| Lesson Plan No. 1 | Course Name: TOC & CD<br>Topic: Introduction to Regular languages and Expressions | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the regular languages<br>b. Explain regular expressions |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is theory of computation?<br>- What is set membership problem<br><br>- **Development** (30 minutes)<br>- Introduction on Symbols, alphabets, strings<br>- Definition of Grammar<br>- Classification of grammar<br>- Introduction of regular expression<br>- Operations on regular language<br>- Discuss with examples<br><br>-Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=539Bk9fFOyo<br><br>3. Homework<br>• Define Grammar and give its classification<br>• Discuss Regular languages and its operations<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Regular language & expression<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 2 | Course Name: TOC & CD<br>Topic: Introduction to Finite Automata | Course No.: PSCSATC 321 |
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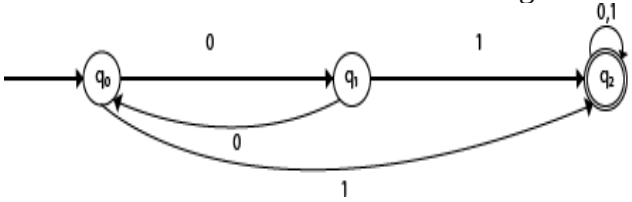
| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Finite Automata<br>b. Compare DFA and NFA<br>c. Construct the Transition Diagrams |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the theory of computation?<br>- What is set membership problem<br>- Basic notation of alphabet, strings, formal language?<br><br>- **Development** (30 minutes)<br>• Overview of Finite Automata<br>- Introduction<br>-Formal Definition of FA<br>-Types of Automata<br>-DFA<br>- NFA<br>• Transition Diagram<br>- Introduction<br>-Rules of transition diagram<br>-Transition table<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>https://www.youtube.com/watch?v=539Bk9fFOyo<br>3. Homework<br>Draw the transition table of the following transition diagram<br>  <br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to |

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| | answer and discuss.<br>2. Nearpod Quiz on Finite Automata<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 3 | Course Name: TOC & CD<br>Topic: Introduction to DFA | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of DFA<br>b. Construct the Transition Diagrams of DFA<br>c. Analyze the applications of DFA |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the DFA, NFA?<br>- Language accepted by DFA, regular language,<br>- Examples on DFA<br>- Introduce the concept of types of automata<br><br>- **Development** (30 minutes)<br>- Introduction of DFA<br>- Formal Definition of DFA<br>- Graphical representation of DFA<br>- Examples on DFA<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://freevideolectures.com/course/4856/nptel-theory-computation/4<br><br>3. Homework<br>1. DFA with $\sum = \{0, 1\}$ accepts all starting with 0.<br>2. DFA with $\sum = \{0, 1\}$ accepts all ending with 0.<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on DFA<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 4 | Course Name: TOC & CD<br>Topic: Introduction to NFA | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of NFA<br>b. Construct the Transition Diagrams of NFA<br>c. Analyze the applications of NFA |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the DFA<br>- Language accepted by DFA, regular language,<br>- Examples on DFA<br>- Introduce the concept of types of automata<br><br>- **Development** (30 minutes)<br>- Introduction of NFA<br>- Formal Definition of NFA<br>- Graphical representation of NFA<br>- Examples on NFA<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://freevideolectures.com/course/4856/nptel-theory-computation/5<br>3. Homework<br>1) NFA with ∑ = {0, 1} accepts all strings with 01.<br>2) Design an NFA with ∑ = {0, 1} accepts all string ending with 01.<br>3) Design an NFA with ∑ = {0, 1} in which double '1' is followed by double '0'<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on NFA<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 5 | Course Name: TOC & CD<br>Topic: conversion with ϵ-NFA | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of ϵ-NFA<br>b. Construct the Transition Diagrams of ϵ-NFA<br>c. Analyze the applications of ϵ-NFA |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the NFA DFA<br>- Examples on DFA NFA<br><br>- **Development** (30 minutes)<br>- Introduction of ϵ-NFA<br>- Formal Definition of ϵ-NFA<br>- Graphical representation of ϵ-NFA<br>- Examples on ϵ-NFA<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=8luLfQdST2g<br>3. Homework<br>1) ϵ-NFA with ∑ = {0, 1} accepts all strings with 01.<br>2) Design an ϵ-NFA with ∑ = {0, 1} accepts all string ending with 01.