Department of CSE(Cybersecurity)

Details of Lesson Plan

S.No.	Particulars	Details
1.	Course Name	ENVIRONMENT & SUSTAINABILITY
2.	Course Code	NCC-201
3.	Academic Year	2024-25
4.	Semester	2nd
5.	Number of Lesson plans	18
6.	Faculty Assigned	Dr.Kavita Abrol

Kavita Abrol

Faculty Signature

Lesson Plan No. 1	Course Name: Environment & Sustainability Topic: Introduction to Sustainability: Humanity and the Environment: What is Sustainability?	Course No.: NCC-201

Objectives	a. At the end of the lesson the student shall be able to: b. articulate the concept of Environment and Sustainability c. understand the appropriate Sustainability: Humanity and the Environment d. Articulate different environmental risks and issues and potential interventions to tackle them. e. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a.Video of Milankovitch (orbit) cycles by NASA(climate.nasa.gov) b. Use of Google form/Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Climate change? How we can make a change in Climate and Global Warming issues? Do you know the major issues related to climate? What do you understand by sustainability? - Introduce the concept of sustainability. Show Figure on slide. - Talk about Human, sustainability and environment - Introduction to Sustainability utilizing the resource from Science direct. (https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/environmental-sustainability - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of sustainability, effect on human and environment etc. - Show video of sustainability https://www.youtube.com/watch?v=rmQby7adocM b. IPAT Equation - Introduce the concepts of IPAT with some examples. - Show figures to illustrate IPAT equation- Give example of notations with reference to human impact on environment which can be easily understood by the students. c. Major human impact on the environment

	- Human Consumption Patterns and the "Rebound" Effect -Types of effects d. Challenges for sustainability - Soil exploitation and overbuilding - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - Environmental sustainability Paper on science direct https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/environmental-sustainability 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on environment/sustainability Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 2	Course Name: Environment & Sustainability Topic: The IPAT Equation, Human Consumption Patterns.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of IPAT equation b. understand the Environmental impacts of population, understand the appropriate Sustainability: Humanity c. Articulate different environmental risks due to population growth and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Video of Milankovitch (orbit) cycles/ and planet earth fron space (https://courses.lumenlearning.com/)by NASA(climate.nasa.gov) b. Use of Google form/Nearpod tool for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Climate and Global risks? How we can make a change in Climate and Global issues? Do you know the major issues related to climate? What do you understand by sustainability? - Introduce the concept of sustainability. Show Figure on slide. - Talk about Human, sustainability and environment - Introduction to IPAT Equation. https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/the-ipat-equation/ - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability revise - Show Fact data of IPAT https://ccea.org.uk/downloads/docs/Support/Fact%20File%3A%20A2/2019/The%20IPAT%20Equation%20Fact%20file%202.pdf b. IPAT Equation - Introduce the concepts of IPAT with some examples. - Show figures to illustrate IPAT equation- Give example of notations with reference to human impact on environment which can be easily

	understood by the students. c. Major Population impact on the environment - Air pollutants - Water pollutants - Toxic materials - Greenhouse gases d. Human Consumption Patterns and the "Rebound" Effect -Types of effects e. Challenges for sustainability - Deserification - Soil exploitation and overbuilding - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects - Population problem and affulunce - (Resources) Renewable or not - Reduce, reuse and recycle - Save energy - Inspire sustainable attitudes) Use Nearpod to collect responses and discuss the answers
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - IPAT Equation https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/the-ipat-equation/ - https://ccea.org.uk/downloads/docs/Support/Fact%20File%3A%20A2/2019/The%20IPAT%20Equation%20Fact%20file%202.pdf - https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/environmental-sustainability 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on IPAT Equation

	Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 3	Course Name: Environment & Sustainability Topic: The "Rebound" Effect, Challenges for Sustainability.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Human consumption and Rebound effect b. understand the impacts of population on Environmental, understand the appropriate Sustainability: Humanity c. Articulate different environmental risks due to population growth and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Reference research material on Human consumption and Rebound effect - (https://www.frontiersin.org/articles/10.3389/fenrg.2018.00081/full) b. Use of Google form.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions Do you know the major issues related to climate? What do you understand by Human Consumption? - Introduce the concept of Human consumption. Show Figure on slide. - Talk about Human, sustainability and environment - Introduction to Human Consumption and Rebound effect (https://www.frontiersin.org/articles/10.3389/fenrg.2018.00081/full) - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/human-consumption-patterns-and-the-rebound-effect/ - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability revise - Show Fact data of Human Consumption b. Rebound effect - Introduce the concepts of rebound equation with some examples. - Show figures to illustrate rebound- Give example of notations with reference to human impact on environment which can be easily understood by the students. c. Human Consumption Patterns and the "Rebound" Effect -Types of effects d. Challenges for sustainability - Pollution - Loss of biodiversity

