



Kot Bhalwal, Jammu



Model Institute of Engineering
& Technology (Autonomous)
Dr. Arun K. Gupta Teaching-Learning Centre

Department of ECE

Details of Lesson Plan

S.No.	Particulars	Details
1.	Course Name	Introduction to Internet of Things
2.	Course Code	ECE -501
3.	Academic Year	2024 -2025
4.	Semester	5 th
5.	Number of Lesson plans	40
6.	Faculty Assigned	Dr. Satyendra Kumar Singh

Faculty Signature



Lesson Plan No. 1.a	Course Name: Introduction to Internet of Things Topic: Introduction of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Understand the Introduction of IoT Illustrate the State of the Art, Architecture of IoT
Teaching Aids (if any)	<ol style="list-style-type: none"> PPT Use of Nearpod tool for online quiz Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ul style="list-style-type: none"> Ask questions about Architecture of IoT Ask questions about Arduino simulation environment Ask questions about interfacing of sensor & actuators Ask questions about basic networking with Wi-Fi module Ask questions about IoT applications and cloud platforms Development (30 minutes) <ol style="list-style-type: none"> Explain the IoT architecture Explanation of Arduino simulation environment Explanation interfacing of sensor & actuators Explain the basic networking with Wi-Fi module IoT applications and cloud platforms Recent applications of IoT Exercise (5 minutes) – Ask students to explain the IoT architecture <ul style="list-style-type: none"> Use Nearpod to collect responses and discuss the answers. Quiz link https://docs.google.com/document/d/1TloJqC945U9_vajm-nzj1Cy_1yg52j8C/edit?usp=drive_link&oid=100610997393466310877&rtpof=true&sd=true
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work on Sensing Layer, Network Layer, Data processing Layer, and Application Layer of IoT Suggested Video lecture https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on basics of Sensing Layer, Network Layer and Data processing Layer of



	Architecture of IoT Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 1	Course Name: Introduction to Internet of Things Topic: Introduction of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the Introduction of IoT b. Illustrate the State of the Art, Architecture of IoT
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions about Architecture of IoT - Ask questions about Arduino simulation environment - Ask questions about interfacing of sensor & actuators - Ask questions about basic networking with Wi-Fi module - Ask questions about IoT applications and cloud platforms 2. Development (30 minutes) a. Explain the IoT architecture b. Explanation of Arduino simulation environment c. Explanation interfacing of sensor & actuators d. Explain the basic networking with Wi-Fi module e. IoT applications and cloud platforms f. Recent applications of IoT 3. Exercise (5 minutes) – Ask students to explain the IoT architecture - Use Nearpod to collect responses and discuss the answers. - Quiz link https://docs.google.com/document/d/1TloJqC945U9_vajm-nzj1Cy_1yg52j8C/edit?usp=drive_link&oid=100610997393466310877&rtpof=true&sd=true
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work on Sensing Layer, Network Layer, Data processing Layer, and Application Layer of IoT 3. Suggested Video lecture https:// https://youtu.be/oxMdDsud5vg Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on basics of Sensing Layer, Network Layer and Data processing Layer of



	Architecture of IoT Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 2	Course Name: Introduction to Internet of Things Topic: State of the art of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the state of the art of IoTUnderstand the platform of IoTUnderstand the future of IoTIllustrate the Architecture Reference ModelUnderstand IOT Reference architecture and reference model dependency
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions about state of the art of IoTAsk questions about platform of IoTAsk questions about future of IoTAsk questions about architecture reference modelAsk questions about IOT reference architecture and reference model dependencyDevelopment (30 minutes)<ol style="list-style-type: none">Explain the IoT architectureExplanation of platform of IoTDiscussion of future of IoTExplain about architecture reference modelExplanation of IoT domain modelDiscussion on model notation and semanticsExercise (5 minutes) – Ask students to explain the IoT architecture<ul style="list-style-type: none">Use Nearpod to collect responses and discuss the answers.Quiz linkhttps://docs.google.com/document/d/1TloJqC945U9_vajm-nzj1Cy_1yg52j8C/edit?usp=drive_link&oid=100610997393466310877&rtpof=true&sd=true
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work on IoT architecture, architecture reference modelSuggested Video lecture https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>



Evaluation	<ol style="list-style-type: none">1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.2. Nearpod Quiz on IoT architecture, examples of IoT <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>
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Lesson Plan No. 3	Course Name: Introduction to Internet of Things Topic: Fundamentals of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the IoT fundamentalsUnderstand the future the data, device, analytics and connectivity of componentsIllustrate the history and working of internet of thing (IoT)
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions about fundamentals of IoTAsk questions about data, device, analytics and connectivity of IoT devicesAsk questions about history and working of internet of thingAsk questions based on features of IoTAsk questions about network infrastructures of IoTDevelopment (30 minutes)<ol style="list-style-type: none">Explain the fundamentals of IoTExplanation of data, device, analytics and connectivity of IoT devicesDiscussion on history and working of internet of thingExplain features of IoTExplanation of network infrastructures ofExercise (5 minutes) – Ask students to explain the fundamentals of IoT<ul style="list-style-type: none">Use Nearpod to collect responses and discuss the answers.Quiz linkhttps://docs.google.com/document/d/1TloJqC945U9_vajm-nzj1Cy_1yg52j8C/edit?usp=drive_link&oid=100610997393466310877&rtfpof=true&sd=true
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work on data, device, analytics and connectivity of IoT devicesSuggested Video lecture https:// https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on features of IoT, data, device, analytics and connectivity of IoT devices