<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on ϵ-NFA<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 6 | Course Name: TOC & CD<br>Topic: Mealy Machine | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the concept of Mealy Machine<br>b. Define the implementation of Mealy Machine<br>c. Illustrate the Mealy Machine with the help of examples |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the NFA DFA<br>- Examples on DFA NFA<br><br>- **Development** (30 minutes)<br>- Introduction of Mealy Machine<br>- Formal Definition of Mealy Machine<br>- Graphical representation of Mealy Machine<br>- Examples on Mealy Machine<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=O3If0Nr9to0<br>3. Homework<br>Design a Mealy machine for a binary input sequence such that if it has a substring 101, the machine output A, if the input has substring 110, it outputs B otherwise it outputs C.<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Mealy Machine<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 7 | Course Name: TOC & CD<br>Topic: Moore Machine | Course No.: PSCSATC 321 |
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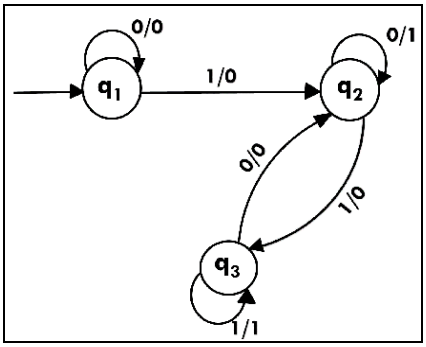
| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the concept of Moore Machine<br>b. Define the implementation of Moore Machine<br>c. Illustrate the Moore Machine with the help of examples |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Mealy machine<br>- Examples on Mealy machine<br>- **Development** (30 minutes)<br>- Introduction of Moore Machine<br>- Formal Definition of Moore Machine<br>- Graphical representation of Moore Machine<br>- Examples on Moore Machine<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=O3If0Nr9to0<br>3. Homework<br>Convert the following Mealy machine into equivalent Moore machine.<br>  <br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Moore Machine<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 8 | Course Name: TOC & CD<br>Topic: Production rules | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the concept of Production rules<br>b. Analyze the types of productions<br>c. Illustrate the concept reduction of grammar |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Grammar<br>- Examples on grammar<br>- **Development** (30 minutes)<br>- Introduction of Production rules<br>- Formal Definition of Production rules<br>- Various types of Productions<br>- Illustration the concept reduction of grammar<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=-aIRqNnUvEg&list=PL85CF9F4A047C7BF7&index=1<br>Homework<br>a. Define production rules<br>b. Discuss various types of productions<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Production rules<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 9 | Course Name: TOC & CD<br>Topic: Chomsky Normal Form | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the concept of Chomsky Normal Form<br>b. Learn the method to convert a grammar to Chomsky normal form |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Grammar<br>- Examples on grammar<br><br>- **Development** (30 minutes)<br>- Introduction of Chomsky Normal Form<br>- Illustration of the method to convert a grammar to Chomsky normal form<br>- Example on Chomsky Normal Form<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=QG9hOwowaXI<br>3. Homework<br>a. Discuss Chomsky Normal Form<br>b. Explain the rules convert a grammar to Chomsky Normal Form<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Chomsky Normal Form<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 10 | Course Name: TOC & CD<br>Topic: Griebach Normal Form | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Understand the concept of Griebach Normal Form<br>b. Learn the method to convert a grammar to Griebach Normal Form |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Grammar<br>- Examples on grammar<br><br>- **Development** (30 minutes)<br>- Introduction of Griebach Normal Form<br>- Illustration of the method to convert a grammar to Griebach normal form<br>- Example on Griebach Normal Form<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=XceVR4_KGkI<br>3. Homework<br>a. Discuss Griebach Normal Form<br>b. Explain the rules convert a grammar to Griebach Normal Form<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Griebach Normal Form<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 11 | Course Name: TOC & CD<br>Topic: Context Free Grammar | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of CFG<br>b. Analyze advantages of CFG and its associated challenges |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Grammar<br>- Examples on grammar<br><br>- **Development** (30 minutes)<br>- Introduction of Context Free Grammar<br>- Rules of Context Free Grammar<br>- Conventions used in CFG<br>- Example on Context Free Grammar<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=6b40kKe2SFg&t=11s<br>3. Homework<br>Q1. Construct the CFG for the language having any number of a's over the set ∑= {a}.