SUBJECT NO-EV10003, SUBJECT NAME- ENVIRONMENTAL SCIENCE

LTP- 2-0-0,CRD- 2

SYLLABUS :-

Environmental Problems, Their Causes, and Sustainability: Causes of modern environmental concerns (overpopulation, tragedy of the commons, affluenza, poverty); IPAT model for human impact on the environment; Ecological footprint analysis; Earth Overshoot Day; Sustainable development – its need and importance; Principles of sustainability; Environmentally sustainable societies; 2030 Agenda for sustainable developmentEcosystems: What are they and how do they work;Matter and energy flow in ecosystems; Natural capital and ecosystem services (provisioning services, regulating services, cultural services); Role of biogeochemical cycles in globalization and sustainable developmentHuman Population and Urbanization: Population explosion, urbanization and sustainability; Challenges of megacities; Spatial patterns of urbanization; Urban sprawl – causes, consequences and regulation; Smart growth, eco-cities and sustainable mobilityUnderstanding Air Pollution: Air pollutants – classification, sources and impacts, Clean air act and national ambient air quality standards (NAAQS);Air quality index; Ground level ozone and photochemical smog; Long-range transboundary air pollution; Ozone depletion in the Antartic stratosphere and the Montreal Protocol; Understanding and improving indoor air qualityClimate Change: Evidence, causes and effects, Keeling curve; Global warming potential; Role of IPCC in the understanding of climate change; Global climate agreements – The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement; Mitigation strategies – carbon capture, utilization and storage; adapting to climate change Energy and Sustainability: Global energy trilemma; Energy efficiency and conservation; Renewable energy for human sustainability (solar, wind, hydroelectricity, biomass, and geothermal energy)Waste Management: Consumerism and our throw-away culture; Characteristics of municipal solid waste; Sustainable practices in waste management; CPHEEO guidelines for solid waste management; Transition to zero waste lifestyle; Tackling the rise of e-waste; Looming waste crisis from global renewable energy boomIndustrial Ecology and Circular Economy: Urban ecology and urban metabolism; material and energy flows of leading global economies; origin of industrial ecology, its definition and its relation to the concept of sustainability; closing material loops (open vs. closed-loop systems) and transition to a circular economy; circular business models; industrial symbiosis – Kalundborg Eco-Industrial ParkTackling Water Pollution: Sources of water pollution; Classification of water pollutants; Overview of water pollution mitigation measures; Applicable wastewater discharge standards (new standard by the National Green Tribunal) and typical flow schemes for sewage treatment plant; Potable water quality requirements (IS 10500); Water quality index; Overview of water treatment plantNoise Pollution: Sources and effects of noise; quantification of noise pollution (Leq, LAeq, etc.); Control and regulation rules in India