	3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects - Save energy - Inspire sustainable attitudes) Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading 3. Consumption pattern and rebound effect(https://www.frontiersin.org/articles/10.3389/fenrg.2018.00081/full) 4. https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/human-consumption-patterns-and-the-rebound-effect/ 5. Homework 6. Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on Human Consumption and rebound Effect Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 4	Course Name: Environment & Sustainability Topic: Climate Processes; External and Internal Controls,	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Climate Processes b. understand the appropriate Climate Sustainability c. Articulate different environmental risks and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Material for reference on Climate processes https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-and-global-change-chapter-introduction/ b. Use of Google form for online quiz.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Climate processes? How we can make a change in Climate and Global issues? Do you know the major issues related to climate? - Introduce the concept of sustainability. Show Figure on slide. - Talk about Human, sustainability and environment - Introduction to Sustainabilityutilizing the resource - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-and-global-change-chapter-introduction/ - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of Insolation, effect on human and environment etc. - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-and-global-change-chapter-introduction/ b. Climate Processes c. - Introduce the concepts of Climate Processes with some examples. d. - Show figures to illustrate Climate Processes. Give example of notations with reference to human impact on environment which can be easily understood by the students. e. Challenges for sustainability - Pollution - Loss of biodiversity

	3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects - Renewable or not - Reduce, reuse and recycle - Save energy - Inspire sustainable attitudes) Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - Climate processes:https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-and-global-change-chapter-introduction/ 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on Climate Processes. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 5	Course Name: Environment & Sustainability Topic: Modern Climate Change.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Modern climate change b. understand the appropriate Sustainability and green-house gases c. Articulate different environmental risks and issues and potential interventions to tackle them. d. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Research material from research gate: (https://www.researchgate.net/publication/8975416_Modern_Global_Change) b. Use of Google form.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Modern Climate change? How we can reduce the impact of climate change? Do you know the major issues related to climate? What do you understand by importance of Green- house gases? - Introduce the concept of sustainability. Show Figure on slide. - Talk about Human, sustainability and environment - Introduction to Sustainabilityutilizing the resource from - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-processes-external-and-internal-controls/ - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of sustainability, effect on human and environment etc. b. –research article from research gate; https://www.researchgate.net/publication/8975416_Modern_Global_Change c. - Introduce the concepts of modern Climate change with some examples. - Show figures to illustrate modern Climate change - Give example of notations with reference to human impact on environment which can be easily understood by the students. 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects

	- Effect of climate change on our life - Creative thinking to make earth a better place to live in - Role of individual in reducing the impact of climate change - Inspire sustainable attitudes) Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - Environmental sustainability Paper on research gate:https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-processes-external-and-internal-controls/ 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings.

Lesson Plan No. 6	Course Name: Environment & Sustainability Topic: Climate Projections	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Environment and Climate Projections b. understand the appropriate Sustainability: Humanity and the Environment c. Articulate different environmental risks and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Material on climate projection (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-projections/) b. Use of Google form for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Climate projections? How we can make a change in Climate and Global issues in future? Do you know the major issues related to climate change? - Introduce the concept of future projections and sustainability. Show Figure on slide. - Talk about sustainability and environment, climate change and risks involved. - Introduction to Sustainability utilizing the resource - (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-projections/) - Highlight the Challenges for Sustainability. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of sustainability, effect on human and environment etc. -Climate projections - Introduce the concepts of Climate projections with some examples. - Show figures to illustrate climate projections- Give example of notations with reference to human impact on environment which can be easily understood by the students. b. Major human impact on the environment - Air pollutants