<br>Q2. Construct a CFG for the regular expression (0+1)*<br>Q3. Construct a CFG for a language L = {wcwR \| where w € (a,b)*}.<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Context Free Grammar<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 12 | Course Name: TOC & CD<br>Topic: Push Down Automata | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Push Down Automata<br>b. Analyze advantages of PDA and its associated challenges<br>c. Illustrate equivalence between CFG and PDA |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Context Free Grammar<br>- Examples on Context Free Grammar<br><br>- **Development** (30 minutes)<br>- Introduction of Push Down Automata<br>- Rules of Push Down Automata<br>- Conventions used in Push Down Automata<br>- Example on Push Down Automata<br>- Explanation on equivalence between CFG and PDA<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=-WKPbLV7JPI<br>3. Homework<br>Q1. Construct the CFG for the language having any number of a's over the set ∑= {a}.<br>Q2. Construct a CFG for the regular expression (0+1)*<br>Q3. Construct a CFG for a language L = {wcwR \| where w € (a,b)*}.<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Push Down Automata<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 13 | Course Name: TOC & CD<br>Topic: Pumping Lemma for CFL | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Pumping Lemma for CFL<br>b. Closure properties for context free languages |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Context Free Grammar<br>- Examples on Context Free Grammar<br><br>- **Development** (30 minutes)<br>- Introduction of Pumping Lemma for CFL<br>- Rules of Pumping Lemma for CFL<br>- Closure properties for context free languages<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br><br>3. Homework<br>Discuss Pumping Lemma for CFL and explain its Closure properties<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Pumping Lemma for CFL<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 14 | Course Name: TOC & CD<br>Topic: Turing Machine | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Turing Machine<br>b. Understand the role of Turing machine<br>c. Construct its transition diagram |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine in AI<br>- What was its significance<br><br>- **Development** (30 minutes)<br>- Introduction of Turing machine<br>- Role of Turing machine<br>- Construction of its transition diagram<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=BR6fHjKFqa0<br>3. Homework<br>Discuss Role of Turing machine and construct its transition diagram<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Turing machine<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 15 | Course Name: TOC & CD<br>Topic: Church-Turing Thesis | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Church-Turing Thesis<br>b. Understand the role of Church-Turing Thesis<br>c. Modular Construction of complex Turing machines |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine<br>- What was its significance<br>- **Development** (30 minutes)<br>- Introduction of Church-Turing Thesis<br>- Role of Church-Turing Thesis<br>- Discussion on Modular Construction of complex Turing machines<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>3. Homework<br>Discuss Church-Turing Thesis<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Church-Turing Thesis<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 15 | Course Name: TOC & CD<br>Topic: Church-Turing Thesis | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Church-Turing Thesis<br>b. Understand the role of Church-Turing Thesis<br>c. Modular Construction of complex Turing machines |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine<br>- What was its significance<br>- **Development** (30 minutes)<br>- Introduction of Church-Turing Thesis<br>- Role of Church-Turing Thesis<br>- Discussion on Modular Construction of complex Turing machines<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>3. Homework<br>Discuss Church-Turing Thesis<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Church-Turing Thesis<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 17 | Course Name: TOC & CD<br>Topic: Decidable and Undecidable Problems | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Decidable and Undecidable Problems<br>b. Understand the Reduction to Another Undecidable Problem |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine<br>- What was its significance<br><br>- **Development** (30 minutes)<br>- Introduction of Decidable and Undecidable Problems<br>- Discussion on Reduction to Another Undecidable