Lovely Professional University, Punjab

Course Code	Course Title	Course Planner
CHE110	ENVIRONMENTAL STUDIES	16464::Dr. Ashish Kumar

Course Outcomes :Through this course students should be able to

CO1 :: observe the current environmental issues and associated problems.

CO2 :: illustrate the basic knowledge of environment and its various components.

CO3 :: devise new approaches to reduce various types of environmental pollution.

CO4 :: identify the environment policies and practices.

	TextBooks (T)		
Sr No	**Title**	**Author**	**Publisher Name**
T-1	PERSPECTIVE IN ENVIRONMENTAL STUDIES	ANUBHA KAUSHIK, C P KAUSHIK	NEW AGE INTERNATIONAL PUBLISHERS

	Reference Books (R)		
Sr No	**Title**	**Author**	**Publisher Name**
R-1	TEXT BOOK OF ENVIRONMENTAL STUDIES	D. DAVE AND S. S. KATEWA	CENGAGE LEARNING

Other Reading (OR)	
Sr No	**Journals articles as Compulsary reading (specific articles, complete reference)**
OR-1	http://www.ed.gov.nl.ca/edu/k12/curriculum/documents/science/highschool/ES3205_student_text_chapter_1.pdf ,
OR-2	http://collegesat.du.ac.in/UG/Envinromental%20Studies_ebook.pdf ,

Relevant Websites (RW)		
Sr No	**(Web address) (only if relevant to the course)**	**Salient Features**
RW-1	http://www.newagepublishers.com/samplechapter/000964.pdf	Basics of Environmental studies
RW-2	http://www.newagepublishers.com/samplechapter/001426.pdf	Multidisciplinary nature of environment
RW-3	http://www.oas.org/dsd/publications/Unit/oea79e/ch05.htm	Renewable resource
RW-4	http://www.un-documents.net/ocf-07.htm	Non-renewable resource

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RW-5	http://www.im4change.org/docs/chhat_chap1-11-40.pdf	Natural resource
RW-6	http://www.learner.org/courses/envsci/unit/pdfs/unit4.pdf	Ecosystem
RW-7	https://www.tracy.k12.ca.us/sites/eraco/Documents/Web/Pre-IB Labs/Ecological Pyramids.pdf	Ecological pyramids
RW-8	http://www.math.unt.edu/~rdoyle/1720/ch25-ecosystems.pdf	Ecological Succession
RW-9	http://www.thewildclassroom.com/biomes/estuaries.html	Importance of deserts & estuaries
RW-10	http://www.oklaenvirothon.org/pdfs/wildlife/biodiversity.pdf	Levels of Biodiversity
RW-11	http://www.cnrs.fr/inee/recherche/fichiers/Biodiversite_hotspots.pdf	Global Biodiversity Hot Spots
RW-12	http://pdf.usaid.gov/pdf_docs/PNABW370.pdf	Modes of conservation of Biodiversity
RW-13	http://www.envirocomp.org/books/chapters/1aap.pdf	Primary and Secondary pollutants
RW-14	http://idosi.org/wasj/wasj7%281%29/10.pdf	Green house effect, Acid rain, Depletion of ozone layer
RW-15	http://www.kankyo.metro.tokyo.jp/en/attachement/airpollution.pdf	Global warming, Smog, Control measures for air pollution
RW-16	http://environment.about.com/od/environmentalevents/a/waterdayqa.htm	Water pollutants, sources of water pollution
RW-17	http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-3.pdf	Eutrophication, Biomagnification
RW-18	http://www.buzzle.com/articles/causes-and-effects-of-land-pollution.html	Pollutants, different type of land pollutants, their origin and effects
RW-19	http://www.yourownhealthandfitness.org/Documents/Hagler_Noise_pollution.pdf	Sources, effects of noise pollution, control measures of noise pollution
RW-20	http://www.creationconcepts.org/resources/NUCLEAR.pdf	Nuclear Hazards (Effects & Control)
RW-21	http://edugreen.teri.res.in/explore/laws.htm	Environmental laws and regulations
RW-22	http://www2.dmu.dk/pub/fr741.pdf	Level of biodiversity
RW-23	http://www.cienciaviva.pt/divulgacao/cafe/World_biodiversity_hotspots.pdf	Biodiversity hot spot
RW-24	http://www.livescience.com/27692-deforestation.html	Deforestation
RW-25	http://www.actionbioscience.org/environment/hinrichsen_robey.html	Human population and environment
RW-26	http://www.bishnoism.com/thefirst.php	Bishnois of Rajasthan.
RW-27	http://pdf.usaid.gov/pdf_docs/PNAAT747.pdf	Silent Valley
RW-28	http://www.gangaaction.org/actions/issues/	Ganga pollution
RW-29	http://www.bmhrc.org/Bhopal%20Gas%20Tragedy.htm	Bhopal Gas Tragedy
RW-30	https://www.cbd.int/convention/	Convention on Biological Diversity

