in apartments. Waste to energy conversion approaches.

- Pedagogy/Course delivery tools:-Chalk and talk, Power point presentation
- Links: -<https://archive.nptel.ac.in/courses/105/103/105103205/>
<https://www.youtube.com/watch?v=Hi4zFTqzf7Q><https://www.youtube.com/watch?v=cjIacnNRLHE&t=10s>
- NPTEL Links: -<https://www.youtube.com/watch?v=ZHD BK5QDd54&t=3s>
https://www.youtube.com/watch?v=hu51ENxiR_M&t=1s

Unit IV

Air & Noise Pollution

Air & Noise pollution: Introduction, history of air pollution. Sources of air pollution and classification of air pollutants. Ambient air quality monitoring: dust fall jar, high volume air sampler and problems. Sources of noise pollution. Standards of noise recommended by Ministry of Environment and Forest. Preventive measures.

- Pedagogy/Course delivery tools:-Chalk and talk, Conventional water treatment plant visit, invited lectures from industry people, Power Point Presentation
- Links:https://www.youtube.com/watch?v=u142u-wJFwI&list=PLLy_2iUCG87BwOQUbS7WSdMVWHDXByk-w&index=2
https://youtu.be/StL9XX7qwCc?list=PLLy_2iUCG87BwOQUbS7WSdMVWHDXByk-w
- NPTEL Links: -<https://youtu.be/5dukz1UOtKA>
<https://youtu.be/DAQapF-F4Vw>
https://youtu.be/I7Z34WU257U?list=PLLy_2iUCG87BwOQUbS7WSdMVWHDXByk-w

Unit V

Environmental Impact Assessment

Definition of EIA, need for EIA, EIS, FONSI, REIA, CEIA, step-by-step procedure for conducting EIA, limitations of EIA, methodologies of EIA: listing, Adhoc method,

Network method and Overlay method. Public participation in environmental decision making, objectives of public participation and public participation techniques. Practical consideration in preparing in EIA and EIS.

- Pedagogy/Course delivery tools:-Chalk and talk, invited lectures from industry people,Powerpoint Presentation, video.
- Links:https://youtu.be/8vymflfip2w?list=PLLy_2iUCG87CkrNdXME16BCptwGx1fl67
https://youtu.be/E_oRwSRdgcQ?list=PLLy_2iUCG87CkrNdXME16BCptwGx1fl67
https://www.youtube.com/watch?v=HlBYCtJ9_Cw
- NPTEL Links: -https://www.youtube.com/watch?v=WIqeZH_0jqQ
https://youtu.be/E_oRwSRdgcQ?list=PLLy_2iUCG87CkrNdXME16BCptwGx1fl67

Text Books:

1. Garg. S.K, “Sewage disposal and Air pollution engineering”, Khanna Publications, 2-019, ISBN-10: 9788174092304
2. Industrial Waste Treatment Contemporary Practice and Vision for the Future by Nelson Leonard Nemerow, Elsevier, 2007, ISBN-13: 978-0-12-372493-9.
3. George Tchobanoglous et.al., “Integrated Solid Waste Management”, Tata-McGraw-Hill, Inc. New York, 1993.
4. Rao, M.N and Rao, H.V.N. (1993) ‘Air Pollution’, Tata-McGraw-Hill Publishing Company Ltd., New Delhi, India.
5. Y. Anjaneyulu and Valli Manickam, “Environment Assessment Methodologies”, B.S Publications, Hyderabad, 2007.

Reference Books:

1. Rao.C.S, (1992) “Environmental Pollution Control Engineering”, Wiley Eastern Limited.
2. Gilbert M Masters, (2004), “Introduction to Environmental Engineering and Science” Second Edition. Pearson Education.
3. Mahajan.S.P, “Pollution Control in Process Industries”, Tata McGraw Hill Publishing Co., New Delhi.
4. A.D.Bhide and B.B.Sudareshan, “Solid waste management in Developing countries”, NEERI, Nagpur, 1983.
5. Larry W Canter, “Environmental Impact Assessment” –McGraw – Hill International Editions, 1996.
6. Pollution Control in Process Industries by S P Mahajan, McGraw Hill Education (2017), ISBN-13: 978-0074517727.

Web links and video Lectures (e- Resources):

1. <https://www.youtube.com/watch?v=4-SRMmqH2s4&t=8s>
2. <https://www.youtube.com/watch?v=TZlA-6tHgTo>
3. https://youtu.be/8FjhsODW1q4?list=PLLy_2iUCG87Cr__rs9sS1zSaR62imd0uB
4. <https://www.youtube.com/watch?v=ZHdBK5QDd54&t=3s>
5. https://youtu.be/I7Z34WU257U?list=PLLy_2iUCG87BwOQUBs7WSdMVWHDXByk-w
6. https://youtu.be/E_oRwSRdgcQ?list=PLLy_2iUCG87CkrNdXME16BCptwGx1fl67

Course Outcomes (COs):

At the end of the course, students will be able to

1. Identify the domestic wastewater sources and its treatment technologies. (PO - 1 & PSO - 1)
2. Identify the industrial wastewater control technologies. (PO - 1,2)
3. Identify municipal solid waste management techniques. (PO - 1,2)
4. Identify Air and noise pollution sources and control techniques. (PO - 1,2)
5. Describe the fundamental concepts of EIA and its methodologies, along with significance of public participation in EIA. (PO - 1,2).

Course Assessment and Evaluation:

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Assignment – MCQ, Quiz, Group presentation	10	CO1, CO2, CO3, CO4 & CO5
Semester End Examination (SEE)	100	CO1, CO2, CO3, CO4, CO5