	- Water pollutants - Toxic materials - Greenhouse gases c. Climate projection and Effect on ecosystem. -Types of effects d. Challenges for sustainability - Desertification - Soil exploitation and overbuilding - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - Climate projections - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/climate-projections/ 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on Climate projections Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 7	Course Name: Environment & Sustainability Topic: Biosphere	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Biosphere b. understand the appropriate biosphere Sustainability c. Articulate different Biosphere risks and issues and potential interventions to tackle them. Appreciate global Biosphere sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Material on biosphere for the reference of students (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biosphere-chapter-introduction/) b. Use of Google form for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Biosphere? How we can make a change in Biosphere? Do you know the major issues related to Biosphere? What do you understand by Atmosphere? - Introduce the parts of Biosphere. Show Figure on slide. - Talk about atmosphere, Lithosphere and Hydrosphere - Introduction to Biosphere (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biosphere-chapter-introduction/) - Highlight the Challenges for saving biosphere. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of sustainability, effect on human and environment etc. - Show video of sustainability https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biosphere-chapter-introduction/ b. Biosphere and its parts - Introduce the concepts of Biosphere with some examples. - Show figures to illustrate Biosphere - Give example of notations with reference to human impact on environment which can be easily

	understood by the students. c. Major polluting biosphere impact on the environment - Atmosphere - Hydrosphere - Lithosphere d. Biosphere pollutents -Types of effects e. Challenges for Biosphere sustainability - Desertification - Soil exploitation and overbuilding - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biosphere-chapter-introduction/ 3. Homework - Create your video log highlighting environment and sustainability concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on environment/sustainability Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 8	Course Name: Environment & Sustainability Topic: Flow of Energy in the Earth System.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Energy Flow Cycle b. understand the Energy flow cycle: Biogeochemical cycle c. Articulate different environmental risks and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Content on Energy flow cycle (https://sciencing.com/energy-cycle-ecosystem-8881.html) b. Use of Google form for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Energy flow cycle? How we can make a change in Energy flow cycle? Do you know the major issues related to climate? - Introduce the concept of Biochemical cycle. Show Figure on slide. - Talk about Biogeochemical cycle - Introduction to Energy flow cycles https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biogeochemical-cycles-and-the-flow-of-energy-in-the-earth-system/ - Highlight the Challenges of Energy flow. 2. **Development** (30 minutes) a. Sustainability - Introduce the concept of sustainability, effect on human and environment etc. https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biogeochemical-cycles-and-the-flow-of-energy-in-the-earth-system/ b. Biogeochemical cycle- Energy Flow Cycle - Introduce the concepts of Energy flow cycle with some examples. - Show figures to illustrate Energy Flow Cycle - Give example of notations with reference to human impact on environment which can be easily understood by the students.

	c. Energy flow cycle and biochemical cycles -Types of effects d. Challenges for sustainability - Soil exploitation and overbuilding - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects - Save energy - Inspire sustainable attitudes) Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading Energy Flow Cycle and Biogeochemical cycles (https://sciencing.com/energy-cycle-ecosystem-8881.html) https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biogeochemical-cycles-and-the-flow-of-energy-in-the-earth-system/ 3. Homework - Create your video log highlighting Energy flow cycle's concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on environment/sustainability Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 9	Course Name: Environment & Sustainability Topic: Biodiversity and Species Loss	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Biodiversity b. understand the biodiversity: biodiversity loss with reference to species and ecosystems c. Articulate different biodiversity loss risks and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Video content on biodiversity:https://www.youtube.com/watch?v=ErATB1aMiSU b. Use of Google form for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Biodiversity? How we can make a change in biodiversity loss? Do you know the major issues related to this loss? - Introduce the concept of biodiversity. Show Figure on slide. - Talk about Biodiversity, with some real world examples - Introduction to biodiversity - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function/ - - Highlight the Challenges to tackle biodiversity loss. 2. **Development** (30 minutes) a. Biodiversity and species loss - Introduce the concept of Species diversity, affect of human activities etc. - (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function) b. Biodiversity- types of biodiversity - Introduce the concepts of biodiversity and biodiversity losswith some examples. - Show figures to illustrate types of biodiversity- Give example of notations with reference to human impact on environment which can be easily understood by the students. c. Major human impact on the environment which affect biodiversity

	with reference to - Air pollutants - Water pollutants - Toxic materials - Greenhouse gases d. Biodiversity and species loss -Types of biodiversity e. Challenges for preserve biodiversity - Desertification - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading 3. Biodiversity and value of biodiversity - https://www.youtube.com/watch?v=ErATB1aMiSU - - (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function) 4. Homework 5. Create your video log highlighting Values of Biodiversity concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on environment/sustainability Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 10	Course Name: Environment & Sustainability Topic: Biodiversity, Species Loss and Ecosystem Function	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. articulate the concept of Biodiversity b. understand the biodiversity: biodiversity loss with reference to species and ecosystems c. Articulate different biodiversity loss risks and issues and potential interventions to tackle them. Appreciate global sustainability best practices in diverse domains.
Teaching Aids (if any)	a. Video content on biodiversity:https://www.youtube.com/watch?v=ErATB1aMiSU b. Use of Google form for online quiz
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Biodiversity? How we can make a change in biodiversity loss? Do you know the major issues related to this loss? - Introduce the concept of biodiversity. Show Figure on slide. - Talk about Biodiversity, with some real world examples - Introduction to biodiversity - https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function/ - - Highlight the Challenges to tackle biodiversity loss. 2. **Development** (30 minutes) a. Biodiversity and species loss - Introduce the concept of Species diversity, affect of human activities etc. - (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function) b. Biodiversity- types of biodiversity - Introduce the concepts of biodiversity and biodiversity losswith some examples. - Show figures to illustrate types of biodiversity- Give example of notations with reference to human impact on environment which can be easily understood by the students.