Problem<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>https://www.youtube.com/watch?v=ttzj5wq_pEw<br>3. Homework<br>Compare Decidable and Undecidable Problems<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Decidable and Undecidable Problems<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 18 | Course Name: TOC & CD<br>Topic: Post Correspondence Problem | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Post Correspondence Problem<br>b. Understand the two forms with examples |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine<br>- What was its significance<br><br>- **Development** (30 minutes)<br>- Introduction of Post Correspondence Problem<br>- Discussion on two forms<br>• Domino's form<br>• Table form<br>- Examples of Post Correspondence Problem<br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>https://www.youtube.com/watch?v=YSr5zmVqZLI&t=2s<br>3. Homework<br>Explain Post Correspondence Problem and its two forms with an example<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Post Correspondence Problem<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 19 | Course Name: TOC & CD<br>Topic: The Halting Problem | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of the Halting Problem<br>b. Analyze why halting problem is undecidable |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What is the Turing machine<br>- What are decidable & undecidable problems<br><br>- **Development** (30 minutes)<br>- Introduction of Halting Problem<br>- Discussion on terms associated with halting problem<br>- Analysis of why halting problem is undecidable<br>- Examples of Halting Problem<br><br>- Exercise (5 minutes) –<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>https://www.youtube.com/watch?v=DqeZlJgrQRA<br>3. Homework<br>Why is the halting problem undecidable?<br>Why is the halting problem important?<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Halting Problem<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 20 | Course Name: TOC & CD<br>Topic: Compiler Structure | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Compiler and its advantages<br>b. Understand phases of compiler and its associated challenges. |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What the Compiler Design,<br>- What is its real-world usage?<br>- Which language is understandable by computer?<br>- **Development** (30 minutes)<br>• Overview of Compiler Design<br>- Introduce the Complier.<br>- Needs of Compiler<br>- About Interpreter<br>• Language Processing System<br>- -Introduce to Language Processing system<br>-Introduction and role of Pre-processor, Compiler, Assembler, Linker/Loader<br>• The Structure of the Compiler<br>- -Lexical Analyzer<br>- Syntax Analyzer<br>- Semantic Analyzer<br>- Intermediate Code Generator<br>- Code Optimizer<br>- Target Code Generation<br>- **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=yxnbvS2t_QA&list=PLbMVogVj5nJQNjkHZgwuAlfQ9tzmQDxjA<br>3. Homework<br>a. Compare and contrast between the compiler and interpreter<br>b. Discuss the structure of compiler.<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Halting Problem<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 21 | Course Name: TOC & CD<br>Topic: Analysis-Synthesis Model of Compilation | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the Analysis – Synthesis Model of compilation<br>b. Understand the concept of Compiler structure |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | - **Introduction** (5 minutes)<br>- Ask questions.<br>- What the Analysis?<br>- Define Synthesis<br>- What is Compilation method<br>- **Development** (30 minutes)<br>**Talk about Principle structure:** -. Introduction to Compiler design, About Compiler, interpreter and its needs, Language processing system, structure of the compiler.<br>**Overview of Analysis Synthesis Compilation**<br>The Structure of the Compiler:<br>-Lexical Analyzer<br>- Syntax Analyzer<br>- Semantic Analyzer<br>- Intermediate Code Generator<br>- Code Optimizer<br>- Target Code Generation<br>- **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=GuzXTsV2JXs&list=PLbMVogVj5nJTmKzaSlCpGgi7qxgcRRs8h&index=4<br>3. Homework<br>a. Discuss the structure of compiler<br>b. Explain the analysis and synthesis model of compilation<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Analysis Synthesis Compilation<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 22 | Course Name: TOC & CD<br>Topic: Error Reporting in Lexical Analyzer | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Error Reporting in Lexical Analyzer<br>b. To gain knowledge of fundamentals of Regular Expression and Transition Table<br>c. Understand advantages of Regular Expression and its associated challenges. |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | • **Introduction** (5 minutes)<br>• Ask questions.