



NATIONAL ENGINEERING COLLEGE
(An Autonomous Institution – Affiliated to Anna University Chennai)
K.R. NAGAR, KOVILPATTI – 628 503

SUSTAINABLE DEVELOPMENT GOALS –17

PARTNERSHIPS FOR THE GOALS





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17.1 Collaboration for SDG Best Practices

The Department of Civil Engineering at National Engineering College successfully organized an International Technical Webinar titled “Rubbercrete Bricks: Pioneering Sustainable Construction with Scrap Tire Innovation” through an online platform. The session was delivered by Dr. Bashar S. Mohammed, Associate Professor at Universiti Teknologi PETRONAS, Malaysia, who served as the international guest speaker. In his insightful presentation, he addressed critical issues related to waste tyre management and introduced innovative approaches for utilizing recycled tire rubber in concrete production. He elaborated on the development and characterization of rubberized concrete and discussed the structural performance of rubbercrete walls as a sustainable construction solution. Dr. Mohammed also emphasized best practices in waste management, effective strategies to reduce carbon footprints, and highlighted innovative products such as Rubber crete and There coBlocks that contribute to environmentally responsible construction practices.

The webinar commenced with a welcome address by Dr. I. Padmanaban, Professor and Head of the Department of Civil Engineering, who warmly welcomed the gathering and highlighted the importance of sustainable innovations in the field of civil engineering. The session was coordinated by Dr. C. Chella Gifta, Associate Professor, and Ms. R. Harshani, who efficiently organized and facilitated the smooth conduct of the International Webinar. The event witnessed active participation from over 100 external attendees across India, along with second- and third-year Civil Engineering students and faculty members of the institution. A few students from Universiti Teknologi PETRONAS also participated in the session and greatly benefited from the expert insights shared. Overall, the webinar served as an enriching academic platform that fostered knowledge exchange, international collaboration, and awareness of sustainable construction practices among aspiring civil engineers.



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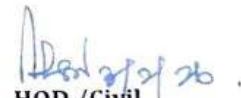
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(An Autonomous Institution affiliated to Anna University, Chennai)
Department of Civil Engineering

03.02.2026

Submitted to the Principal :

Department of Civil Engineering is planning to organize an International Online Webinar on 14 February 2026 (Saturday) , scheduled from 11.30 AM to 12.30 PM (IST), for the students and faculty members. Tentative title of the webinar is Rubbercrete Bricks: Pioneering Sustainable Construction with Scrap Tire Innovation and the session will be delivered by an eminent international academician **Dr. Bashar S Mohammed, Associate Professor Civil & Environmental Engineering Universiti Teknologi PETRONAS Perak, Malaysia** (Total Citations: 5,300 and h-Index: 43) through an online platform.

The objective of the webinar is to provide international academic exposure, encourage innovation, and enhance knowledge in emerging areas relevant to sustainable future in civil engineering. Hence, we kindly request to grant permission to conduct the above-mentioned webinar.


HOD /Civil



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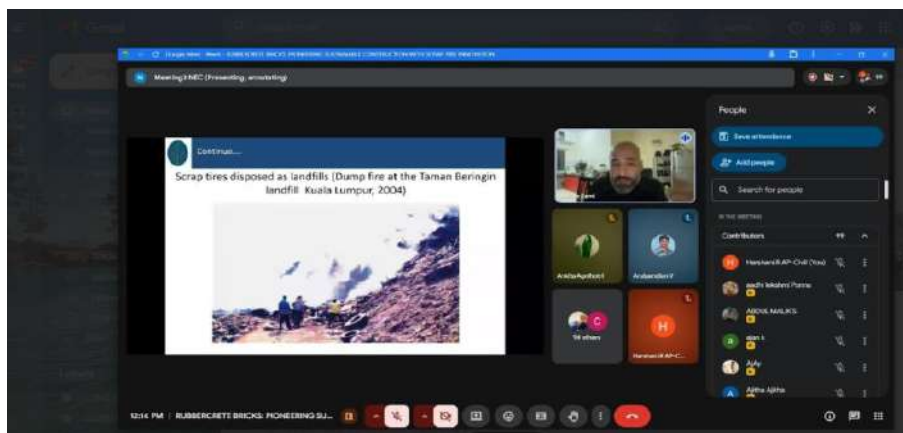
National Engineering College
(Autonomous Institution)
K.R.Nagar, Kovilpatti - 628 503.
DEPARTMENT OF CIVIL ENGINEERING
Organizes
An International Webinar
on
**Rubbercrete Bicks:
Pioneering Sustainable
Construction with
Scrap Tire Innovation**
February 14th | **Saturday**
2026 | **11.30 a.m.**
meet.google.com/www-pvie-jgi
For registration




Dr Bashar S Mohammed
Associate Professor
Civil & Environmental Engineering
Universiti Teknologi PETRONAS
Bandar Seri Iskandar, 32610 Perak, Malaysia



THIRUVALLUVAR
12-24 x 2019





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17.2 Dedicated Courses for Sustainability SDGs

19TD10E SUSTAINABLE DEVELOPMENT AND PRACTICES

L T P C
0 0 0 3

COURSE OUTCOMES

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

- CO 1: recognize the sustainable development and the way to achieve the sustainable development.
- CO 2: outline the concept, factors governing the sustainability and their linkages.
- CO 3: explain the environmental impact assessment and environmental audit.
- CO 4: describe the environmental planning and managing the resources.
- CO 5: acquire the knowledge about the environmental problems and their solutions.