	c. Major human impact on the environment which affect biodiversity with reference to - Air pollutants - Water pollutants - Toxic materials - Greenhouse gases d. Biodiversity and species loss -Types of biodiversity e. Challenges for preserve biodiversity - Desertification - Pollution - Loss of biodiversity 3. Exercise (5 minutes) – Give different use-cases and make students think about sustainability aspects Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading 3. Biodiversity and value of biodiversity - https://www.youtube.com/watch?v=ErATB1aMiSU - - (https://courses.lumenlearning.com/suny-sustainability-a-comprehensive-foundation/chapter/biodiversity-species-loss-and-ecosystem-function) 4. Homework 5. Create your video log highlighting Values of Biodiversity concepts and submit on Google classroom Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Google form Quiz on environment/sustainability Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 11	Course Name: Environment and Sustainability Topic: Environmental and Resource Economics: Tragedy of the Commons. Environmental Valuation. Evaluating Projects and Policies. Solutions: Property Rights, Regulations, and Incentive Policies.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To understand the concept of the Tragedy of the Commons and its implications in environmental and resource economics. b. To explore various methods of environmental valuation and their significance in decision-making processes. c. To analyze the effectiveness of evaluating projects and policies in addressing environmental challenges. d. To examine potential solutions to mitigate the Tragedy of the Commons, including property rights, regulations, and incentive policies. e. To foster critical thinking and problem-solving skills in applying economic principles to environmental issues.
Teaching Aids (if any)	a. PowerPoint presentations featuring key concepts, case studies, and visual aids. b. Real-life examples and scenarios to illustrate economic theories in practice. c. Interactive activities such as group discussions, debates, and role-playing exercises. d. Multimedia resources including videos, documentaries, and online simulations. e. Relevant readings from textbooks, academic journals, and policy reports.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Environmental Valuation? What do you understand by Property Rights, Regulations, and Incentive Policies? - Introduce the concept of Environmental Valuation. 2. **Development** (30 minutes) a. Introduce the topic by discussing historical and contemporary examples of the Tragedy of the Commons. b. Facilitate a discussion on environmental valuation techniques and their applications. c. Present case studies to analyze the evaluation of projects and policies in addressing environmental issues. d. Explore the advantages and limitations of different solutions to the Tragedy of the Commons. e. Engage students in critical analysis and debate regarding the effectiveness of various approaches.

	Exercise (5 minutes) – Give different use-cases and make students think about Environmental and Resource Economics Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize key concepts and insights gained from the discussion. 2. Encourage students to reflect on how economic principles can inform environmental decision-making. 3. Emphasize the importance of considering both economic and environmental factors in policy formulation. 4. Invite students to brainstorm potential solutions to real-world environmental challenges. 5. Provide resources for further exploration and encourage continued learning beyond the classroom. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Assess understanding through quizzes, tests, and class participation. 2. Evaluate critical thinking skills through written assignments and presentations. 3. Analyze the application of economic principles to real-world scenarios in case studies. 4. Solicit feedback through surveys or discussions to gauge the effectiveness of teaching methods. 5. Measure students' ability to evaluate and propose solutions to environmental problems based on economic analysis. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 12	**Course Name: Environment and Sustainability** **Topic: Modern Environmental Management: Systems of Waste Management. Case Study: Electronic Waste and Extended Producer Responsibility.**	**Course No.: NCC-201**

