

Lesson Plan No. 1	Course Name: Hybrid and Electric Vehicles	Course No.: EE-702(A)
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> History of hybrid vehicles History of electric vehicles
Teaching Aids (if any)	<ol style="list-style-type: none"> Whiteboard and markers PowerPoint slides (optional) Handouts or reading materials on power electronics basics Use of Nearpod tool for online quiz
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ol style="list-style-type: none"> Ask questions Do you know about the electric vehicles? Requirement of electric and hybrid vehicles? Explain the basic history of Hybrid and Electric Vehicles and its applications. History of Hybrid and Electric Vehicles (30 minutes) <ol style="list-style-type: none"> History of Hybrid and Electric Vehicles Description of progress of automobile in electrical vehicles. Working principle of electrical and hybrid vehicles Industrial application of electrical and hybrid vehicles Exercise (5 minutes) – Explain progress of automobile in hybrid uses with suitable examples. Use Nearpod to collect responses and discuss the answers.
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Suggested Video Lecture <p>Spend 5 minutes to wrap up and consolidate the learnings</p> <p>https://archive.nptel.ac.in/courses/108/103/108103009/</p>
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on power Electronics. <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>

Lesson Plan No.2	Course Name: Hybrid and Electric Vehicles	Course No.: EE-702(A)
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Students will understand the social and environmental significance of hybrid and electric vehicles. Students will be able to articulate the benefits and challenges associated with the widespread adoption of these vehicles.
Teaching Aids (if any)	<ol style="list-style-type: none"> Whiteboard and markers PowerPoint slides (optional) Handouts or reading materials on power electronics basics Use of Nearpod tool for online quiz
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (15 minutes) <ul style="list-style-type: none"> Begin with a brief discussion on the current state of the automotive industry and the environmental challenges associated with traditional gasoline-powered vehicles. Introduce the concept of hybrid and electric vehicles as sustainable alternatives. Ask students if they have any prior knowledge or opinions on hybrid and electric vehicles. 2. Background Information (15 minutes): <ol style="list-style-type: none"> Provide a brief overview of how hybrid and electric vehicles work, emphasizing the role of batteries and electric motors. Discuss key differences between hybrid and electric vehicles. Share statistics on the environmental impact of traditional vehicles, such as air pollution and greenhouse gas emissions. 3. Benefits of Hybrid and Electric Vehicles (20 minutes): <ol style="list-style-type: none"> Divide the class into small groups and assign each group a specific benefit of hybrid and electric vehicles to research. Possible benefits to assign: <ul style="list-style-type: none"> Reduction in air pollution Lower greenhouse gas emissions Energy efficiency Economic savings (fuel costs, maintenance) Decreased dependence on fossil fuels
Closure	<ol style="list-style-type: none"> Summarize the key points discussed during the lesson. Have students reflect on whether they believe hybrid and electric vehicles are a viable solution to environmental and social issues related to transportation. <p>Spend 5 minutes to wrap up and consolidate the learnings</p> <p>https://archive.nptel.ac.in/courses/108/103/108103009/</p>
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to



	<p>answer and discuss.</p> <p>2. Nearpod Quiz on power Electronics.</p> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>
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Lesson Plan No. 3	Course Name: Hybrid and Electric Vehicles	Course No.: EE-702(A)
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Students will gain a foundational understanding of key concepts related to vehicle performance. Students will be able to identify and explain the factors that contribute to a vehicle's overall performance.
Teaching Aids (if any)	<ol style="list-style-type: none"> Whiteboard and markers PowerPoint slides (optional) Handouts or reading materials on power electronics basics Use of Nearpod tool for online quiz
Teaching Development	<ol style="list-style-type: none"> Introduction (15 minutes) <ul style="list-style-type: none"> Begin with a brief discussion on why vehicle performance is important and how it affects the driving experience. Introduce the key aspects of vehicle performance, such as acceleration, top speed, fuel efficiency, and handling. Ask students if they have any prior knowledge or experiences related to vehicle performance. Engine and Power train (15 minutes): <ol style="list-style-type: none"> Discuss the role of the engine in vehicle performance, including the basic principles of internal combustion engines. Explain how power is transmitted from the engine to the wheels through the powertrain. Introduce terms such as horsepower, torque, and transmission, and explain their significance in determining a vehicle's performance. Acceleration and Speed (20 minutes): <ol style="list-style-type: none"> Explain the concept of acceleration and how it is measured in terms of 0-60 mph or 0-100 km/h times. Discuss the relationship between engine power, vehicle weight, and acceleration. <p>Introduce the concept of top speed and factors that influence it, such as aerodynamics and engine power.</p>
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Suggested Video Lecture <p>Spend 5 minutes to wrap up and consolidate the learnings</p> <p>https://archive.nptel.ac.in/courses/108/103/108103009/</p>
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on power Electronics. <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>

Lesson Plan No. 4	Course Name: Hybrid and Electric Vehicles	Course No.: EE-702(A)
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Students will understand the different power sources used in vehicles and their characteristics. Students will be able to compare and contrast traditional internal combustion engines with alternative power sources.
Teaching Aids (if any)	<ol style="list-style-type: none"> Whiteboard and markers PowerPoint slides (optional) Handouts or reading materials on power electronics basics Use of Nearpod tool for online quiz
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (15 minutes) <ul style="list-style-type: none"> Begin with a brief discussion on the various power sources used in vehicles. Introduce the concept of internal combustion engines and their historical significance in the automotive industry. Highlight the need for alternative power sources due to environmental concerns and technological advancements. 2. Traditional Power Sources (20 minutes): <ol style="list-style-type: none"> Discuss the characteristics of internal combustion engines, including gasoline and diesel engines. Explain how these engines work, emphasizing the combustion process, power generation, and emissions. Discuss the advantages and disadvantages of traditional power sources. 3. Alternative Power Sources (20 minutes): <ol style="list-style-type: none"> Introduce alternative power sources used in vehicles, such as electric, hybrid, hydrogen fuel cell, and compressed natural gas (CNG). Explain the basic principles of each alternative power source and how they differ from traditional engines. Discuss the environmental impact, energy efficiency, and infrastructure considerations for each alternative.
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Suggested Video Lecture <p>Spend 5 minutes to wrap up and consolidate the learnings</p> <p>https://archive.nptel.ac.in/courses/108/103/108103009/</p>



Evaluation	<ol style="list-style-type: none">1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.2. Nearpod Quiz on power Electronics. <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>
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