UNIT I SUSTAINABLE DEVELOPMENT

Need for Sustainability - 17 Sustainable Development Goals - Nine Ways to Achieve Sustainability - Economics as the Dismal Science - Population, Resources and Environment.

UNIT II CHALLENGES OF SUSTAINABLE DEVELOPMENT

Concept of Sustainability - Factors Governing Sustainable Development - Linkages among Sustainable Development, Determinants of Sustainable Development - Case Studies on Sustainable Development.

UNIT III ENVIRONMENT IMPACT ASSESSMENT AND AUDIT

Concepts-process-evaluation methodology-EIA and EMS integration-setting up of audit programme - typical audit process - carrying out the audit-benefits of environmental auditing-environmental audit programmes in India.



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UNIT IV ENVIRONMENTAL PLANNING

Introduction - Perspective of Environmental Planning - land resource development planning - Planning and managing the natural resources - landscape ecological planning - information and decision of environmental planning - Land use policy in India.

UNIT V ENVIRONMENTAL EDUCATION

Knowledge about the environment - Knowledge about the environment and population growth - Knowledge about the solution and environmental problems - Environmental education (EE) – Strategies for EE – Models for future Environmental Education Systems.

TEXT BOOKS

1. Rogers P, Jalal K.F, Boyd J.A, "An Introduction to Sustainable Development", Earth scan Publications Ltd., UK, 2006.
2. Santra S.C, "Environmental Science", 3rd Edition, New Central Book Agency (P) Ltd., London, 2013.

REFERENCES

1. Stavins R.N. "Economics of the Environment: Selected Readings", 5th Edition, W.W. Norton and Company, New York, 2005.
2. Sachs J.D, "The Age of Sustainable Development", Columbia University Press, New York, 2015.

Course Code	ENVIRONMENTAL SCIENCE AND	L	T	P	E	C
23CE22C	SUSTAINABILITY	2	0	0	0	2

COURSE OUTCOMES

Upon the successful completion of the course, the student will be able to

- CO1 : Explain the functions of environment, ecosystems and biodiversity and their conservation.
- CO2 : Analyze the causes, effects of environmental pollution and natural disasters.
- CO3 : Apply the understanding of renewable and non-renewable resources.
- CO4 : Apply the goals of sustainable development for technological and societal development.
- CO5 : Demonstrate the knowledge of sustainability practices, energy cycles .

CO 1: Explain the functions of environment, ecosystems and biodiversity and their conservation

Definition, scope and importance of environment – need for public awareness. Ecosystem and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ.

L:6



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CO 2 Analyze the causes, effects of environmental pollution and natural disasters

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

L:6

CO 3 Apply the understanding of renewable and non-renewable resources

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

L:6

CO 4 Apply the goals of sustainable development for technological and societal development

Development, GDP, Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

L:6

CO 5 Demonstrate the knowledge of sustainability practices, energy cycles

L:6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization- Socio-economical and technological change.

TEXT BOOKS:

1. Anubha Kaushik and C.P.Kaushik's "Perspectives in Environmental Studies", 6th Edition, New Age International Publishers, 2018.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2016.
3. Gilbert M. Masters, 'Introduction to Environmental Engineering and Science', 2nd Edition, Pearson Education, 2004.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38th Edition 2010.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT. LTD, New Delhi, 2007.
4. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. 2013.

L:30; TOTAL : 30 PERIODS



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23CE29E

SMART CITIES

L	T	P	E	C
3	0	0	0	3

COURSE OUTCOMES

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

CO1: Explain the concept of smart & sustainable city and associated challenges.

CO2: Explain the Infrastructure Planning and Development for smart Cities.

CO3: Explain feasibility analysis of Transportation system for Smart Cities.

CO4: Apply data-driven strategies and modern technologies to improve smart city functions.

CO5: Apply GIS and remote sensing techniques to urban planning and management for smart cities.

CO1 Explain the concept of smart & sustainable city and associated challenges L: 9

Introduction to smart & sustainable cities- Definition, dimensions, scope Smart Cities – Global Standards and Performance Benchmarks, Practice Code, Principal stakeholders, key trends in smartcities developments, Concept of Sustainable cities. Applications of SmartTechnologies in Urban Planning, Case Studies of Smart City Projects, Challenges and Future Trends.Smartcity Mission of India.