RW-31	http://www.nei.org/master-document-folder/backgrounders/fact-sheets/chernobyl-accident-and-its-consequences	Chernobyl Accident

Audio Visual Aids (AV)		
Sr No	**(AV aids) (only if relevant to the course)**	**Salient Features**
AV-1	https://www.youtube.com/watch?v=wvP7474y8Jw	Sustainable Development
AV-2	https://www.youtube.com/watch?v=Sk5ELLPsD80	Environmental Science and Sustainability Notes
AV-3	https://www.youtube.com/watch?v=Sk5ELLPsD80	Introduction to Environmental Science
AV-4	https://www.youtube.com/watch?v=7G3eXI_DPn8	Introduction to Environmental Science
AV-5	https://www.youtube.com/watch?v=iMy5-Npr69E	Land degradation
AV-6	https://www.youtube.com/watch?v=gRJBuM7qjQ0	Desertification
AV-7	https://www.youtube.com/watch?v=a0S8iayJDhQ	Causes and impacts due to mining
AV-8	https://www.youtube.com/watch?v=GK_vRtHJZu4	Biodiversity
AV-9	https://www.youtube.com/watch?v=5lK_fs3p7yc	Use of surface and ground water
AV-10	https://www.youtube.com/watch?v=n1gsyhuHGgc	Over-exploitation of surface and ground water
AV-11	http://study.com/academy/lesson/what-are-floods-causes-types-prevention.html	Floods
AV-12	https://www.youtube.com/watch?v=Xo1Jyzba7rA	Droughts
AV-13	https://www.youtube.com/watch?v=_v8MEaejTok	Conflicts over water
AV-14	http://study.com/academy/lesson/what-are-natural-resources-definition-lesson-quiz.html	Classification of natural resources
AV-15	https://www.youtube.com/watch?v=J4osIBchx7k	Importance of forests
AV-16	https://www.youtube.com/watch?v=eEFwaQej_0E	Sustainable Development
AV-17	http://study.com/academy/lesson/what-is-sustainable-forest-management-definition-and-examples.html	Control.
AV-18	http://study.com/academy/lesson/soil-profile-definition-development-types.html	Soil profile
AV-19	https://www.youtube.com/watch?v=kxqbpPWTl6A	Importance of water
AV-20	https://pmm.nasa.gov/education/videos/water-cycle-animation	Water cycle
AV-21	https://www.youtube.com/watch?v=m4WBbSv_N7U	Sources of water
AV-22	http://study.com/academy/lesson/what-is-a-renewable-energy-source-definition-example-quiz.html	Renewable Energy Source
AV-23	http://study.com/academy/lesson/renewable-non-renewable-resources-definition-differences.html	Non-renewable energy sources
AV-24	http://video.nationalgeographic.com/video/alternative-energy?source=relatedvideo	Use of alternate energy sources
AV-25	https://www.youtube.com/watch?v=xP0MuoYnMl0	Case studies: India's-rising-energy-needs
AV-26	https://www.youtube.com/watch?v=Da6DhVAeN9s	Case Studies in Municipal Energy Conservation
AV-27	https://www.youtube.com/watch?v=auBFn-u9b6A	JK Energy Solutions Case Study