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	Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 4	Course Name: Introduction to Internet of Things Topic: IOT protocols & architecture	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the IOT protocols & architecture b. Understand the IoT Network Protocols c. Understand the IoT Data Protocols d. Understand the MQTT, DDS, AMQP & CoAP protocols e. Illustrate the 3-layer & 5-layer architecture of IoT
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about MQTT & DDS protocols - Ask questions about AMQP & CoAP protocols - Ask questions about IoT data protocols - Ask questions based the IoT network protocols - Ask questions about 3-layer & 5-layer architecture of IoT 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain the types of IoT protocols b. Explanation of MQTT, DDS, AMQP & CoAP protocols c. Discussion on IoT data protocols d. Explain IoT network protocols e. Explanation of 3-layer & 5-layer architecture of IoT 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain the specific IoT protocols list - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work on 3-layer & 5-layer architecture of IoT 3. Suggested Video lecture https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on features of IoT data protocols, IoT network protocols <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



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Lesson Plan No. 5	Course Name: Introduction to Internet of Things Topic: Real-time examples of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the real-time examples of IoT b. Understand the concept of real-time examples of IoT c. Understand the data & network Protocols of real-time examples
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about real-time application of IoT - Ask questions about examples of real-time application of IoT - Ask questions about data & network Protocols of real-time examples - Ask questions based on the identification of component of devices - Ask questions about IO port and signalling conditioning of the given examples 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain the real-time application of IoT b. Explanation of examples of real-time application of IoT c. Discussion on the identification of component of devices d. Explain IO port and signalling conditioning of the given examples e. Explanation of different type of fields for application of Iot 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain the real-time examples of IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work on health centre, agriculture & toll tax collection by IoT devuces 3. Suggested Video lecture https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on features of real-time examples of IoT <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



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Lesson Plan No. 6	Course Name: Introduction to Internet of Things Topic: Various platforms for IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the various platforms for IoT b. Understand the concept to how IoT platform help c. Illustrate the service offer by IoT platform
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about various platforms for IoT - Ask questions about name of platforms - Ask questions about how IoT platform help - Ask questions about working of IoT platform 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain the various platforms for IoT b. Explanation of how IoT platform help c. Discussion on the about working of IoT platform d. Explain the service offer by IoT platform e. Explanation of service offering by various types of IoT platform 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain the real-time examples of IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work on how IoT platform help 3. Suggested Video lecture https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on service offer by IoT platform & name of IoT platform <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 7	Course Name: Introduction to Internet of Things Topic: Overview of IoT components	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the overview of IoT components b. Understand the name of major IoT components and their working principle c. Illustrate the specific area, range and communication protocol of IoT components
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions about overview of IoT components - Ask questions about hardware and signal conditioning the components - Ask questions about how name of major IoT components and their working principle - Ask questions about specific area, range and communication protocol of IoT components 2. Development (30 minutes) a. Explain the overview of IoT components b. Explanation of block diagram for IoT components c. Discussion on the about hardware and signal conditioning the components d. Explain the how name of major IoT components and their working principle e. Explanation of specific area, range and communication protocol of IoT components 3. Exercise (5 minutes) – - Ask students to explain the real-time examples of IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work on specific area, range and communication protocol of IoT components 3. Suggested Video lecture https:// https://youtu.be/oxMdDsud5vg Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on name of the IoT components and their range



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	Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 8	Course Name: Introduction to Internet of Things Topic: IoT Communication Technologies	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the IoT Communication TechnologiesUnderstand the device - to- device communicationUnderstand the cloud - to- device communicationUnderstand the peer - to- peer communicationUnderstand the machine - to- machine communication
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions about IoT Communication TechnologiesAsk questions about device - to- device communicationAsk questions about cloud - to- device communicationAsk questions about the peer - to- peer communicationAsk questions about the machine - to- machine communicationDevelopment (30 minutes)<ol style="list-style-type: none">Explain the IoT Communication Technologies and its examplesExplanation of device - to- device communication e.g. name of some devicesDiscussion on cloud - to- device communication e.g. name of cloud offeringExplain the peer - to- peer communicationExplanation of machine - to- machine communicationExercise (5 minutes) –<ul style="list-style-type: none">Ask students to explain the peer - to- peer communicationUse Nearpod to collect responses and discuss the answers.Quiz linkhttps://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work on specific area, range and communication protocol of IoT componentsSuggested Video lecture https:// https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on IoT Communication Technologies



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	Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 9	Course Name: Introduction to Internet of Things Topic: M2M Vs IOT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the M2M Vs IOT b. Understand the difference between M2M Vs IOT by on the basis of various parameter
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions about M2M communication - Ask questions about IoT devices - Ask questions about the difference between M2M Vs IOT by on the basis of various parameter 2. Development (30 minutes) a. Explain of M2M communication b. Explanation of IoT devices & its communication techniligy c. difference between M2M Vs IOT by on the basis of various parameter 3. Exercise (5 minutes) – - Ask students to explain the difference between M2M Vs IOT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/forms/d/1A3n94xLwPnv15Zrex5vq0b8iI3wIurm-BxDBS2AizL0/edit
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work to explain machine – to- machine communication 3. Suggested Video lecture https:// https://youtu.be/oxMdDsud5vg Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on difference between M2M Vs IOT by on the basis of various parameter Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 10	Course Name: Introduction to Internet of Things Topic: recent developments in IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the recent developments in internet of things b. Understand the challenges in internet of things
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about recent developments in technology - Ask questions about recent developments in internet of things - Ask questions about the challenges in internet of things - Ask questions about the data security - Ask questions about protection of IoT devices 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain the recent developments in technology that are used in IoT technology b. Explain the recent developments in internet of things c. Explanation of the challenges in internet of things due data security & protection of IoT devices 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to recent developments in internet of things - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://docs.google.com/document/d/1TloJqC945U9_vajm-nzj1Cy_1yg52j8C/edit?usp=drive_link&oid=100610997393466310877&rtpof=true&sd=true
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work to recent developments in technology that are used in IoT technology 2. Suggested Video lecture https:// https://youtu.be/oxMdDsud5vg <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on recent developments in technology that are used in IoT technology <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 11	Course Name: Introduction to Internet of Things Topic: Arduino Simulation Environment	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the Arduino Simulation Environment b. Understand the different type of Arduino board c. Working with the Setup the IDE
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about Arduino Simulation Environment - Ask questions about different type of Arduino board - Ask questions about the Arduino board specification - Ask questions about Setup the IDE software - Ask questions about program sketch, program upload & serial monitor 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain Arduino Simulation Environment b. Explain the different type of Arduino board c. Explanation of the Arduino board specification e.g. IO port, power supply, Digital IO port, Analog IO port & other pin configuration d. Explain the Setup the IDE software e. Explanation with programming Setup the IDE software 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to Arduino Simulation Environment - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work to draw Arduino board diagram with pin configuration 2. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Arduino board diagram with pin configuration Spend 5 minutes to evaluate student assimilation of the lesson contents



