



Kot Bhalwal, Jammu



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

## Department of Computer Science & Technology

### (Cyber Security)

#### Details of Lesson Plan

S. No.	Particulars	Details
1.	Course Name	Discrete Mathematics
2.	Course Code	BSC-401
3.	Academic Year	2024-25
4.	Semester	4th
5.	Number of Lesson plans	27
6.	Faculty Assigned	Dr Pallavi Sharma

*Pallavi*

Faculty Signature



Version 1.1

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<b>Lesson Plan No. 1</b>	<b>Course Name: Discrete Mathematics Topic: Operations and Laws of Sets</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Articulate the concept of Sets.</li> <li>To learn about what are operations and laws of sets.</li> <li>Understand about operations and laws of sets with the help of an example.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk &amp; talk</li> <li>Group discussion</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction (5 minutes)</b> <ul style="list-style-type: none"> <li>Ask questions.               <ul style="list-style-type: none"> <li>What is a set?</li> <li>How can we represent sets in tabular and set-roaster form?</li> <li>What are different types of sets?</li> <li>What do you mean by universal set?</li> </ul> </li> <li>Introduce the students with the concept and explain what a set is in a simple way.</li> <li>Talk about its applications.</li> <li>Introduce the formal definition of a set through NPTEL portal</li> <li><a href="https://archive.nptel.ac.in/courses/111/106/111106086/">https://archive.nptel.ac.in/courses/111/106/111106086/</a></li> <li>Highlight the important characteristics of the sets and their types.</li> <li>Highlight the operations and important laws of sets.</li> </ul> </li> <li><b>Development (30 minutes)</b> <ol style="list-style-type: none"> <li>Sets and their representation.               <ul style="list-style-type: none"> <li>Introduce the concept of sets, their representation and their types</li> <li><a href="https://www.youtube.com/watch?v=oaOm2pnKkyY">https://www.youtube.com/watch?v=oaOm2pnKkyY</a></li> </ul> </li> <li>Operations and Laws of Sets               <ul style="list-style-type: none"> <li>Introduce the concepts of union, intersection and complement of a set with the help of examples.</li> <li>Show Venn diagrams to illustrate the operations on sets.</li> <li>Give examples on different types of sets and how an operation on sets works.</li> </ul> </li> <li>Laws on Sets               <ul style="list-style-type: none"> <li>Associative Law</li> <li>Distributive Law</li> <li>De-Morgan's Law</li> <li>Generalized Form of laws</li> <li>Give various results on operations and laws of sets.</li> </ul> </li> </ol> </li> </ol>



	<p>3. Exercise (10 minutes) – Give different examples and problems related to operations and laws of Sets.</p>
<b>Closure</b>	<p>1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.</p> <p>2. Suggested Reading - Sharma Publications : Set theory: Pg no 31-48</p> <p>3. Homework - Solve different problems on laws of sets and generalized results of family of sets.</p> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<p>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</p> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents</p>



<b>Lesson Plan No. 2</b>	<b>Course Name: Discrete Mathematics Topic: Finite &amp; Infinite Sets</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Understand the concept of finite set and infinite set.</li><li>Able to define and understand the concept of countable and uncountable set.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What are finite and infinite numbers?</li><li>What are countable and uncountable numbers?</li><li>Difference between finite and infinite numbers and countable and uncountable numbers.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduction of finite and infinite set, countable and uncountable set.</li><li>Explain the concept of finite set and infinite set.</li><li>Explain the concept of countable and uncountable set.</li><li>Explain the difference between finite set and countable set.</li><li>Explain various examples.</li><li>Explain the difference between infinite set and uncountable set.</li><li>Do various problems of countable and uncountable sets.</li></ol></li></ol> <p>Web Link: <a href="https://archive.nptel.ac.in/courses/111/106/111106086">https://archive.nptel.ac.in/courses/111/106/111106086</a></p> <ol style="list-style-type: none"><li><b>Exercise:</b> (10 minutes)<ul style="list-style-type: none"><li>Do some problems based on finite, infinite, countable and uncountable set.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li><li>Covers the following: What is finite and infinite set, countable and uncountable set?</li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on finite and infinite set to solve.</li><li>Give some problems on countable and uncountable sets to solve.</li></ul></li></ol>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<ul style="list-style-type: none"><li>Quiz based activity including MCQs.</li></ul></li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