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AV-28	https://www.youtube.com/watch?v=f_x_saJEGiw	Energy recovery
AV-29	http://study.com/academy/lesson/food-chains-trophic-levels-and-energy-flow-in-an-ecosystem.html	Food chains
AV-30	http://study.com/academy/lesson/what-is-ecological-succession-definition-types-stages.html	Ecological succession
AV-31	https://www.youtube.com/watch?v=Nbi4wW7ojXs	Desert Ecosystem
AV-32	https://www.youtube.com/watch?v=f8eCbwg-lik	Forest Ecosystem
AV-33	http://study.com/academy/lesson/aquatic-ecosystems-abiotic-factors.html	Aquatic Ecosystems
AV-34	https://www.youtube.com/watch?v=gB4UDHCvXMU	Grassland Ecosystem
AV-35	https://www.youtube.com/watch?v=7tgNamjTRkk	What is biodiversity and why is it important
AV-36	https://www.youtube.com/watch?v=Jtuh368CW3c	Levels of biological diversity: genetic, species and ecosystem diversity
AV-37	https://www.youtube.com/watch?v=VoS1-yOeEo4	Values of biodiversity.
AV-38	https://www.youtube.com/watch?v=GK_vRtHJZu4	India as a mega diversity nation
AV-39	https://www.youtube.com/watch?v=zJyxOYfvIfA	Threats to biodiversity: Habitat loss
AV-40	https://www.youtube.com/watch?v=JZv3LOMiI9Q	Endangered and endemic species of India
AV-41	https://www.youtube.com/watch?v=bTsxx1KZwlM	Water pollution
AV-42	https://www.youtube.com/watch?v=00c4goQRLek	Soil Pollution
AV-43	https://www.youtube.com/watch?v=-VaaTn_g1_k	Noise Pollution
AV-44	https://www.youtube.com/watch?v=KxlgRHf_7oA	Radioactive Pollution
AV-45	https://www.youtube.com/watch?v=Xvz3jh7ujZg	Nuclear hazards. Cause, effect and control
AV-46	https://www.youtube.com/watch?v=yhWnrNQPwAs	Solid waste management: Control measures of urban and industrial waste
AV-47	https://www.youtube.com/watch?v=3nx5yr2GnGk	Ill-effects of fireworks
AV-48	https://www.youtube.com/watch?v=61CNyFPdwO0	Acid rain and impacts on human communities and agriculture
AV-49	https://www.youtube.com/watch?v=9aEx067YkD	Ozone layer depletion
AV-50	https://www.youtube.com/watch?v=CTUOchYZG2k	Environment Laws:
AV-51	https://www.youtube.com/watch?v=hPgBLOZ85Cw	Environment protection act:
AV-52	https://www.youtube.com/watch?v=tYJOd-QYidc	Wild life conservation act
AV-53	https://www.youtube.com/watch?v=6U_4jX4engM	Forest conservation act:
AV-54	https://www.youtube.com/watch?v=aXdmqXG3ITU	Basics of Kyoto Protocol
AV-55	https://www.youtube.com/watch?v=p1sG3DX-blI	Montreal Protocol Documentary
AV-56	https://www.youtube.com/watch?v=fTznEIZRkLg	population growth
AV-57	http://study.com/academy/lesson/comparing-life-centered-human-centered-environmental-ethics.html	Environmental ethics
AV-58	https://www.youtube.com/watch?v=YIrKW6jXjdM	Environmental Conservation

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AV-59	https://www.youtube.com/watch?v=CebTVhzigOA	Public awareness

LTP week distribution: (LTP Weeks)	
Weeks before MTE	7
Weeks After MTE	7
Spill Over (Lecture)	4

Detailed Plan For Lectures

Week Number	Lecture Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples

Week 1	Lecture 1	Introduction and natural resources(Multidisciplinary nature of environmental studies)	T-1 R-1	RW-1 RW-2 RW-5 AV-4 AV-14	Lecture-1: Zero lecture for the introduction to the Course objectives, structure and details of academic tasks. Introduction to environment and its various components. Lecture-2: Interrelation of environmental studies with other subjects.	To make students conversant with the course objectives and academic details. To instill in students the global empathy for saving the world from environmental destruction. Students will learn how environmental study is related to all other subjects.	Lecture delivery with discussion	Medha Patkar, Maneka Gandhi, Anil Kumar Agarwal, Sunita narain, M S Swaminathan, Chandra Bhushan and many other renowned dignitaries and personages who have been treasured by distinguished awards in various disciplines now directing and managing center for science and environment-India top NGO to analyses and study the relationship between environment and development and create public consciousness about the need for sustainable development.