<br>• What is the role of error handle in the phases of Compiler?<br>• How regular expression is used in Lexical Analyzer?<br>• **Development** (30 minutes)<br>a. Overview of Error Reporting<br>- Introduction<br>-Function of Error Reporting<br>b. Introduction to Regular Expression<br>-Rules<br>-Inductive Step<br>-Algebraic laws of regular expressions<br>-Example<br>-Transition Diagram<br>• **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>3. Homework<br>Q1. Define language for R.E a\|b<br>Q2. Define language for R.E (a\|b).(a\|b)<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Error Reporting and Regular Expression<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 23 | Course Name: TOC & CD<br>Topic: Parsing | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept of Parsing<br>b. To impart knowledge of fundamentals of Derivation<br>c. To understand advantages of Parsing and Derivation and its associated challenges |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | • **Introduction** (5 minutes)<br>• Ask questions.<br>- What is exactly grammar is?<br>- What is context free grammar,<br>- What is derivation?<br>• **Development** (30 minutes)<br>• Overview of Derivation<br>a. Introduction<br>- Right-Most Derivation<br>- Left-Most Derivation<br>- Example<br>• Overview of Parsing<br>b. Introduction<br>- Rules<br>- Examples<br>• **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=IdCT0KgUZXU&list=PLbRMhDVUMngcseCW7wXDvtTDemCuH80fP&index=17<br>3. Homework<br>Let G be CFG<br>S->bB/Aa<br>A-> b/Bs/Aaa<br>B-> a/aS/Bbb<br>For String bbaabab. Find<br>1) Left most derivation<br>2) Right most derivation<br>3) Parse tree<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. |

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| | 2. Nearpod Quiz on derivation and Parsing<br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 24 | Course Name: TOC & CD<br>Topic: Parsing with backtracking | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept Parsing with backtracking<br>b. Gain knowledge on fundamentals of Recursive Descent Parsers |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | • **Introduction** (5 minutes)<br>• Ask questions.<br>• What is Parsing?<br>• Explain Right-Most Derivation<br>• Describe Left-Most Derivation<br>• **Development** (30 minutes)<br>Overview of Parsing<br>- Introduction<br>-Types of Parsing<br>-Top-Down with Backtracking<br>-Example<br>• **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture<br>https://www.youtube.com/watch?v=IdCT0KgUZXU&t=444s<br>3. Homework<br>Given Grammar S-> AB , A-> c/e, B-> cbB/ca/cB (with S as a start symbol) generate the following derivations for the input string cccbca (a)Top-Down (Left-most)<br>(b)Bottom-up(right most)<br><br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Parsing with Backtracking and Recursive descent parsing<br><br>Spend 5 minutes to evaluate student assimilation of the lesson contents |

| Lesson Plan No. 25 | Course Name: TOC & CD<br>Topic: Predictive Parsing and Non-Recursive Parser | Course No.: PSCSATC 321 |
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| **Objectives** | At the end of the lesson the student shall be able to:<br>a. Articulate the concept Predictive Parsing and Non-Recursive Parser<br>b. Gain knowledge on fundamentals of First and Follow Set |
| **Teaching Aids (if any)** | a. Power point presentation<br>b. Use of Near pod tool for online quiz |
| **Teaching Development** | • **Introduction** (5 minutes)<br>• Ask questions.<br>• What is Parsing?<br>• Explain Right-Most Derivation & Left-Most Derivation<br>• **Development** (30 minutes)<br>Overview of Predictive Parsing<br>- Introduction<br>-First Set<br>-Example<br>-Follow Set<br>-Example<br>• **Exercise (5 minutes) –**<br>Use Google forms and Near pod tool for quiz based on the above topic<br>Use Nearpod to collect responses and discuss the answers. |
| **Closure** | 1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.<br>2. Suggested NPTEL video lecture https://www.youtube.com/watch?v=P9uw8XyVtF8&list=PLbRMhDVUMngcseCW7wXDvtTDemCuH80fP&index=21<br>3. Homework<br>Q1. Calculate the first and follow functions for the given grammar- S → aBDh<br>B → cC<br>C → bC / ∈<br>D → EF<br>E → g / ∈<br>F → f / ∈<br>Q2. Calculate the first and follow functions for the given grammar-<br>S → AaAb / BbBa<br>A → ∈<br>B → ∈<br>Spend 5 minutes to wrap up and consolidate the learnings |
| **Evaluation** | 1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<br>2. Nearpod Quiz on Predictive Parsing and Non-Recursive Parser parsing |

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| | Spend 5 minutes to evaluate student assimilation of the lesson contents |