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Lesson Plan No. 12	Course Name: Introduction to Internet of Things Topic: program using Arduino Software	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the writing of program using Arduino Software b. Understand Embedded C programming for Arduino c. Understand the Arduino Libraries
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about void setup - Ask questions about void loop - Ask questions about the program using Arduino Software - Ask questions about Embedded C programming for Arduino - Ask questions about Arduino Libraries 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explain programming through Arduino Software b. Explain the different void setup & void loop with its physical significance c. Explanation of various function with their instruction d. Explanation of pinMode i.e. selection of pin number and mode meaning it may input or output. Input and output value are shown on the mode d. Explain the Embedded C programming are used for controllers e. Explanation with programming Setup the IDE software 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to Arduino Simulation Environment - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work to draw Arduino board diagram with pin configuration 2. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Arduino board diagram with pin configuration



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Lesson Plan No. 13	Course Name: Introduction to Internet of Things Topic: Interfacing LED & push-button	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the Interfacing LED, push-button, buzzer and LCD with Arduino Uno b. Understand the sketch and upload the program using IDE software c. Understand the Arduino port and wiring on the board
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about Arduino Uno, Buzzer, LED, LDR (photoresistor), 220 and 10k ohm resistor, Wires & Breadboard - Ask questions about interfacing of above component to Arduino Uno - Ask questions about the program using Arduino Software - Ask questions about power supply to Arduino Uno 2. Development (30 minutes) <ul style="list-style-type: none"> a. develop the programming for Interfacing LED, push-button, buzzer and LCD with Arduino Uno b. Explain the different void setup & void loop with its physical significance c. Explanation of interfacing of above component to Arduino Uno d. Explanation of upload the program for uploading into IDE d. Explain the execution of program and turn the LED 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to Arduino Simulation Environment - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work to draw Arduino board diagram with pin configuration 2. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Arduino board diagram with pin configuration <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 14	Course Name: Introduction to Internet of Things Topic: Cloud Computing	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the Cloud Computing b. Understand the generation and model of Raspberry Pi c. Understand the Raspberry Architecture and Pin Configuration d. Understand the Raspberry Pi version, CPU speeds, core & RAM
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions about generation and model of Raspberry Pi - Ask questions about Introduction to Raspberry Pi - Ask questions based on the Raspberry Architecture and Pin Configuration - Ask questions related Raspberry Pi version, CPU speeds, core & RAM 2. Development (30 minutes) <ul style="list-style-type: none"> a. Introduction to Raspberry Pi b. Explanation on generation and model of Raspberry Pi c. Explanation of Raspberry Pi version, CPU speeds, core & RAM d. Explanation of Raspberry Pi Architecture and Pin Configuration d. Interfacing of Raspberry Pi to external world 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to generation and model of Raspberry Pi - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work on write notes on Raspberry Pi version, CPU speeds, core & RAM 2. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Arduino board diagram with pin configuration <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



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Lesson Plan No. 15	Course Name: Introduction to Internet of Things Topic: Cloud computing service provider	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the cloud computing b. Understand cloud computing service provider c. Understand the cloud computing provider
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions any idea about cloud computing provider - Ask questions about requirements of cloud computing - Ask questions based Cloud Service Models - Ask questions about the working of cloud computing 2. Development (30 minutes) a. Introduction to Raspberry Pi b. Explanation on generation and model of Raspberry Pi c. Explanation of Raspberry Pi version, CPU speeds, core & RAM d. Explanation of Raspberry Pi Architecture and Pin Configuration d. Interfacing of Raspberry Pi to external world 3. Exercise (5 minutes) – - Ask students to generation and model of Raspberry Pi - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work on write notes on Raspberry Pi version, CPU speeds, core & RAM 2. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on Arduino board diagram with pin configuration Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 16	Course Name: Introduction to Internet of Things Topic: Interfacing of sensor & actuators	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand introduction to interfacing of sensor & actuators b. Understand overview of sensors working c. Understand different types of Sensors & their working
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based on sensor & actuators - Ask questions what is the difference between sensor & actuators - Ask questions different types of Sensors their working - Ask questions about interfacing and wiring of sensors 2. Development (30 minutes) a. Explanation of theory for sensor & actuators b. Explanation of different types of Sensors their working c. Explanation of interfacing and wiring of sensors d. Explanation of operation of sensor e. Explanation of pin configuration, colour coding, data signal and power supply and construction of sensor 3. Exercise (5 minutes) – - Ask students about introduction to interfacing of sensor & actuators - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for explanation of different types of Sensors their working 3. Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on types of sensor, types of output signals Spend 5 minutes to evaluate student assimilation of the lesson contents