Week 1	Lecture 2	Introduction and natural resources(Multidisciplinary nature of environmental studies)	T-1 R-1	RW-1 RW-2 RW-5 AV-4 AV-14	Lecture-1: Zero lecture for the introduction to the Course objectives, structure and details of academic tasks. Introduction to environment and its various components. Lecture-2: Interrelation of environmental studies with other subjects.	To make students conversant with the course objectives and academic details. To instill in students the global empathy for saving the world from environmental destruction. Students will learn how environmental study is related to all other subjects.	Lecture delivery with discussion	Medha Patkar, Maneka Gandhi, Anil Kumar Agarwal, Sunita narain, M S Swaminathan, Chandra Bhushan and many other renowned dignitaries and personages who have been treasured by distinguished awards in various disciplines now directing and managing center for science and environment-India top NGO to analyses and study the relationship between environment and development and create public consciousness about the need for sustainable development.
Week 2	Lecture 3	Introduction and natural resources(Scope and importance: Concept of sustainability and sustainable development)	T-1 R-1	OR-1 OR-2 RW-24 AV-1 AV-2 AV-3 AV-16 AV-17	Scope and importance of environmental studies. Measures for sustainable development, problems of sustainable development. Classification of natural resources	Making students aware about scope and importance of environmental studies. Student will learn about the concept of sustainability and sustainable development. Student will learn about natural resources.	Lecture delivery with ppt, discussion	Borgen Project:Working to downsize poverty

Week 2	Lecture 4	Introduction and natural resources(Land resources: Land degradation, soil erosion and desertification)	T-1 R-1	AV-5 AV-6 AV-7 AV-18	Land resource, soil profile, function of soil. Cause, effect and control methods of land degradation, soil erosion and desertification. After the lecture delivery, last 15 minutes is used to allotment of the assignment/term paper topics.	Students will learn about land resource, soil erosion and its control methods, desertification.	Lecture delivery with discussion	The effect of desertification in Northern Gujarat
Week 3	Lecture 5	Introduction and natural resources(Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations)	T-1 R-1	RW-28 AV-15 AV-35	Forest resource. Importance of forests: Direct and indirect benefits. Deforestation: causes, effect and control.	Students will learn about importance and benefits of forest, deforestation.	Lecture delivery with discussion and using videos related to deforestation.	Most frequent rainfall in the tropical rain forest. Drought in Kalahandi (Government induced drought), Save Ganga Movement, Ganga action plan. Eco-task force to check the Ganga pollution. Cherrapunji-Drinking the sky. Still unsettled Kaveri dispute.
	Lecture 6	Introduction and natural resources(Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water)	T-1 R-1	AV-9 AV-10 AV-11 AV-12 AV-13 AV-19 AV-20 AV-21	Water resource. Importance of water. Water cycle. Source of water, over-exploitation of ground water. Water calamities: Floods and droughts. Conflicts over water.	Students will learn about water resource and various water calamities.	Lecture delivery with discussion and using videos related to water problems.	Most frequent rainfall in the tropical rain forest. Drought in Kalahandi (Government induced drought), Save Ganga Movement, Ganga action plan. Eco-task force to check the Ganga pollution. Cherrapunji-Drinking the sky. Still unsettled Kaveri dispute.

Week 4	Lecture 7	Introduction and natural resources(Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies)	T-1 R-1	RW-3 RW-4 AV-22 AV-23 AV-24 AV-25 AV-26 AV-27 AV-28	Renewable and non-renewable energy resources. Use of alternative energy resource and limitations of alternative energy resource. Energy recovery. Urban problems related to energy.	Giving an idea of different renewable and non-renewable energy resources.	Lecture delivery with discussion and using videos related to various sources of energy.	Solar energy flow as the single energy source that is perpetual and causes the flow of water and air currents that are renewable resources. Think about Petroleum and coal reserves of the world which are getting depleted rampantly-Fossil fuel reserves are non-renewable
	Lecture 8	Ecosystems(What is an ecosystem? structure and function of ecosystem)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.