Objectives	At the end of the lesson the student shall be able to: a. To understand the principles and importance of modern environmental management systems in the context of waste management. b. To analyze the challenges and implications of electronic waste (e-waste) on the environment and human health. c. To explore the concept of Extended Producer Responsibility (EPR) and its role in sustainable waste management. d. To examine various strategies and technologies employed in the management of electronic waste. e. To foster critical thinking and problem-solving skills in addressing environmental issues related to waste management.
Teaching Aids (if any)	a. Presentation slides or multimedia materials showcasing statistics, graphs, and case studies related to electronic waste. b. Videos or documentaries illustrating the processes and impacts of electronic waste. c. Models or diagrams representing different waste management systems and technologies. d. Interactive quizzes or discussions to engage students in active learning. e. Guest speakers from relevant industries or environmental organizations to provide real-world insights.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Environmental Management? - What do you understand by Electronic Waste and Extended Producer Responsibility - Introduce the concept of Waste Management. 2. **Development** (30 minutes) a. Introduction to modern environmental management and its significance in addressing contemporary environmental challenges. b. Overview of waste management systems, focusing on the principles of reduce, reuse, recycle, and proper disposal. c. Case study analysis of electronic waste, including its composition, sources, and environmental impacts. d. Exploration of Extended Producer Responsibility (EPR) as a regulatory approach to managing electronic waste.

	e. Examination of innovative technologies and strategies for electronic waste recycling and disposal. f. Group activities or discussions to brainstorm potential solutions to electronic waste management issues. g. Reflection on personal and collective responsibilities in promoting sustainable waste management practices. Exercise (5 minutes) – Give different use-cases and make students think about Electronic Waste and Extended Producer Responsibility. Use Nearpod to collect responses and discuss the answers.
Closure	1. Modern environmental management systems play a crucial role in addressing the challenges posed by electronic waste. 2. Through understanding the principles of waste management, analyzing case studies, and exploring innovative solutions such as Extended Producer Responsibility, we can work towards a more sustainable future. 3. It's imperative for individuals, industries, and governments to collaborate in adopting responsible practices to mitigate the adverse effects of electronic waste on our planet and future generations. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Assessment of understanding through quizzes or exams covering key concepts, principles, and case studies discussed during the lessons. 2. Evaluation of critical thinking and problem-solving skills demonstrated in group activities or discussions. 3. Review of student presentations or projects focusing on proposing solutions to electronic waste management challenges. 4. Feedback on participation and engagement during class activities and discussions. 5. Peer evaluation of collaborative efforts in group assignments related to waste management strategies and technologies. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 13	Course Name: Environment and Sustainability Topic: Government and Laws on the Environment. Risk Assessment Methodology for Conventional and Alternative Sustainability Options	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. Educate students on the various governmental structures, policies, and laws concerning environmental protection and conservation. b. Analyze conventional and alternative sustainability options to assess their potential risks and benefits for the environment. c. Develop critical thinking skills by examining and evaluating the effectiveness of governmental regulations and laws in addressing environmental issues. d. Encourage students to actively engage with the subject matter through discussions, case studies, and interactive activities.
Teaching Aids (if any)	a. Slideshows or multimedia presentations to illustrate key concepts, laws, and case studies related to government and environmental regulations. b. Real-world examples of environmental policies, regulations, and their impacts on ecosystems and communities. c. Online simulations or games that simulate the decision-making process involved in environmental policymaking and risk assessment. d. Inviting experts in environmental law, policy, or sustainability to provide insights and answer questions from students.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Risk Assessment Methodology for Conventional and Alternative Sustainability Options? - Introduce the concept of Risk Assessment Methodology. 2. **Development** (30 minutes) a. Present foundational knowledge on government and environmental laws through lectures, followed by open discussions to encourage student participation and exchange of ideas. b. Divide students into groups to analyze and discuss case studies or scenarios related to environmental regulations and risk assessment methodologies. c. Organize field trips to governmental agencies, environmental organizations, or sustainable businesses to provide students with practical insights into the implementation of environmental laws and sustainability initiatives. d. Assign research projects where students explore specific environmental laws, regulations, or sustainability initiatives and present their findings to the class.