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Lesson Plan No. 17	Course Name: Introduction to Internet of Things Topic: Analog and digital sensors	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Understand of analog and digital sensors Understand different types of analog and digital sensors Understand difference between analog and digital sensors
Teaching Aids (if any)	<ol style="list-style-type: none"> PPT Use of Nearpod tool for online quiz Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ul style="list-style-type: none"> Ask questions based on analog sensor Ask questions based on digital sensor Ask questions what is the difference between analog and digital sensors Ask questions on working of analog and digital sensors Ask questions about application of analog and digital sensors Development (30 minutes) <ol style="list-style-type: none"> Explanation of analog and digital sensors Explanation of different types of analog and digital sensors Explain the difference between analog and digital sensors Explain the working principle of analog and digital sensors List out the application of analog and digital sensors Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to explain the working principle of analog and digital sensors Use Nearpod to collect responses and discuss the answers. Quiz link https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work for application of analog and digital sensors Suggested Video lecture https:// Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on types of sensor based on their nature (analog and digital sensors) <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 18	Course Name: Introduction to Internet of Things Topic: Temperature & humidity sensors	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the working principle, pin configuration of temperature & humidity sensors b. Understand sketches with arduino c. Understand the interfacing of temperature and humidity with arduino
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based working principle, pin configuration of temperature & humidity sensors - Ask questions programming of temperature & humidity sensors - Ask questions program upload and pin selection using arduino - Ask questions based monitor the data display devices & PC monitor 2. Development (30 minutes) a. Explanation of working principle, pin configuration of temperature & humidity sensors b. Explanation of programming of temperature & humidity sensors c. Explain the upload and pin selection using arduino d. Explain the of temperature & humidity sensors for IoT based application e. List out the application of analog and digital sensors 3. Exercise (5 minutes) – - Ask students to explain the working principle, pin configuration of temperature & humidity sensors - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for programming of temperature & humidity sensors 3. Suggested Video lecture https://drive.google.com/file/d/1ISZCWjQMj5dToRu10hpfT-3S09jOvNXg/view?usp=drive_link Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on temperature & humidity sensors for IoT based application Spend 5 minutes to evaluate student assimilation of the lesson contents



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Lesson Plan No. 19	Course Name: Introduction to Internet of Things Topic: pin configuration of motion sensor	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the working principle, pin configuration of motion, light and gas sensor b. Understand sketches of motion, light and gas sensor using arduino c. Understand the interfacing of motion, light and gas sensor
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based working principle, pin configuration of motion, light and gas sensor - Ask questions programming of motion, light and gas sensor - Ask questions program upload and pin selection using arduino - Ask questions based monitor the data display devices & PC monitor 2. Development (30 minutes) a. Explanation of working principle, pin configuration of a motion, light and gas sensor b. Explanation of programming of motion, light and gas sensor c. Explain the upload and pin selection using arduino d. Explain the of motion, light and gas sensor for IoT based application e. List out the application of analog and digital sensors 3. Exercise (5 minutes) – - Ask students to explain the working principle, pin configuration of a motion, light and gas sensor - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for programming of a motion, light and gas sensor 3. Suggested Video lecture https://drive.google.com/file/d/16JqarSVckPfCnRoTwPLfnlo1kEAXedRj/view?usp=drive_link Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on motion, light and gas sensor for IoT based application Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 20	Course Name: Introduction to Internet of Things Topic: Actuators with arduino, interfacing of relay switch	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the interfacing of actuators with arduino, interfacing of relay switch b. Understand the function of actuators c. Understand the function of relay switch d. Understand the uses of relay switch e. Understand the interfacing of actuators with arduino, interfacing of relay switch with load devices
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based on the interfacing of actuators with arduino, interfacing of relay switch - Ask questions based on function of actuators - Ask questions based on uses of actuators - Ask questions based on the function of relay switch - Ask questions based on uses of relay switch - Ask questions for generation of different supply using actuator - Ask questions based on interfacing of actuators & relay switch with arduino board 2. Development (30 minutes) a. Explanation of on the interfacing of actuators with arduino, interfacing of relay switch b. Explanation of function of actuators c. Explanation of uses of actuators d. Explanation of uses of relay switch e. Explanation of function of relay switch f. Explanation of generation of different supply using actuator g. Explain the interfacing of actuators & relay switch with arduino board 3. Exercise (5 minutes) – - Ask students to explain the function of actuators - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738



Closure	<ol style="list-style-type: none">1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.2. Home work for the interfacing of actuators & relay switch with arduino board3. Suggested Video lecture https://drive.google.com/file/d/16JqarSVckPfCnRoTwPLfnlo1kEAXedRj/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.2. Nearpod Quiz on the interfacing of actuators & relay switch with arduino board <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 21	Course Name: Introduction to Internet of Things Topic: Basics of wireless networking	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the basics of wireless networkingUnderstand the types of wireless networksUnderstand advantages of wireless networksUnderstand introduction to ESPXXUnderstand the features and application of micro controller ESPX
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions based on basics of wireless networkingAsk questions based on types of wireless networksAsk questions based on advantages of wireless networksAsk questions based on introduction to ESPXXAsk questions based on features and application of micro controller ESPXDevelopment (30 minutes)<ol style="list-style-type: none">Explanation based on basics of wireless networkingExplanation on types of wireless networksExplanation of advantages of wireless networksExplanation based on introduction to ESPXXExplanation based on features and application of micro controller ESPXExercise (5 minutes) –<ul style="list-style-type: none">Ask students to basics of wireless networkingUse Nearpod to collect responses and discuss the answers.Quiz linkhttps://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work for the interfacing of actuators & relay switch with arduino boardSuggested Video lecture https://drive.google.com/file/d/1iqOiCoZNnoSOyrAfnP8_OzHK-bQIAKvO/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on advantages of wireless networks