Week 4	Lecture 8	Ecosystems(Energy flow in an ecosystem: food chains, food webs and ecological succession)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.
		Ecosystems(Case studies of the following ecosystems : a)forest ecosystem b) grassland ecosystem c) desert ecosystem d) aquatic ecosystem)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.

Week 5	Lecture 9	Ecosystems(What is an ecosystem? structure and function of ecosystem)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.
		Ecosystems(Energy flow in an ecosystem: food chains, food webs and ecological succession)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.

Week 5	Lecture 9	Ecosystems(Case studies of the following ecosystems : a)forest ecosystem b) grassland ecosystem c) desert ecosystem d) aquatic ecosystem)	T-1 R-1	RW-6 RW-7 RW-8 RW-9 AV-29 AV-30 AV-31 AV-32 AV-33 AV-34	Lecture 8-Introduction and classification of ecosystem. Structure of ecosystem: biotic and abiotic components. Function of ecosystem: food chain, food wave, flow of energy. Ecological pyramids. Lecture 9-Types and process of ecological succession. Structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.	Lecture-8 Students will learn about ecosystem, food chain, food web and flow of energy in ecosystem. Make student aware about different type of ecosystems. Lecture-9 Students will learn about Ecological Succession.Make students aware about types of ecological succession, process of ecological succession and various types of ecosystem.	Lecture delivery with videos, animations, and discussion.	Destruction of ecosystem of Sahara deserts. Destruction of ecosystem by taking example of Yamuna river.
	Lecture 10	Biodiversity and conservation(Levels of biological diversity : genetic, species and ecosystem diversity)	T-1 R-1	RW-10 RW-11 RW-12 RW-22 RW-23 RW-30 AV-36 AV-40	Lecture -10: Various types of biodiversity such as genetic, species and ecosystem diversity. Lecture -11: Values of biodiversity.Biodiversity hot spots.	Lecture -10: Students will learn about biodiversity and various types of biodiversity. Lecture-11: Make student aware about the values of biodiversity and biodiversity hotspots.	Lecture delivery with discussion and by showing videos.	Genetic diversity of rice in India, Advantages of biodiversity to developing countries. Endangered Bengal Tiger, Black buck, Indian Rhino. The western ghats and Eastern Himalayas region.

Week 6	Lecture 11	Biodiversity and conservation(Levels of biological diversity : genetic, species and ecosystem diversity)	T-1 R-1	RW-10 RW-11 RW-12 RW-22 RW-23 RW-30 AV-36 AV-40	Lecture -10: Various types of biodiversity such as genetic, species and ecosystem diversity. Lecture -11: Values of biodiversity.Biodiversity hot spots.	Lecture -10: Students will learn about biodiversity and various types of biodiversity. Lecture-11: Make student aware about the values of biodiversity and biodiversity hotspots.	Lecture delivery with discussion and by showing videos.	Genetic diversity of rice in India, Advantages of biodiversity to developing countries. Endangered Bengal Tiger, Black buck, Indian Rhino. The western ghats and Eastern Himalayas region.
	Lecture 12	Biodiversity and conservation(Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions)	T-1 R-1	AV-8 AV-37 AV-39	Threats to biodiversity due to habitat destruction, poaching, pollution, climate change, biological invasion, legal system, mining.	Making students aware about the values of biodiversity and the main reasons of destruction of bio diversity.	Lecture delivery with discussion and videos.	Indian Sandal wood plant is a vulnerable species owing to exploitation and smuggling of wood for fine furniture. Distruction of Biodiversity in Tehri Dam Uttrakhand.
		Biodiversity and conservation(Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity)	T-1 R-1	AV-8 AV-37 AV-39	The methods of conservation of biodiversity - In situ conservation: national parks, wildlife sanctuary and biosphere reserves. The merits and demerits of each of the conservation method. The progress report of the field work based term paper will be collected at the end of this lecture.	Making students aware about the values of biodiversity and different methods of conservation of biodiversity.	Lecture delivery with discussion and videos.	Indian Sandal wood plant is a vulnerable species owing to exploitation and smuggling of wood for fine furniture.

