BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

SECOND SEMESTER 2020-2021
COURSE HANDOUT

Date: 16.01.2021

In addition to part I (General Handout for all courses appended to the Time table) this portion gives further specific details regarding the course.

Course No : **BITS F225**
Course Title : **Environmental Studies**
Instructor-in-Charge : **Smita Raghuvanshi**
Instructor(s) : **Arvind K Sharma, B Vani, G Muthukumar, Madhurima Das, Tanu Shukla, Rajneesh Choubisa, Harikrishnan Gopinadhan Nair, Sunita Raina**

1. Course Description: Environment, human population, and industrialization; natural resources and the impact of man-made activities on them; structure and function of ecosystem, population ecology, biodiversity and its conservation, environmental pollution, social issues and the environment, and environmental impact assessment.

2. Scope and Objective of the Course: The United Nations Conference on Environment and Development (UNCED) held in Rio De Janero in 1992, the 1994 conference on United Nations Framework Convention on Climate Change (UNFCCC), and a very recent 2015 Paris Agreement have created awareness among the people around the globe about the deteriorating condition of Earth's environment. It has warned us not to be ignorant of the environmental issues. In lieu of the situation, the Hon'ble Supreme Court directed the UGC to introduce a basic course on environment for undergraduate students in India.

The course is designed to cover all aspects of environment [Ecological including biotic (flora- fauna) and abiotic (air, water, soil & geography), social, economic and aesthetical]. The course is of interdisciplinary nature dealing with social, biological & engineering aspects of environment. The role of biotic and abiotic factors in the functioning of the environment, the impact of anthropogenic activities on the environment, different environmental pollutants, its impact and management strategies; and ecological, socio-political and economic issues will be discussed with appropriate real-life examples and case studies. The course would also provide insight into practical solutions to different environmental issues. Finally, important concepts of environmental impact assessment from all the above mentioned sources would be dealt with. The interested students can take the learnings forward from this point and enrich themselves further by doing other electives/projects in these areas.

3. Text Books: Erach Bharucha, Text Book of Environmental Studies for Undergraduate Courses, University Press (India) Private Limited, Second Edition, 2005.

4. Reference Books:

1. Richard T. Wright, Dorothy F. Boorse, Gordon College, Environmental Science: Toward a Sustainable Future, Pearson Publishers, 12th Edition, 2014.
2. Gerard Kiely, Environmental Engineering, McGraw Hill Education, Special Indian Edition, 2007.
3. Gilbert M. Masters and Wendell P. Ella, Introduction to Environmental Engineering and Sciences, PHI Learning Private Lt d, 3rd Edition, 2007.
4. Dynamically shared on Google class room

5. Course Plan:

Module Number	Lecture session	Reference	Learning Outcome
1. Introduction to Environmental Studies (All faculties, 18/01)	L1: Introduction to the course and importance of Environment.	*T1-Unit 1 & Class notes*	Understand the modality of the course, environmental issues and its impact of life on Earth
2. Concept of ecosystems (20/01; 22/01 BV)	L2: Structure of Ecosystems, Global biomes and Climate. L3: Energy and Material flow in ecosystems	*T1-Unit 3; R1 Ch-5 and 7 & Class notes*	Learn about structure and functioning of ecosystems, biomes and climate
3. Biodiversity and its conservation (25/01; 27/01 BV)	L4 - 5: Biodiversity, its value and measurement methods	*T1-Unit 4; R1 Ch-6 & Class notes*	Know about the biological wealth and its value. Learn biodiversity estimation methods, understand why there is biodiversity crisis and methods/strategies for its conservation
4. Biodiversity and its conservation (29/01, 01/02 BV)	L 6 - 7 : Biodiversity crisis and conservation strategies	*T1-Unit 4; R1 Ch-6 & Class notes*	Know about the biological wealth and its value. Learn biodiversity estimation methods, understand why there is biodiversity crisis and methods/strategies for its conservation
5. Environmental Pollution (05/02, 08/02 AKS)	L9 : Pollution: Air, Water, Soil, Marine, Noise, Thermal, Nuclear & Related Aspects	*T1 –Unit 5, 5.1 – 5.8& Class notes*	An overview of environmental pollution, which will unfold as details are covered
6. Air Pollution (10/02, 12/02 SR)	L10: Criteria pollutants, Non criteria pollutants, L11: Air pollution meteorology, Atmospheric Dispersion	*R2 – Ch 8, 8.1, 8.3, 8.4, 8.6 - 8.10*	Gives an understanding of different types of air pollutants, effect of atmosphere on pollutants behavior, specific case study of carbon capture sequestration
7. Environmental Laws and Regulations- (15/02, 17/02 SR)	L12 and L13: Legal framework of Environmental Laws & regulations	R2 – Ch 1, 1.2 – 1.3, 1.6, 1.8 & class notes	Gives an over view of US-EPA laws and CPCB laws & standards followed
8. Need and importance of water resources (19/02, 22/02 GM)	L14 and L15: Water Cycle, Water Requirements, Water resources, utilization and its management,	*T1-Unit 2 &Class Notes*	Present day status/over utilization of water resources and their pollution. Water stressed countries, disputes and conflicts over water

