SDG 13: CLIMATE ACTION

SDG 13 highlights climate action and environmental protection. Integrating this SDG builds awareness of climate change impacts and mitigation strategies. Students understand adaptation and sustainability practices. This supports climate resilience.



List of Courses mapped to SDG 13:

S.No	Course Title	Name of the Program	Justification for SDG Mapping
1	ECOLOGY AND ENVIRONMENT	All Programs	Builds awareness of ecosystems, environmental change and the human role in climate and sustainability.
2	CLIMATE RESPONSIVE ARCHITECTURE	B.Arch	Teaches building design adapted to climate, cutting energy demand and emissions.
3	ENVIRONMENTAL POLLUTION CONTROL METHODS	All B.Tech Programs	Covers methods to control air, water and soil pollution and emissions.
4	EXPLORING OUR RESPONSES TO CLIMATE CHANGE	All B.Tech Programs	Examines climate-change impacts and mitigation and adaptation strategies.
5	ENVIRONMENTAL SCIENCES	B.Pharmacy	Introduces environmental systems, pollution and sustainability relevant to climate challenges.
6	INSIGHTS TO SUSTAINABLE DEVELOPMENT GOALS	All B.Tech Programs	Module 4 covers Climate Action, and Module 1 introduces planetary boundaries and the sustainability context in which climate change is addressed.

Course Outcomes and Syllabus

Ecology and Environment

SDG 13

Course code: 22UC0009 | L-T-P-S: 2-0-0-0 | Credits: 0 | Programme: All Programs

CO	Course Outcome	PO / PSO	BTL
CO1	Understanding the importance of Environmental education and conservation of natural resources	PO2,PO3	2
CO2	Understanding the Ecosystems, biodiversity	PO3,PO1	2
CO3	Understand global Environmental issues, pollution	PO1,PO3	2
CO4	Understand the knowledge on solid waste management, disaster management and EIA process	PO1,PO3	2

Syllabus

The Multidisciplinary nature of Environmental Studies - Natural Resources - Forest resources – Mining its impact on environment - Water resources – Mineral resources – Food resources – Energy resources - Land resources - Soil erosion – Ecosystems - Biodiversity and its Conservation - Environmental Pollution – Solid waste Management- Electronic waste management – Biomedical waste management - Disaster management –Environmental Legislation - Environmental Impact Assessment Process.

Climate Responsive Architecture

SDG 13

Course code: 22AR1209 | L-T-P-S: 3-0-0-0 | Credits: 3 | Programme: B.Arch

CO	Course Outcome	PO / PSO	BTL
CO1	An understanding of elements of climate, human comfort, and human body heat balance.	PO4	2
CO2	Understanding the concept of heat transfer in buildings, sun path diagrams and designing shading devices.	PO1	2
CO3	Understanding air movement for designing buildings accordingly.	PO4	2
CO4	Understanding climate responsive architecture through case studies.	PO5	2

Syllabus

Climate and Human Comfort: Factors that determine climate of a place – Components of Climate – Climate characteristics - Climate classifications - NBC climatic classification for India – classification for building designers in tropics. Human body heat balance – Human body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C.Mahony's tables. Heat Flow through Building Envelope Concepts: The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value) – Time lag and decrement – Types of envelops with focus on glass. Design of Solar Shading Devices: Movement of sun – Locating the position of sun – Sun path diagram – Overhead period–Solar shading– Shadow angles – Design of appropriate shading devices. Air Movement due to Natural and Built Forms: The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of courtyard. Climate and Design of Buildings: Design strategies in warm humid climates, hot humid climates, hot and dry climates, and cold climates – Climate responsive design exercises.

Environmental Pollution Control Methods

SDG 13

Course code: 22CE40A2 | L-T-P-S: 3-0-0-0 | Credits: 3 | Programme: All B.Tech Programs

CO	Course Outcome	PO / PSO	BTL
CO1	Applying the modelling techniques used in Air Pollution	PO1, PO5, PO7	3
CO2	Applying the Mathematical modelling techniques used for control of water Pollution	PO1, PO5, PO7	3
CO3	Understanding the waste treatment unit processes	PO1, PO5, PO7	2
CO4	Applying a mathematical model of municipal solid waste Management	PO1, PO5, PO7	3

Syllabus

Air pollution: Sources, Types, and effects and Fate of air pollutants. Meteorological factors and their impacts on pollutants dispersal. Sampling and measurement of air pollutants. Air quality standards. Air pollution control methods for particulates and gaseous pollutants. Emission Control equipments for particulate and gaseous matter. Mathematical modelling of Air pollutant Water pollution: Sources, Types and Effects of Water pollutants. Measurement of pollution loads: DO, BOD, COD, TOC - Water quality and Effluent discharge standards. Mathematical modelling of water pollution control Role of Microorganisms in wastewater treatment. Bacterial population dynamics- growth kinetics. Pre treatment, primary treatment, secondary and tertiary treatment of wastewater. Advance wastewater treatment Methods Solid waste: Sources and types of Solid wastes – Disposal methods: Land filling - Composting - Incineration – Pyrolysis. Reclamation of polluted and degraded soil by Bioremediation- Phyto- remediation. A mathematical model of municipal solid waste management Noise Pollution: Human acoustics, Sound and its general features- Noise and its measurement - Noise pollution hazards - Control methods.