Week 7	Lecture 13	Biodiversity and conservation(India as a mega diversity nation)	T-1 R-1	AV-38	Biogeographical classification of India. India: a megadiversity nation. Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value.	To make student aware about types of biogeographical region found in India.	Lecture delivery with discussion and videos.	Seven major biogeographical regions of India
		Biodiversity and conservation(Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value)	T-1 R-1	AV-38	Biogeographical classification of India. India: a megadiversity nation. Ecosystem and biodiversity services: ecological, economic, social, ethical, aesthetic and Informational value.	To make student aware about types of biogeographical region found in India.	Lecture delivery with discussion and videos.	Seven major biogeographical regions of India
		SPILL OVER						
Week 7	Lecture 14				Spill Over			
		MID-TERM						
Week 8	Lecture 15	Environmental pollution(ill-effects of Fireworks)	T-1 R-1	RW-13 RW-16 RW-17 RW-18 RW-19 AV-42 AV-43 AV-47	Lecture-15: Types of environmental pollution. Cause, effect and control of air pollution. Major air pollutants and their sources. Lecture-16: Cause, effect and control of water, soil and noise pollution. Major soil pollutants and their impacts on human health. Basic concept of Eutrophication and biomagnification. ill effects of fireworks.	Lecture-15: Student will learn about major type of pollutions and thier source with example of air pollution. Lecture-16: Make student aware about cause,effect and control of water,noise and soil pollution. Also, will learn ill effects of fireworks and basic concepts such as Eutrophication and biomagnification..	Lecture delivery with discussion.	

Week 8	Lecture 16	Environmental pollution(ill-effects of Fireworks)	T-1 R-1	RW-13 RW-16 RW-17 RW-18 RW-19 AV-42 AV-43 AV-47	Lecture-15: Types of environmental pollution. Cause, effect and control of air pollution. Major air pollutants and their sources. Lecture-16: Cause, effect and control of water, soil and noise pollution. Major soil pollutants and their impacts on human health. Basic concept of Eutrophication and biomagnification. ill effects of fireworks.	Lecture-15: Student will learn about major type of pollutions and thier source with example of air pollution. Lecture-16: Make student aware about cause,effect and control of water,noise and soil pollution. Also, will learn ill effects of fireworks and basic concepts such as Eutrophication and biomagnification..	Lecture delivery with discussion.	
Week 9	Lecture 17	Environmental pollution (Nuclear hazards and human health risks)	T-1 R-1	RW-20 RW-31 AV-41 AV-44 AV-45	Nuclear hazards. Cause, effect and control of radiation pollution. Bioremediation. Solid waste management: control measures of urban and industrial waste. Pollution case study: Bhopal gas tragedy, Chernobyl accident, Ganga water pollution.	Making students aware about nuclear hazards, solid waste and its management procedures.	Lecture delivery with ppt, discussion and documentary clip.	
	Lecture 18	Environmental pollution (Pollution case studies)	T-1 R-1	RW-29 RW-31	Nuclear hazards. Cause, effect and control of radiation pollution. Pollution case study: Bhopal gas tragedy, Chernobyl accident, Ganga water pollution.	Making students aware about nuclear hazards.	Lecture delivery with ppt, discussion and documentary clip	Tin mining destroys forest and coral reefs in Indonasia
Week 10	Lecture 19				Online Assignment			

Week 10	Lecture 20	Environmental Policies & Practices(Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture)	T-1 R-1	RW-14 RW-15 AV-48 AV-49	Lecture-20: Solid waste management Global climate change. Greenhouse effect and global warming. Effect of increase of Carbon dioxide. Environmental effects of global warming, its control measure. Causes and effects of acid rain. Lecture-21: Cause and mechanism of ozone layer depletion. Environmental effects of ozone layer depletion. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students.	Lecture-20: Students will get knowledge about solid waste,its effect and solid waste management.Make student aware about Green house effect,Global warming,Acid rain and their effect on environment. Lecture-21:Student will learn about ozone layer depletion,cause and their effect on environment.	Lecture delivery with necessary animations and videos.	
		Environmental Policies & Practices(Solid waste management: Control measures of urban and industrial waste)	T-1 R-1	RW-14 RW-15 AV-46 AV-48 AV-49	Lecture-20: Solid waste management Global climate change. Greenhouse effect and global warming. Effect of increase of Carbon dioxide. Environmental effects of global warming, its control measure. Causes and effects of acid rain. Lecture-21: Cause and mechanism of ozone layer depletion. Environmental effects of ozone layer depletion. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students.	Lecture-20: Students will get knowledge about solid waste,its effect and solid waste management.Make student aware about Green house effect,Global warming,Acid rain and their effect on environment. Lecture-21:Student will learn about ozone layer depletion,cause and their effect on environment.	Lecture delivery with necessary animations and videos.	