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	Spend 5 minutes to evaluate student assimilation of the lesson contents
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Lesson Plan No. 22	Course Name: Introduction to Internet of Things Topic: Variant and features of ESP8266	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the ESP8266Understand the variant and features of ESP8266Understand the NodeMCUUnderstand the working with NodeMCUUnderstand various Wi-Fi librariesUnderstand WiFi class, IPAddress class & Server class
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions based on ESP8266Ask questions based on variant and features of ESP8266Ask questions based on NodeMCUAsk questions based on working with NodeMCUAsk questions based on various Wi-Fi librariesAsk questions based on WiFi class, IPAddress class & Server classDevelopment (30 minutes)<ol style="list-style-type: none">Explanation based on basics of ESP8266Explanation on variant and features of ESP8266Explanation of NodeMCUExplanation based on various Wi-Fi librariesExplanation based on WiFi class, IPAddress class & Server classExercise (5 minutes) –<ul style="list-style-type: none">Ask students to basics of ESP8266Use Nearpod to collect responses and discuss the answers.Quiz linkhttps://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work for the variant and features of ESP8266Suggested Video lecture https://drive.google.com/file/d/1uBvnySniQjTdwkghlXZS9e-0_T7MuK_/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on variant and features of ESP8266 <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



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Lesson Plan No. 23	Course Name: Introduction to Internet of Things Topic: BACNet Protocol	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the BACNet ProtocolUnderstand BACnet network layerUnderstand the BACnet Application LayerUnderstand the Bacnet Protocol
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions based on BACNet ProtocolAsk questions based on BACnet network layerAsk questions based on BACnet Application LayerAsk questions based on BACnet ProtocolDevelopment (30 minutes)<ol style="list-style-type: none">Explanation based on BACNet ProtocolExplanation on BACnet network layerExplanation of NodeMCUExplanation based on various Wi-Fi librariesExplanation based on WiFi class, IPAddress class & Server classExercise (5 minutes) –<ul style="list-style-type: none">Ask students to basics of BACNet ProtocolUse Nearpod to collect responses and discuss the answers.Quiz linkhttps://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work for the BACnet network layerSuggested Video lecture https://drive.google.com/file/d/1uBvnySniQjTdwkghIXZS9e-0_T7MuK/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on BACnet network layer <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 24	Course Name: Introduction to Internet of Things Topic: Virtualization concepts of IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the virtualization concepts of IoT b. Understand the virtualization allows sharing of the physical resources c. Understand the virtualization allows supporting dynamic connectivity among connected devices d. Understand the cloud architecture of IoT e. Understand the cloud architecture components f. Understand the work of cloud architecture
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions based on the virtualization concepts of IoT - Ask questions based on sharing of the physical resources using virtualization - Ask questions based on dynamic connectivity among connected devices - Ask questions based on cloud architecture of IoT - Ask questions based on cloud architecture components - Ask questions for the working of cloud architecture 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation of the virtualization concepts of IoT b. Explanation of sharing of the physical resources using virtualization c. Explanation of virtualization allows supporting dynamic connectivity among connected devices d. Explanation of uses of cloud architecture of IoT e. Explanation of cloud architecture components f. Explanation of working of cloud architecture 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to the virtualization concepts of IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for cloud architecture components 3. Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqrrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization



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Spend 5 minutes to evaluate student assimilation of the lesson contents





Lesson Plan No. 25	Course Name: Introduction to Internet of Things Topic: Network layer in IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Understand the role of the network layer in IoT Identify key protocols used in the network layer for IoT. Analyze how the network layer facilitates communication protocol in IoT. Illustrate function of each layer its communication to other layer. Understand the OSI model for the network model
Teaching Aids (if any)	<ol style="list-style-type: none"> PPT Use of Nearpod tool for online quiz Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ul style="list-style-type: none"> Ask questions based on the brief explanation of the OSI model Ask questions on role of network model Ask questions based on directing routing of data packets between devices Ask questions based on assigning unique IP addresses to devices. Ask questions based on breaking down and reassembling data packets Ask questions on network protocol in IoT Ask questions on challenges in IoT networking Development (30 minutes) <ol style="list-style-type: none"> Explanation of the explanation of the OSI model Explanation of role of network model Explanation of directing routing of data packets between devices Explanation of assigning unique IP addresses to devices. Explanation of challenges in IoT networking Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to the network layer of IoT Use Nearpod to collect responses and discuss the answers. Quiz link https://www.geeksforgeeks.org/quizzes/network-layer-gq/
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work for Network layer & OSI Model Suggested Video lecture https://m.youtube.com/watch?v=NK2C2p2FfWs&pp=ygUUTmV0d29yayBsYXllciBpbiBpb3Q%3D Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on the cloud architecture components and virtualization <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



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Lesson Plan No. 26	Course Name: Introduction to Internet of Things Topic: APS layer in IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the role and importance of the APS layer in IoT systems. b. Identify key protocols and standards associated with the APS layer. c. Analyze how the APS layer facilitates communication between IoT devices and applications. d. Understand the structure and functions of the APS Layer.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions on overview of ZigBee protocol and its relevance in IoT. - Ask questions on explanation of the APS layer and its position in the ZigBee stack. - Ask questions based on structure and functions of the APS Layer - Ask questions based on application support data Entity - Ask questions based on breaking down and reassembling data packets - Ask questions on Functions such as filtering, acknowledgments, retries, and maintaining binding and address maps - Ask questions on Role of the APS layer as the interface between the network layer and the application layer. 2. Development (30 minutes) a. Explanation of the overview of the APS Layer b. Explain the concept and functionality of the APS layer. c. Explanation of definition and purpose of the APS layer. d. Explanation of protocols and standards in the APS Layer. e. Explanation of Challenges and Considerations 3. Exercise (5 minutes) – - Ask students to the APS layer of IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://www.dr-chuck.com/net-intro/quiz/index.php?quiz=07-application-layer
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for APS layer 3. Suggested Video lecture 4. https://m.youtube.com/watch?v=NK2C2p2FfWs&pp=ygUUTmV0d29vayBsYXllciBpbjBpb3Q%3D 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization Spend 5 minutes to evaluate student assimilation of the lesson contents