	Exercise (5 minutes) – Give different use-cases and make students think about Risk Assessment Methodology for Conventional and Alternative Sustainability Options Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize key concepts covered during the session, revisit the learning objectives, and encourage students to reflect on their understanding and insights gained. 2. Provide an opportunity for students to ask questions or seek clarification on any topic covered. 3. Finally, assign any homework or reading assignments related to the upcoming lessons. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Evaluate students' understanding through quizzes, exams, or class discussions focusing on key concepts, laws, and risk assessment methodologies covered in the lesson. 2. Assess students' ability to apply their knowledge by evaluating their research projects or presentations on environmental laws, regulations, and sustainability options. 3. Monitor students' participation and engagement during class discussions, group activities, and interactive exercises to gauge their involvement in the learning process. 4. Provide constructive feedback to students on their performance and understanding, and encourage them to reflect on areas for improvement in their comprehension of government and laws on the environment and risk assessment methodologies for sustainability options. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 14	Course Name: Environment and Sustainability Topic: Sustainable Energy Systems: Environmental Challenges in Energy, Carbon Dioxide, Air, Water and Land Use.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To educate students about the environmental challenges associated with energy production and consumption. b. To provide an understanding of sustainable energy systems and their role in mitigating environmental impacts. c. To explore the effects of carbon dioxide emissions on the environment and strategies for reducing them. d. To analyze the impacts of energy production on air, water, and land resources. e. To promote critical thinking and problem-solving skills in addressing sustainability issues in energy systems.
Teaching Aids (if any)	a. PowerPoint presentations with visuals depicting environmental challenges and sustainable energy solutions. b. Interactive simulations or models demonstrating the concepts of energy production and its environmental impacts. c. Videos showcasing real-world examples of sustainable energy projects and their benefits. d. Case studies illustrating the effects of energy systems on the environment and communities. e. Online resources such as articles, reports, and websites for further exploration of sustainable energy topics.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Sustainable Energy Systems? - Introduce the concept of Environmental Challenges in Energy. 2. **Development** (30 minutes) a. Begin with an introduction to the concept of sustainability and its relevance to energy systems. b. Present key environmental challenges related to energy production, including carbon dioxide emissions, air pollution, water usage, and land degradation. c. Discuss various sustainable energy technologies and practices, such as renewable energy sources, energy efficiency measures, and circular economy principles. d. Engage students in discussions and activities to explore the complexities of balancing energy needs with environmental conservation. e. Encourage collaborative learning through group projects or presentations on innovative solutions to sustainability challenges in energy systems.

	Exercise (5 minutes) – Give different use-cases and make students think about Environmental Challenges in Energy, Carbon Dioxide, Air, Water and Land Use. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize the main points covered in the lesson, emphasizing the importance of addressing environmental challenges in energy systems. 2. Reflect on the potential benefits of transitioning to sustainable energy sources and practices. 3. Encourage students to consider their roles as future professionals in contributing to sustainable energy solutions. 4. Provide resources for further reading and exploration of the topic. 5. Invite students to share their insights and reflections on the lesson before concluding. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Assess students' understanding through quizzes, tests, or assignments focusing on key concepts and principles covered in the lesson. 2. Evaluate students' critical thinking and analytical skills through problem-solving activities or case studies related to sustainable energy systems. 3. Observe students' participation and engagement in class discussions and activities. 4. Review students' group projects or presentations on sustainable energy solutions for depth of analysis and creativity. 5. Gather feedback from students on the effectiveness of teaching methods and materials used in the lesson to inform future instruction. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 15	Course Name: Environment and Sustainability Topic: Energy Sources and Carriers. Electricity. Energy Uses. Applications of Phase Change Materials for Sustainable Energy.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To understand the various sources and carriers of energy, including their characteristics and sustainability aspects. b. To explore the generation, transmission, and utilization of electricity as a primary energy carrier. c. To examine the diverse uses of energy in different sectors and their implications on the environment and society. d. To analyze the applications of phase change materials (PCMs) in achieving sustainable energy solutions and mitigating energy-related challenges.
Teaching Aids (if any)	a. PowerPoint presentations illustrating different energy sources, carriers, and their applications. b. Videos or animations demonstrating the processes involved in electricity generation and distribution. c. Physical models or diagrams showcasing the applications of phase change materials in energy systems. d. Interactive simulations allowing students to explore energy transformations and efficiency concepts.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Energy Sources and Carriers, Applications of Phase Change Materials for Sustainable Energy? - Introduce the concept of electricity. Energy Uses. 2. **Development** (30 minutes) a. Introduction to Energy: Discuss the fundamental concepts of energy, different forms of energy, and the laws of thermodynamics. b. Energy Sources and Carriers: Present an overview of renewable and non-renewable energy sources, along with their extraction, conversion, and distribution. c. Electricity: Delve into the generation of electricity from various sources such as fossil fuels, nuclear, and renewables. Explore grid systems and smart grids. d. Energy Uses: Explore the diverse applications of energy in transportation, industry, residential, and commercial sectors. Discuss energy efficiency measures and conservation strategies. e. Applications of Phase Change Materials: Introduce phase change materials and their ability to store and release energy during phase transitions. Examine their applications in thermal energy storage, building insulation, and HVAC systems.