Week 11	Lecture 21	Environmental Policies & Practices(Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture)	T-1 R-1	RW-14 RW-15 AV-48 AV-49	Lecture-20: Solid waste management Global climate change. Greenhouse effect and global warming. Effect of increase of Carbon dioxide. Environmental effects of global warming, its control measure. Causes and effects of acid rain. Lecture-21: Cause and mechanism of ozone layer depletion. Environmental effects of ozone layer depletion. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students.	Lecture-20: Students will get knowledge about solid waste,its effect and solid waste management.Make student aware about Green house effect,Global warming,Acid rain and their effect on environment. Lecture-21:Student will learn about ozone layer depletion,cause and their effect on environment.	Lecture delivery with necessary animations and videos.	
		Environmental Policies & Practices(Solid waste management: Control measures of urban and industrial waste)	T-1 R-1	RW-14 RW-15 AV-46 AV-48 AV-49	Lecture-20: Solid waste management Global climate change. Greenhouse effect and global warming. Effect of increase of Carbon dioxide. Environmental effects of global warming, its control measure. Causes and effects of acid rain. Lecture-21: Cause and mechanism of ozone layer depletion. Environmental effects of ozone layer depletion. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students.	Lecture-20: Students will get knowledge about solid waste,its effect and solid waste management.Make student aware about Green house effect,Global warming,Acid rain and their effect on environment. Lecture-21:Student will learn about ozone layer depletion,cause and their effect on environment.	Lecture delivery with necessary animations and videos.	

Week 11	Lecture 22	Environmental Policies & Practices(Environment Laws: Environment Protection Act)	T-1 R-1	RW-21 AV-50 AV-51	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	National Green Tribunal and supreme court judgement against stubble and solid waste burning,responsible for smog in National Capital Region(NCR).)
		Environmental Policies & Practices(Air (Prevention & Control of Pollution) Act)	T-1 R-1	AV-51	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	

Week 11	Lecture 22	Environmental Policies & Practices(Water (Prevention and control of Pollution) Act)	T-1 R-1	AV-51	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	Elk river,West Virginia Chemical Spill
		Environmental Policies & Practices(Wildlife Protection Act)	T-1 R-1	AV-52	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	

Week 11	Lecture 22	Environmental Policies & Practices(Forest Conservation Act)	T-1 R-1	AV-53	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	
		Environmental Policies & Practices(Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context)	T-1 R-1	AV-50 AV-51	Environmental legislation: Environment (protection) Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act. Issues involved in the enforcement of environmental legislation. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about various Environmental Law.	Lecture delivery with discussion.	

Week 12	Lecture 23	Environmental Policies & Practices(International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD))	T-1 R-1	AV-54 AV-55	Montreal and Kyoto protocols. Convention on Biological Diversity (CBD) [Only the main goals of CBD will be discussed]. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will get awareness about various international initiatives to save the environment.	Lecture delivery with ppt, discussion and documentary clip	
	Lecture 24	Human Communities and the Environment(Human population growth: Impacts on environment, human health and welfare)	T-1 R-1	RW-25 AV-56	Population growth: Birth rate, death rate, migration. Causes and effects of population growth. Factors affecting variation of population. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will get awareness about causes and effects of population growth.	Lecture delivery with discussion	
Week 13	Lecture 25	Human Communities and the Environment(Disaster management : floods, earthquake, cyclones and landslides)	T-1 R-1	AV-11 AV-12	Types of disaster. Cause, effects and management of- floods, earthquake, cyclones and landslides. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Making students aware about disaster management.	Lecture delivery with discussion	Cyclone Ockhi in India