	Smart cities and water requirements		Need for Water Resource Management
9. Development and Regulation of Water Resources (26/02 GM)	L17: Water Resource Regulations in India	*T1-Unit 6 &Class notes*	Rain water harvesting, Innovations in irrigation techniques. Engineering considerations for construction of dams and major infrastructure projects
(Mid sem week March 1 – March 6)			
10. Development and Regulation of Water Resources (08/03 GM)	L18: Water Resource Regulations in India	*T1-Unit 6 &Class notes*	Rain water harvesting, Innovations in irrigation techniques. Engineering considerations for construction of dams and major infrastructure projects
11. Disaster mitigation and management (10/03, 12/03 GM)	L19, 20: Types of Natural Disaster, Hazard Identification, Risk Analysis and Management	*Class Notes and PPT*	Understand the importance of disaster mitigation, identification of various disasters and preparedness for their effective management
12. Environmental science and legislation (15/03 – Madhurima Das HSS)	L21: Sustainable Development, Eco-feminism.	-	-
12. Environmental science and legislation (17/03 – Hari Nair HSS)	L22: Environmental consciousness in India and Ecological imperialism (Modern period).	-	-
12. Environmental science and legislation (19/03 – Rajneesh Choubisa HSS)	L23: Population explosion, Human Health and Demographic Transitions.	-	-
12. Environmental science and legislation (22/03 – Sunita Raina HSS)	L24: Environmental Public Policy and Politics.	-	-
12. Environmental science and legislation (24/03 – Tanu Shukla HSS)	L25: Social Modernization, Information Technology and Environment and Health.	-	-

14. Technologies employed for industrial air emissions control (26/03 AKS)	L27: Characterizing the Air Stream, Equipment Selection, Different Types of Air Pollution Control Techniques	*R2 – Ch- 16 and Class notes*	Characterization of air stream(s), so that suitable equipment (technology) can be selected for industrial air emissions control
14. Design aspects of three major technologies for industrial air emissions control (31/03, 05/04, 07/04 AKS)	L28,29,30: Equipment Design: Scrubbers Absorption Adsorption	*R2 – Ch - 16 and Class notes*	Appreciation and understanding of the principles (involved) which help in designing the equipment for the control of industrial air emission(s)
15. Solid waste Management (09/04, 12/04 AKS)	L31 and 32: Integrated Management of Solid waste, Sources of Solid Waste, Properties of Municipal Solid Waste (MSW), Storage & Transport of MSW, Biological MSW Treatment Techniques	*R2 – Ch14, 14.1 -14.3, 14.8-14.12*	Awareness of integrated solid waste management system in place and methodologies followed
16. Sanitation science and engineering (19/04, 23/04 SR)	L34 and L 35: Sustainable Development Goal 6 (SDG 6) and alarming urgency of '*on the ground*' professional impact on clean water and sanitation	Reference Notes	Appreciation of sanitation science and engineering w.r.t SDG and understanding of technological developments in the field of sanitation
17. Population Ecology (26/04, 28/04 BV)	L36: Dynamics of natural populations L37: Mechanisms of Population Equilibrium, Response of population to environment	*T1-Unit 7; R1 Ch-4, 8 and 9 & Class notes*	Learn about different growth curves, intra and inter-species interactions. Understand evolution as a force for change, ecosystem responses to disturbance, ecological succession

6. Evaluation Scheme:

S.No.	Component	Duration	Weightage (100 % 200 Marks)	Date & Time	Remarks

1.	Midsem Test[#]	1h	30 % (60 M)	<March 1 to March 6>	OB
2.	Comprehensive Examination	2h	40 % (80 M)	<May 03>	OB
3.	Surprise quiz	-	30 % (60 M)	-	OB on regular basis

[#] Exact mode will be put up on Google Class room in due course of time.

7. Online Consultation Hour: To be announced in the class.

8. Notices: All Notices would be put up on Google class room.

9. Make-up Policy: Make-up is granted only for genuine cases with valid justification and prior permission of Instructor-in-charge. No makeup for surprise quizzes.

10. Note (if any):

Instructor-in-charge
BITS F225