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Lesson Plan No. 27	Course Name: Introduction to Internet of Things Topic: Security in IoT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the unique security challenges in IoT environments. b. Identify key threats and vulnerabilities in IoT systems. c. understand the different security challenges, measures, and technologies used to protect IoT devices and networks.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions on definition of IoT security. - Ask questions on importance of securing IoT devices. - Ask questions based on common IoT vulnerabilities - Ask questions based on Importance of security in IoT due to interconnected devices. 2. Development (30 minutes) a. Explanation of IoT security. b. Explain the of IoT Security Challenges c. Explanation of Importance of securing IoT devices. d. Explanation of IoT security best practices. e. Explanation of security technologies and protocols 3. Exercise (5 minutes) – - Ask students to the security in IoT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://www.dr-chuck.com/net-intro/quiz/index.php?quiz=07-application-layer
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for APS layer 3. Suggested Video lecture 4. https://m.youtube.com/watch?v=BYtbc4tDwLo&list=PLaxu2gn9WXMf_In5pMvxjf043jzof4-i&index=11&pp=iAQB 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 28	Course Name: Introduction to Internet of Things Topic: NodeMcu	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the basics of NodeMCU hardware and its applications. b. Learn to program NodeMCU using the Arduino IDE. c. understand setting up NodeMCU with wifi devices.
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions on NodeMCU. - Ask questions to explain NodeMCU as an open-source IoT platform for the ESP8266 microcontroller. - Ask questions based on Applications of NodeMCU 2. Development (30 minutes) <ol style="list-style-type: none"> a. Explanation of Introduction to NodeMCU. b. Familiarize students with NodeMCU and its features. c. Explanation of Importance of securing IoT devices. d. Explanation of Explain NodeMCU as an open-source IoT platform based on the ESP8266 microcontroller. e. Explanation of security basic programming for NodeMCU. 3. Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to explain the NodeMCU. - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://www.sanfoundry.com/arduino-basic-questions-answers/
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for NodeMCU 3. Suggested Video lecture 4. https://m.youtube.com/watch?v=1zQ8wbBozqI&list=PLaxu2gn9WXMf_In5pMvxjf043jzof4-i&index=8&pp=iAQB 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 29	Course Name: Introduction to Internet of Things Topic: Wi-Fi libraries of IDE	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the purpose and functionality of Wi-Fi libraries in the Arduino IDE. b. Learn how to use Wi-Fi libraries to connect an Arduino board to a wireless network. c. Implement basic Wi-Fi-based projects, such as HTTP requests and hosting a web server.
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions on What is Wi-Fi. - Ask questions to explain Wi-Fi technology and its applications in IoT projects. - Ask questions based on Wi-Fi Libraries in Arduino IDE - Ask questions on Key Functions of Wi-Fi Libraries 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation of Introduction to Wi-Fi Libraries in Arduino IDE. b. Familiarize students with Key Functions of Wi-Fi Libraries. c. Explanation of Importance of securing IoT devices. d. Explanation of Wi-Fi technology and its applications in IoT projects. e. Explanation of selecting the right library. 3. Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to explain the Wi-Fi Libraries in Arduino IDE. - Use Nearpod to collect responses and discuss the answers. - Quiz link https://app.nearpod.com/command?puid=9af9123e5a3cf3b69ef5dc44d9b8fae01&sid=ef19e4523ab85c45c82798ad29711ffb&origin=Other%20Page
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for Wi-Fi Libraries in Arduino IDE 3. Suggested Video lecture 4. https://drive.google.com/file/d/1KNfDakxAm_akAGEVOQ97nzXU4m_YvJ8/view?usp=drive_link 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Lesson Plan No. 30	Course Name: Introduction to Internet of Things Topic: Benefit of cloud computing	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of cloud computing. b. Illustrate the benefits of cloud computing in personal, professional, and industrial contexts. c. Understand real-world applications of cloud computing.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions on concept of cloud computing. - Ask questions to benefits and infrastructures of cloud computing. - Ask questions based on cloud computing providers - Ask questions based on scalability and flexibility of cloud computing 2. Development (30 minutes) a. Explanation of objective of cloud computing. b. Explanation of definition of cloud computing. c. Explanation of cloud service models. d. Explanation of benefits of cloud computing e. Explanation of scalability and flexibility. 3. Exercise (5 minutes) – Ask students to explain the NodeMCU. - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://app.nearpod.com/?pin=6k8xp
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for NodeMCU 3. Suggested Video lecture 4. https://drive.google.com/file/d/1Is6iCLL9nvWjTOzTVbu_tkrXHFba_X2/view?usp=drive_link 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on the cloud architecture components and virtualization Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 31	Course Name: Introduction to Internet of Things Topic: Cloud Architecture	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the cloud architecture supports for IoT solutions b. Understand the concept of data storage, processing, scalability, and security. c. Illustrate the importance of cloud architecture in IoT applications. d. Familiarize with type of cloud models and their applications.
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions based on the cloud architecture - Ask questions based on cloud models and their applications - Ask questions based on concept of data storage, processing - Ask questions on scalability, and security - Ask questions Key Components of Cloud Architecture 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation on the cloud services - SaaS, PaaS, IaaS b. Explanation on the difference between SaaS, PaaS, IaaS c. Explanation on the difference between SaaS, PaaS, IaaS d. Explanation of cloud providers & offerings e. Explanation on the difference between SaaS, PaaS, IaaS 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain about cloud services - SaaS, PaaS, IaaS - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://app.nearpod.com/?pin=g427c
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work difference between SaaS, PaaS, IaaS 3. Suggested Video lecture 4. https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 32	Course Name: Introduction to Internet of Things Topic: SaaS, PaaS, IaaS	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Understand the cloud services - SaaS, PaaS, IaaS Understand the difference between SaaS, PaaS, IaaS Understand the cloud providers & offerings Understand the data centre of cloud providers
Teaching Aids (if any)	<ol style="list-style-type: none"> PPT Use of Nearpod tool for online quiz Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ul style="list-style-type: none"> Ask questions based on the cloud services - SaaS, PaaS, IaaS Ask questions based on the difference between SaaS, PaaS, IaaS Ask questions based on the difference between SaaS, PaaS, IaaS Ask questions based on cloud providers & offerings Ask questions based on the data centre of cloud providers Development (30 minutes) <ol style="list-style-type: none"> Explanation on the cloud services - SaaS, PaaS, IaaS Explanation on the difference between SaaS, PaaS, IaaS Explanation on the difference between SaaS, PaaS, IaaS Explanation of cloud providers & offerings Explanation on the difference between SaaS, PaaS, IaaS Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to explain about cloud services - SaaS, PaaS, IaaS Use Nearpod to collect responses and discuss the answers. Quiz link https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work difference between SaaS, PaaS, IaaS Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 33	Course Name: Introduction to Internet of Things Topic: Cloud providers & offerings	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> Understand the cloud services - SaaS, PaaS, IaaS Understand the difference between SaaS, PaaS, IaaS Understand the cloud providers & offerings Understand the data centre of cloud providers
Teaching Aids (if any)	<ol style="list-style-type: none"> PPT Use of Nearpod tool for online quiz Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> Introduction (5 minutes) <ul style="list-style-type: none"> Ask questions based on the cloud services - SaaS, PaaS, IaaS Ask questions based on the difference between SaaS, PaaS, IaaS Ask questions based on the difference between SaaS, PaaS, IaaS Ask questions based on cloud providers & offerings Ask questions based on the data centre of cloud providers Development (30 minutes) <ol style="list-style-type: none"> Explanation on the cloud services - SaaS, PaaS, IaaS Explanation on the difference between SaaS, PaaS, IaaS Explanation on the difference between SaaS, PaaS, IaaS Explanation of cloud providers & offerings Explanation on the difference between SaaS, PaaS, IaaS Exercise (5 minutes) – <ul style="list-style-type: none"> Ask students to explain about cloud services - SaaS, PaaS, IaaS Use Nearpod to collect responses and discuss the answers. Quiz link https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> Summarize the Lesson Learning Outcomes and get affirmation from students on these. Home work difference between SaaS, PaaS, IaaS Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> Reflective Questions (What, Why, Who?). Allow students to answer and discuss. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 34	Course Name: Introduction to Internet of Things Topic: IOT applications for industry	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the IOT applications for industry b. Understand the future factory concepts of IoT
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based on IOT applications for industry - Ask questions based on IOT applications e.g. Predictive maintenance, Quality control, Supply chain management, Asset tracking, Inventory monitoring etc. - Ask questions based on the future factory concepts of IoT 2. Development (30 minutes) a. Explanation on the IoT applications for industry b. Explanation of IIoT c. Explanation on the Predictive maintenance, Quality control, Supply chain management 3. Exercise (5 minutes) – - Ask students to explain about IoT applications for industry - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for future factory concepts of IoT 3. Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on future factory concepts of IoT Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 35	Course Name: Introduction to Internet of Things Topic: Cloud Architecture	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the cloud architecture supports for IoT solutions b. Understand the concept of data storage, processing, scalability, and security. c. Illustrate the importance of cloud architecture in IoT applications. d. Familiarize with type of cloud models and their applications.
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions based on the cloud architecture - Ask questions based on cloud models and their applications - Ask questions based on concept of data storage, processing - Ask questions on scalability, and security - Ask questions Key Components of Cloud Architecture 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation on the cloud services - SaaS, PaaS, IaaS b. Explanation on the difference between SaaS, PaaS, IaaS c. Explanation on the difference between SaaS, PaaS, IaaS d. Explanation of cloud providers & offerings e. Explanation on the difference between SaaS, PaaS, IaaS 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain about cloud services - SaaS, PaaS, IaaS - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work difference between SaaS, PaaS, IaaS 3. Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 37	Course Name: Introduction to Internet of Things Topic: Cloud providers & offerings	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the cloud services - SaaS, PaaS, IaaS b. Understand the difference between SaaS, PaaS, IaaS c. Understand the cloud providers & offerings d. Understand the data centre of cloud providers
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions based on the cloud services - SaaS, PaaS, IaaS - Ask questions based on the difference between SaaS, PaaS, IaaS - Ask questions based on the difference between SaaS, PaaS, IaaS - Ask questions based on cloud providers & offerings - Ask questions based on the data centre of cloud providers 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation on the cloud services - SaaS, PaaS, IaaS b. Explanation on the difference between SaaS, PaaS, IaaS c. Explanation on the difference between SaaS, PaaS, IaaS d. Explanation of cloud providers & offerings e. Explanation on the difference between SaaS, PaaS, IaaS 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain about cloud services - SaaS, PaaS, IaaS - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work difference between SaaS, PaaS, IaaS 3. Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 37	Course Name: Introduction to Internet of Things Topic: Cloud providers & offerings	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> a. Understand the cloud services - SaaS, PaaS, IaaS b. Understand the difference between SaaS, PaaS, IaaS c. Understand the cloud providers & offerings d. Understand the data centre of cloud providers
Teaching Aids (if any)	<ul style="list-style-type: none"> a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none"> 1. Introduction (5 minutes) <ul style="list-style-type: none"> - Ask questions based on the cloud services - SaaS, PaaS, IaaS - Ask questions based on the difference between SaaS, PaaS, IaaS - Ask questions based on the difference between SaaS, PaaS, IaaS - Ask questions based on cloud providers & offerings - Ask questions based on the data centre of cloud providers 2. Development (30 minutes) <ul style="list-style-type: none"> a. Explanation on the cloud services - SaaS, PaaS, IaaS b. Explanation on the difference between SaaS, PaaS, IaaS c. Explanation on the difference between SaaS, PaaS, IaaS d. Explanation of cloud providers & offerings e. Explanation on the difference between SaaS, PaaS, IaaS 3. Exercise (5 minutes) – <ul style="list-style-type: none"> - Ask students to explain about cloud services - SaaS, PaaS, IaaS - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://nearpod.com/quick-launch/oeq/create/1856086738
Closure	<ol style="list-style-type: none"> 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work difference between SaaS, PaaS, IaaS 3. Suggested Video lecture https://drive.google.com/file/d/18WyBFZwWW9bYRUSqkrrObXXUISDghS84/view?usp=drive_link <p>Spend 5 minutes to wrap up and consolidate the learnings</p>
Evaluation	<ol style="list-style-type: none"> 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on difference between SaaS, PaaS, IaaS Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 38	Course Name: Introduction to Internet of Things Topic: Thing Speak API and MQTT	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the purpose and functionality of the ThingSpeak API and MQTT protocol. b. Familiarize to use ThingSpeak for data visualization and analysis. c. Understand MQTT's role in lightweight communication for IoT devices. d. Apply the ThingSpeak API and MQTT to create a simple IoT project
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based on ThingSpeak is and its purpose - Ask questions based on features of ThingSpeak - Ask questions based on basic concepts: publish-subscribe, topics, and QoS levels - Ask question on setting up ThingSpeak 2. Development (30 minutes) a. Explanation of introduction to ThingSpeak b. Explain what is ThingSpeak and its purpose c. Describe the basic concepts: publish-subscribe, topics, and QoS levels d. Set up an MQTT broker using Eclipse Mosquitto. e. Setting Up ThingSpeak and MQTT on Hardware 3. Exercise (5 minutes) – - Ask students to explain about ThingSpeak API and MQTT - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://app.nearpod.com/?pin=vcqr4
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for future factory concepts of IoT 3. Suggested Video lecture 4. https://drive.google.com/file/d/1Is6iCLL9nvWjTOzTVbu_ttkrXHFba_X2/view?usp=drive_link 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on future factory concepts of IoT Spend 5 minutes to evaluate student assimilation of the lesson contents