Week 13	Lecture 26	Human Communities and the Environment (Environmental ethics: Role of Indian and other religions and cultures in environmental conservation)	T-1 R-1	AV-57 AV-58	Resettlement and rehabilitation of people: problems and concern. Environmental ethics: Issues and possible solutions. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students	Students will learn about problems of resettlement. Students will learn about Environmental ethics issues and possible solutions	Lecture delivery by showing documentary clips and ppts.	
Week 14	Lecture 27	Human Communities and the Environment (Environmental communication and public awareness, case studies)	T-1 R-1	RW-26 RW-27 AV-59	Objectives and methods of public awareness. Environmental movements : Chipko, Silent valley, Bishnoi's of Rajasthan. Role of an individual in conservation of natural resource. After completion of lecture delivery remaining time will be utilized for taking presentation of assignment from students.	Students will learn about various Environmental movements and Environmental communication.	Lecture delivery with the help of ppt, animations and documentary clips.	Swachh Bharat Abhiyan (Initiative taken by Honorable prime minister of India)
		SPILL OVER						
Week 14	Lecture 28				Spill Over			
Week 15	Lecture 29				Spill Over			
	Lecture 30				Spill Over			

Plan for Tutorial: (Please do not use these time slots for syllabus coverage)

Tutorial No.	Lecture Topic	Type of pedagogical tool(s) planned (case analysis,problem solving test,role play,business game etc)
Tutorial1	Environment types and components	Case studies on environmental types and its components

An instruction plan is only a tentative plan. The teacher may make some changes in his/her teaching plan. The students are advised to use syllabus for preparation of all examinations. The students are expected to keep themselves updated on the contemporary issues related to the course. Upto 20% of the questions in any examination/Academic tasks can be asked from such issues even if not explicitly mentioned in the instruction plan.

Tutorial2	Sustainable development	Case studies on public awareness about environment
Tutorial3	Soil Profiling	Case studies on soil profiling and analysis
Tutorial4	Forest Resources	Case studies on food resources and effects of modern agriculture
Tutorial5	Water Resources	Case studies on different water resources
Tutorial6	Energy Resources	Case studies on new alternative energy resources and recovery
Tutorial7	Ecosystem	Case studies on interrelationships between biotic and abiotic components
Tutorial8	Food Chain and Food Web	Case studies on building up of DDT concentration in tropic levels
Tutorial9	Ecological Pyramids	Case studies on relationship of different organisms in ecosystem
Tutorial10	Ecological Succession	Case studies on development of ecosystem
Tutorial11	Biodiversity and India as Mega-diverse nation	Case studies on diversities in India
Tutorial12	Hot Spot of Biodiversity	Case studies on variety of biotic species in India
Tutorial13	Endangered, Endemic and EDGE Species	Case studies on endangered, endemic and EDGE Species in India
Tutorial14	Biodiversity Conservation Methods	Case studies on biodiversity loss in India and Canada
After Mid-Term		
Tutorial15	Air Pollution	Case studies on Chembur-The gas chamber of Mumbai
Tutorial16	Water Pollution	Case studies on Ganga river water pollution
Tutorial17	Soil Pollution	Case studies on industrial waste discharge
Tutorial18	Noise Pollution	Case studies on various effects of high frequency sound on living organisms
Tutorial19	Nuclear Hazards	Case studies on Chernobyl nuclear disaster and Fukushima nuclear disaster
Tutorial20	Bhopal gas tragedy	Case studies on health, climatic effects of methyl isocyanate.
Tutorial21	ILL Effect of Fireworks	Case studies on several poisonous metals used in fireworks
Tutorial22	Greenhouse Gases, Global warming and Acid Rain	Case studies on effects of pollution on climate, acid rain - Taj Mahal, Agra, India
Tutorial23	Ozone Layer Depletion	Case studies on various factors responsible for ozone layer depletion
Tutorial24	Environmental Policies and International Treaties and Protocols	Case studies on Kyoto and Montreal Protocols
Tutorial25	Population Growth	Case studies on milestones of worlds population
Tutorial26	Solid Waste Management	Case studies on rag pickers segregation of waste materials
Tutorial27	Disaster Management	Case studies on Nepal earthquake
Tutorial28	Environmental Movements	Case studies on silent valley movement