CO2 Explain the Infrastructure Planning and Development for smart Cities L: 9

Planning for Urban Infrastructure, Introduction to city planning, key trends in smart cities developments, Sustainable features for smart cities. Role of Planner in the provision of urban networks for different services. Feasibility studies for infrastructure projects, planning for major infrastructure projects, Various Infrastructure Program and policies by MOUD, PPP (DBOOT, BOOT, etc.) in infrastructure projects. Dimension of smart cities, financing smart cities development, Governance of smart cities.



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CO3 Explain feasibility analysis of Transportation system for Smart Cities L: 9

Urbanization and urban mobility, urban land use and transport. Concepts of sustainable mobility, public transportation, pedestrians and bicyclists and parking, fundamentals of the intelligent transportation systems (ITS)

CO4 Apply data-driven strategies and modern technologies to improve smart city functions L: 9

Role of Technologies in Smart Cities - Data driven strategies implementation in smart cities, leveraging recent technologies in enhancing urban living: internet of things (IoT), ICT services for smart cities, Benefits of employing ICT, ICT system components for smart cities, State of the art in ICT.

CO5 Apply GIS and remote sensing techniques to urban planning and management

for smart cities L: 9

Fundamentals of GIS and Remote Sensing, Applications of GIS and Remote Sensing – Urban Planning and Management, Smart Cities, Transportation Planning, Environmental Management and Sustainability, Case Studies.

REFERENCES

1. P. Sharma , “Sustainable Smart cities in India, Challenges and Future Perspectives”, Springer Link, 2017
2. Sameer Sharma, “Smart Cities Unbounded- Ideas and Practice of Smart Cities in India”, Bloomsbury India, 2018.
3. Binti Singh, Manoj Parmar, “Smart City in India Urban Laboratory, Paradigm or Trajectory?”, Routledge India, 2019
4. <https://smartcities.gov.in/guidelines#block-habikon-content>
5. Stimmel, L., "Building Smart Cities: Analytics, ICT, and Design Thinking," Boca Raton, FL, USA: CRC Press, Taylor & Francis Group, 2016.
6. UN-Habitat, “Inclusive and sustainable urban planning: a guide for municipalities”; Volume 3: Urban Development Planning (2007); United Nations Human Settlements Programme (ISBN: 978- 92-1-132024-4).

L: 45; TOTAL: 45 PERIODS



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23CE30E

ENERGY EFFICIENT BUILDINGS

L	T	P	E	C
3	0	0	0	3

COURSE OUTCOMES

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

CO1: Explain Energy Demand and Efficient Systems

CO2: Explain Energy Use Solutions in Building Systems

CO3: Apply Heat Flow Principles and Optimize Glazing and Shading Systems

CO4: Acquire knowledge of ECBC Guidelines and Green Building Strategies

CO5: Explain Energy Economics and Efficient Building Technologies

CO1: Explain Energy Demand and Efficient Systems

9

Introduction and need for energy efficiency – Overview of energy efficiency in Vernacular buildings - Energy conservation through site planning, design and development - Energy - Past & Present scenario of World; National Energy consumption Data – Environmental aspects associated with energy utilization

CO2: Explain Energy Use Solutions in Building Systems

9

Factors that affect energy use in buildings - envelope factors, air- conditioning systems factors, Building management systems -Artificial lighting-Day lighting – Sources and concepts Daylight apertures

CO3: Apply Heat Flow Principles and Optimize Glazing and Shading Systems

9

Introduction to periodic heat flow in building- Glazing types, properties, glass layers, external and internal shading devices-Thermal performance of Building sections – Orientation of buildings

CO4: Acquire knowledge of ECBC Guidelines and Green Building Strategies

9

Overview of Energy Conservation Building Code (ECBC) -Concepts of green buildings - sustainable site, water efficiency, materials and resources, energy and atmosphere, indoor environmental quality, and innovation in design- case studies and examples. – Green Building Rating System- BREEAM, LEED, IGBC, GRIHA.

CO5: Explain Energy Economics and Efficient Building Technologies

9

Energy Economics –Net Present Value, Life Cycle Costing –Energy Service Companies ESCO concept- Case studies on the energy efficient techniques and technologies adopted in buildings

TEXT BOOKS

1. Zhai, Z. J. (2023). Energy Efficient Buildings: Fundamentals of Building Science and Thermal Systems. John Wiley & Sons.
2. Tyma, C., & Kolokotroni, M. (2022). Building Services Design for Energy Efficient Buildings. Routledge.
3. IGBC Green new buildings Manual Version 3.0
4. SP72: 2010- National Lighting Code

REFERENCES

1. Roaf, S., & Crichton, D. (2019). Adapting Buildings and Cities for Climate Change: A 21st Century Survival Guide. Routledge.
2. Koenigsberger, O. H., & Ingersoll, T. G. (2013). Manual of Tropical Housing and Building: Climate Design. Hyderabad: Universities Press India Pvt. Ltd.
3. Majumdar, M. (2009). Energy-efficient buildings in India. TERI Press.

L: 45; TOTAL: 45 PERIODS


SDG Member


SDG Co-ordinator


Principal