	f. Case Studies and Discussion: Analyze real-world examples of energy systems and the integration of sustainable practices. Encourage critical thinking and debate on energy policies and technologies. Exercise (5 minutes) – Give different use-cases and make students think about Phase Change Materials for Sustainable Energy. Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize key concepts covered in the lesson, emphasizing the importance of sustainable energy practices in addressing global challenges. 2. Encourage students to reflect on the significance of their role in promoting energy efficiency and conservation in their communities. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Quizzes or tests assessing students' understanding of energy concepts, sources, and applications. 2. Assignments requiring students to research and present on specific energy technologies or case studies. 3. Class discussions and participation in activities exploring the advantages and limitations of different energy sources and carriers. 4. Projects or presentations evaluating the feasibility and effectiveness of using phase change materials in various energy applications, considering environmental, economic, and social factors. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 16	Course Name: Environment and Sustainability Topic: Problem-Solving, Metrics, and Tools for Sustainability.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To enhance students' problem-solving skills in the context of sustainability. b. To introduce students to relevant metrics and tools used in sustainability assessment and decision-making. c. To foster critical thinking and analytical skills among students through interactive learning experiences. d. To encourage students to apply problem-solving techniques and metrics in real-world sustainability scenarios. e. To instill a sense of responsibility towards sustainable practices and environmental stewardship in students.
Teaching Aids (if any)	a. Presentation slides illustrating key concepts, case studies, and examples. b. Interactive simulations or games demonstrating sustainability metrics and tools. c. Multimedia resources such as videos, infographics, and online articles related to sustainability. d. Hands-on activities or experiments showcasing practical applications of problem-solving in sustainability. e. Guest speakers from relevant industries or organizations to provide real-world perspectives.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Problem-Solving, Metrics and Tools for Sustainability.? - Introduce the concept of Problem-Solving, Metrics, and Tools for Sustainability. 2. **Development** (30 minutes) a. Begin with an introduction to the concept of sustainability, emphasizing its importance and relevance in contemporary society. b. Introduce problem-solving methodologies and techniques applicable to sustainability challenges. c. Explore various metrics and tools commonly used to assess sustainability performance and impact. d. Facilitate group discussions, case studies, and problem-solving exercises to engage students actively. e. Encourage collaborative learning and peer-to-peer knowledge sharing. f. Provide constructive feedback and guidance to students as they apply problem-solving approaches to sustainability issues.

	g. Incorporate opportunities for reflection and self-assessment to promote continuous learning and improvement. Exercise (5 minutes) – Give different use-cases and make students think about Tools for Sustainability. Use Nearpod to collect responses and discuss the answers.
Closure	1. Recap key learnings and insights gained throughout the session. 2. Emphasize the importance of problem-solving and metrics in driving sustainable decision-making. 3. Encourage students to reflect on how they can apply the knowledge and skills acquired to address sustainability challenges in their personal and professional lives. 4. Provide resources for further exploration and learning beyond the classroom. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Assess students' understanding of problem-solving methodologies and sustainability metrics through quizzes, assignments, and exams. 2. Evaluate students' ability to apply problem-solving techniques in real-world sustainability scenarios through case studies or projects. 3. Use rubrics to measure the effectiveness of students' critical thinking, analytical skills, and communication abilities in the context of sustainability. 4. Solicit feedback from students regarding the teaching methods, materials, and overall learning experience to identify areas for improvement. 5. Monitor students' engagement and participation during class activities and discussions. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 17	Course Name: Environment and Sustainability Topic: Sustainable Infrastructure: The Sustainable City. Sustainability and Buildings. Sustainable Energy Practices: Climate Action Planning.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To understand the concept of sustainable infrastructure within the context of urban development. b. To explore the significance of sustainability in city planning and infrastructure design. c. To analyze various sustainable energy practices and their implications for climate action planning. d. To evaluate the role of buildings in achieving sustainable development goals. e. To develop critical thinking skills regarding the integration of sustainability principles in infrastructure projects.
Teaching Aids (if any)	a. Presentation slides illustrating examples of sustainable infrastructure projects and practices. b. Videos showcasing sustainable city initiatives and energy-efficient buildings. c. Case studies highlighting successful climate action plans and their impact on infrastructure. d. Interactive simulations or games demonstrating the effects of different energy practices on the environment. e. Diagrams and charts illustrating data related to sustainable infrastructure and energy consumption.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Sustainable Infrastructure? What do you understand by Sustainability and Buildings. Sustainable Energy Practices, Climate Action Planning? - Introduce the concept of Sustainable Energy Practices. 2. **Development** (30 minutes) a. Introduction to sustainable infrastructure: Definitions, principles, and importance. b. Sustainable city planning: Key components, challenges, and strategies. c. Sustainable energy practices: Renewable energy sources, energy-efficient technologies, and climate action planning. d. Role of buildings in sustainability: Green building design, energy conservation measures, and sustainable materials. e. Group discussions, debates, and collaborative activities to encourage critical thinking and problem-solving.