Lesson Plan No. 39	Course Name: Introduction to Internet of Things Topic: Future Factory Concepts	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: <ol style="list-style-type: none">Understand the concept of the "Future Factory" in the context of Industry 4.0 and beyond.Familiarize technologies driving the future of manufacturing.Understand the benefits, challenges, and real-world applications of future factories.Explore the innovative thinking by designing a smart factory prototype
Teaching Aids (if any)	<ol style="list-style-type: none">PPTUse of Nearpod tool for online quizChalk & talk, Blackboard
Teaching Development	<ol style="list-style-type: none">Introduction (5 minutes)<ul style="list-style-type: none">Ask questions based on future factory conceptsAsk questions based on autonomous systems and robotics.Ask questions based on artificial intelligence (AI) and machine learning (ML) for decision-making.Ask question on additive manufacturingAsk question on real-world applications and benefitsDevelopment (30 minutes)<ol style="list-style-type: none">Explanation of Future FactoryExplanation of technologies driving the future of manufacturing of industryExplanation of future factories are highly automated, data-driven manufacturing environments leveraging Industry 4.0 technologies for efficiency, sustainability, and flexibility.Technologies in Future FactoriesExercise (5 minutes) –<ul style="list-style-type: none">Ask students to explain about future factory conceptsUse Nearpod to collect responses and discuss the answers.Quiz linkhttps://app.nearpod.com/?pin=vcqr4
Closure	<ol style="list-style-type: none">Summarize the Lesson Learning Outcomes and get affirmation from students on these.Home work for future factory concepts of IoTSuggested Video lecturehttps://onlinecourses.nptel.ac.in/noc20_cs69/unit?unit=17&lesson=19Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	<ol style="list-style-type: none">Reflective Questions (What, Why, Who?). Allow students to answer and discuss.Nearpod Quiz on future factory concepts of IoT <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