Exploring our Responses to Climate Change

SDG 13

Course code: 20OE4003M | L-T-P-S: 4-0-0-0 | Credits: 4 | Programme: All B.Tech Programs

CO	Course Outcome	PO / PSO	BTL
CO1	Identify, discuss, and critique the merits and shortcomings of climate policies.	PO1	1
CO2	Recognize activities that emit or capture greenhouse gases, and opportunities to reduce emissions and enhance sinks.	PO1	2
CO3	Identify climate risks where you live, and opportunities to manage those risks.	PO1	2
CO4	Serve as a resource for others on climate issues in their community or at their workplace.	PO1	2

Syllabus

Identify, discuss, and critique the merits and shortcomings of climate policies - Recognize activities that emit or capture greenhouse gases, and opportunities to reduce emissions/enhance sinks - Identify climate risks where you live, and opportunities to manage risks - Serve as a resource for others on climate issues in their community or at their workplace. Web Link: 1. https://www.coursera.org/specializations/our-responses-climate-change?#about

Environmental Sciences

SDG 13

Course code: 22PY1212T | L-T-P-S: 3-0-0 | Credits: 3 | Programme: B.Pharmacy

CO	Course Outcome	PO / PSO	BTL
CO1	Understand the importance of Environmental education and conservation of natural resources.	PO7	2
CO2	Understand the importance of ecosystems and biodiversity.	PO7	2
CO3	Apply the environmental science knowledge on solid waste management, disaster management and EIA process.	PO7	3

Syllabus

The Multidisciplinary nature of environmental studies Natural Resources. Renewable and non- enewable resources: Natural resources and associated problems: a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources. Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Introduction types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Environmental Pollution: Air pollution; Water pollution; Soil pollution

Insights to Sustainable Development Goals

SDG 13

Course code: 25UC0032E | L-T-P-S: 2-0-0-0 | Credits: 0 | Programme: All B.Tech Programs

CO	Course Outcome	PO / PSO	BTL
CO1	Understand sustainable development — concept, pillars, and the road to the SDGs.	PO6, PO7, PSO1	2
CO2	Understand the 17 SDGs, their targets, and their interlinkages.	PO6, PO7, PSO1	2
CO3	Analyze the people-and-prosperity SDGs in the Indian and global context.	PO6, PO7, PSO2	4
CO4	Analyze the planet SDGs — climate, energy, water, and ecosystems.	PO6, PO7, PSO2	4
CO5	Apply SDG measurement, governance, and localisation.	PO7, PO11, PSO2	3
CO6	Analyze how technology, AI, and innovation can accelerate the SDGs.	PO5, PO7, PSO2	4

Syllabus

Module 1: Foundations of Sustainable Development. Topics: What sustainable development means; The Brundtland definition; The three pillars - economic, social, environmental; Planetary boundaries; From MDGs to SDGs; The 2030 Agenda and 'leave no one behind'; Sustainability vs growth debates; India's sustainability context. Labs: Map a real project against the three pillars of sustainability; Footprint lab: estimate and reduce a sustainability footprint. Case Study: a development-vs-environment trade-off (e.g., a dam/infrastructure project): analyse how the three pillars of sustainability were balanced or violated.

Module 2: The 17 SDGs Overview. Topics: Overview of all 17 goals; Targets and indicators; The SDG 'wedding cake' model; Interlinkages and trade-offs among goals; Synergies across goals; 'Leave no one behind'; The global indicator framework; Tracking progress. Labs: Build an SDG interlinkage map for a chosen development problem; Indicator lab: interpret SDG progress data for a country/state. Case Study: SDG interlinkages in practice (e.g., clean energy enabling health and education): analyse how progress on one goal advances others.

Module 3: People & Prosperity SDGs. Topics: No poverty and zero hunger; Good health and well-being; Quality education; Gender equality; Decent work and economic growth; Reduced inequalities; Industry, innovation, and infrastructure; India's progress on people/prosperity goals. Labs: Analyse a region's people/prosperity indicators and gaps; Design an intervention targeting a people/prosperity SDG. Case Study: an Indian social initiative (e.g., a health/education/livelihood program): analyse its SDG contribution and outcomes.

Module 4: Planet SDGs. Topics: Clean water and sanitation; Affordable and clean energy; Climate action; Life below water; Life on land; Sustainable cities and communities; Responsible consumption and production; Circular economy. Labs: Audit a setting for responsible consumption and propose circular fixes; Design a planet-SDG (energy/water/waste) solution for a community. Case Study: a clean-energy or water initiative in India (e.g., solar mission / river rejuvenation): analyse its planet-SDG impact and scalability.

Module 5: Partnership, Governance & Measurement. Topics: Peace, justice, and strong institutions (SDG16); Partnerships for the goals (SDG17); Financing the SDGs; Indicators and the SDG India Index; Localising the SDGs; Voluntary National Reviews; Role of governments, business, and civil society; Accountability and reporting. Labs: Build an SDG scorecard for an organisation/community; Design a multi-stakeholder partnership for an SDG target. Case Study: the SDG India Index / a state's SDG localisation: analyse how SDGs are measured and localised, and what drives improvement.

Module 6: Technology, AI & Innovation for the SDGs. Topics: Technology as an SDG accelerator; AI for good - use cases across goals; Social entrepreneurship and impact ventures; Frugal and inclusive innovation; Digital public infrastructure for development; Measuring impact (theory of change); The engineer's and youth's role; Designing an SDG-aligned solution. Labs: Design a technology/AI-enabled solution mapped to an SDG with a theory of change; Pitch a social-impact venture targeting one or more SDGs. Case Study: AI/technology for an SDG (e.g., AI in healthcare access or precision agriculture): analyse how technology accelerates a specific goal, with its risks.