	f. Guest lectures or field trips to sustainable infrastructure sites for real-world application and inspiration. Exercise (5 minutes) – Give different use-cases and make students think about Sustainable Energy Practices Use Nearpod to collect responses and discuss the answers.
Closure	1. Recap of key concepts and learning objectives. 2. Reflection on personal insights gained and potential applications in future projects or careers. 3. Assignment or project briefing to reinforce learning and encourage further exploration of sustainable infrastructure topics. 4. Opportunity for students to ask questions or seek clarification on any remaining doubts. 5. Encouragement for continued engagement with sustainability principles beyond the classroom. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Assessments could include quizzes or exams testing comprehension of sustainable infrastructure concepts and principles. 2. Evaluation of assignments or projects measuring students' ability to apply sustainability principles in practical scenarios. 3. Participation in discussions, group activities, and presentations assessing engagement and critical thinking skills. 4. Feedback on the quality of contributions to group projects or collaborative tasks. 5. Peer review of presentations or reports to encourage constructive feedback and learning from peers. Spend 5 minutes to evaluate student assimilation of the lesson contents

Lesson Plan No. 18	Course Name: Environment and Sustainability Topic: Sustainable Transportation: Accessibility, Mobility, and Derived Demand. Sustainable Stormwater Management.	Course No.: NCC-201

Objectives	At the end of the lesson the student shall be able to: a. To understand the concept of sustainable transportation and its significance in promoting accessibility and mobility. b. To explore the factors influencing derived demand in transportation systems and their implications for sustainability. c. To examine sustainable stormwater management practices and their role in mitigating environmental impacts. d. To analyze the relationship between transportation infrastructure, accessibility, and urban development. e. To discuss strategies for promoting sustainable transportation and stormwater management at the local, regional, and global levels.
Teaching Aids (if any)	a. To understand the concept of sustainable transportation and its significance in promoting accessibility and mobility. b. To explore the factors influencing derived demand in transportation systems and their implications for sustainability. c. To examine sustainable stormwater management practices and their role in mitigating environmental impacts. d. To analyze the relationship between transportation infrastructure, accessibility, and urban development. e. To discuss strategies for promoting sustainable transportation and stormwater management at the local, regional, and global levels.
Teaching Development	1. **Introduction** (5 minutes) - Ask questions What do you understand by Sustainable Transportation? What do you understand by Sustainable Stormwater Management? - Introduce the concept of Sustainable Stormwater Management. 2. **Development** (30 minutes) a. Introduction to Sustainable Transportation: Definitions, principles, and challenges. b. Accessibility and Mobility: Factors influencing transportation accessibility, including infrastructure, land use, and socio-economic factors. c. Derived Demand in Transportation: Understanding the concept and its implications for transportation planning and policy. d. Sustainable Stormwater Management: Strategies for managing stormwater runoff to minimize environmental impacts. e. Case Studies and Examples: Analysis of real-world examples to illustrate sustainable transportation and stormwater management in practice.

	f. Group Discussions and Debates: Encourage critical thinking and debate on the effectiveness of different sustainability strategies. g. Interactive Activities: Engage students in hands-on activities or simulations to apply concepts learned. h. Reflection and Application: Encourage students to reflect on how they can contribute to promoting sustainable transportation and stormwater management in their communities. Exercise (5 minutes) – Give different use-cases and make students think about Sustainable Energy Practices Use Nearpod to collect responses and discuss the answers.
Closure	1. Summarize key concepts and takeaways. 2. Encourage students to reflect on the importance of sustainable transportation and stormwater management in creating more livable and resilient communities. 3. Invite students to share any insights or questions they have gained from the lesson. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Quizzes or tests assessing understanding of key concepts and principles. 2. Assignments or projects requiring students to analyze and propose sustainable transportation or stormwater management solutions for a given scenario. 3. Participation in group discussions and activities demonstrating engagement with course material. 4. Peer evaluations of presentations or group work. 5. Reflection papers where students articulate their understanding of the connections between transportation, stormwater management, and sustainability, and propose actions for promoting sustainability in their own lives or communities. Spend 5 minutes to evaluate student assimilation of the lesson contents