Model Institute of Engineering
& Technology (Autonomous)
Lesson Plan

Kot Bhalwal, Jammu



Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

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Lesson Plan No. 40	Course Name: Introduction to Internet of Things Topic: Big data analysis	Course No.: ECE-501
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Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of Big Data and its key characteristics. b. Learn about the significance and applications of Big Data. c. Explore tools and technologies used in Big Data analysis.
Teaching Aids (if any)	a. PPT b. Use of Nearpod tool for online quiz c. Chalk & talk, Blackboard
Teaching Development	1. Introduction (5 minutes) - Ask questions based on introduction to big data - Ask questions based on Characteristics of Big Data. - Ask questions based on data privacy and security - Ask question on Data quality management - Ask question on handling unstructured data 2. Development (30 minutes) a. Explanation of big data concept b. Explanation of technologies driving the big data c. Explanation of data privacy and security d. Explanation to handle unstructured data 3. Exercise (5 minutes) – - Ask students to explain about big data - Use Nearpod to collect responses and discuss the answers. - Quiz link - https://app.nearpod.com/?pin=nlmf6
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Home work for bigdata 3. Suggested Video lecture 4. https://youtu.be/cTZVK7CK1gs 5. Spend 5 minutes to wrap up and consolidate the learnings
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. 2. Nearpod Quiz on future factory concepts of IoT Spend 5 minutes to evaluate student assimilation of the lesson contents