# Model Institute of Engineering & Technology (Autonomous) Lesson Plan

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<b>Lesson Plan No. 3</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Introduction to Binary Relations and its types</b>	<b>Course No.: BSC- 401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of Binary relation.</li> <li>b. Able to define various types of relation.</li> <li>c. Understand how to check type of relation through various problems.</li> </ul>
<b>Teaching Aids (if any)</b>	<ul style="list-style-type: none"> <li>a. Chalk &amp; talk</li> <li>b. Group discussion</li> </ul>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is an ordered pair?</li> <li>- What is a binary relation?</li> <li>- Difference between relations and sets.</li> <li>- Introduce the formal definition of a Cartesian Product, different types of sets through NPTEL portal</li> <li>- <a href="https://archive.nptel.ac.in/courses/111/106/111106086/">https://archive.nptel.ac.in/courses/111/106/111106086/</a></li> </ul> </li> <li>2. <b>Development</b> (30 minutes) <ol style="list-style-type: none"> <li>a. Introduce the concept of binary relation. <ul style="list-style-type: none"> <li>- Explain the concept of binary relation with examples.</li> <li>- Explain various types of relation: reflexive, symmetric and transitive relation.</li> </ul> </li> <li>b. Explain the difference between reflexive, symmetric and transitive relation. <ul style="list-style-type: none"> <li>- Explain various examples.</li> </ul> </li> <li>c. Explain the concept of equivalence relation with the help of examples. <ul style="list-style-type: none"> <li>- Explain the concept of partition and partial order relation with examples and some results.</li> </ul> </li> </ol> </li> <li>3. <b>Exercise</b> (10 minutes) – <ul style="list-style-type: none"> <li>- Do various problems on binary relation and its various types.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>2. Suggested video links: <a href="https://www.youtube.com/watch?v=jZXHzpq-vmM">https://www.youtube.com/watch?v=jZXHzpq-vmM</a></li> <li>3. Homework: <ul style="list-style-type: none"> <li>- Give some problems on binary relation and its types to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to</li> </ol>



	answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents.
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<b>Lesson Plan No. 4</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Function and its types</b>	<b>Course No.: BSC- 401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Articulate the concept of functions.</li> <li>Able to define various types of functions.</li> <li>Understand how to check type of function through various problems.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk &amp; talk</li> <li>Group discussion</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction</b> (5 minutes)           <ul style="list-style-type: none"> <li>Ask questions</li> <li>What is the image of a function?</li> <li>What is domain and co-domain of a function?</li> <li>Talk about its applications.</li> <li>Introduce the formal definition of functions and its types through NPTEL portal.</li> </ul> </li> <li><b>Development</b> (30 minutes)           <ol style="list-style-type: none"> <li>Introduce the definition of function.               <ul style="list-style-type: none"> <li>Explain the concept of function.</li> <li>Explain various types of function: one-one and onto function.</li> <li>Explain the difference between one-one and onto function.</li> <li>Explain why every relation is not a function.</li> </ul> </li> <li>Explain the concept of Bijective function with the help of examples.</li> </ol> </li> <li>Exercise (10 minutes) –           <ul style="list-style-type: none"> <li>Do various problems on function and its various types.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>Suggested video links: <a href="https://youtu.be/jZXHzpq-vmM">https://youtu.be/jZXHzpq-vmM</a></li> <li>Covers the following: What are function and its various types?</li> <li>Homework:           <ul style="list-style-type: none"> <li>Give some problems on functions and its types to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the learnings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 5</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Principal of Mathematical Induction</b>	<b>Course No.: BSC- 401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of mathematical induction.</li><li>Understand how to find mathematical induction through various problems.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>Tell them that principle of mathematical induction is a tool that is used to prove different kinds of mathematical statements.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce the principle of mathematical induction.<ul style="list-style-type: none"><li>Explain the concept of principle of mathematical induction.</li><li>Talk about its applications in various mathematical results.</li></ul></li><li>Explain them that Mathematical Induction is a technique of proving a statement, theorem or formula which is thought to be true, for each and every natural number <math>n</math> with the help of examples.</li></ol></li><li><b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on principle of mathematical induction.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links: <a href="https://www.youtube.com/watch?v=qJDieyIpRfl">https://www.youtube.com/watch?v=qJDieyIpRfl</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on principle of mathematical induction to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the learnings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 6</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Principle of Inclusion &amp; Exclusion</b>	<b>Course No.: BSC- 401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of principle of inclusion and exclusion.</li><li>Understand the concept through Venn diagram.</li><li>Able to find problems on principle of inclusion and exclusion.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What is union and intersection of two sets?</li><li>When two sets are disjoint?</li><li>Talk about representation of sets and operations of sets through Venn diagram</li><li>Introduce the concept of principle of Exclusion &amp; Inclusion through NPTEL portal</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce the principle of inclusion and exclusion.<ul style="list-style-type: none"><li>Explain the concept of principle of inclusion and exclusion.</li><li>Explain the concept through Venn diagram.</li><li>Talk about its applications in combination and probability.</li></ul></li><li>Explain the concept of principle of inclusion and exclusion for two sets and three sets with the help of examples.</li></ol></li><li><b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on principle of inclusion and exclusion.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links: <a href="https://www.youtube.com/watch?v=As7cm17KI">https://www.youtube.com/watch?v=As7cm17KI</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on principle of inclusion and exclusion to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the learnings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



Lesson Plan No. 7	Course Name: Discrete Mathematics Topic: Pigeonhole Principle	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of Pigeonhole principle.</li><li>Able to find problems on Pigeonhole principle.</li><li>Talk about its applications in day-to-day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>Introduce simple form of Pigeonhole principle.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce Pigeonhole principle.<ul style="list-style-type: none"><li>Explain the concept of Pigeonhole principle.</li><li>Explain how we use Pigeonhole principle to use problems.</li><li>Talk about its applications in real world.</li></ul></li><li>Explain the strong form of Pigeonhole principle with the help of examples.</li></ol></li><li><b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on Pigeonhole principle.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links: <a href="https://www.digimat.in/nptel/courses/video/106106094/L27.html">https://www.digimat.in/nptel/courses/video/106106094/L27.html</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on Pigeonhole principle to solve.</li></ul></li></ol> Spend 5 minutes to wrap up and consolidate the leanings.
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<ul style="list-style-type: none"><li>Quiz based activity including MCQs</li></ul></li></ol> Spend 5 minutes to evaluate student assimilation of the lesson contents.



<b>Lesson Plan No. 8</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Groups and subgroups</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of group, subgroup and its properties.</li> <li>b. Gain some knowledge about algebraic structure with one binary operation.</li> <li>c. Talk about its applications in day to day life</li> </ul>
<b>Teaching Aids (if any)</b>	a. Chalk & talk
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is set and subset?</li> <li>- Talk about binary operation.</li> <li>- Introduce the concept of groups and subgroups through NPTEL portal</li> </ul> </li> <li><b>Development</b> (30 minutes) <ol style="list-style-type: none"> <li>a. Introduce group and subgroup. <ul style="list-style-type: none"> <li>- Explain the concept of group and subgroup and their various properties.</li> <li>- Explain when an operation is a group and subgroup.</li> <li>- Talk about its applications in engineering.</li> </ul> </li> <li>b. Explain examples of group through this link: <a href="https://www.digimat.in/nptel/courses/video/111106113/L01.html">https://www.digimat.in/nptel/courses/video/111106113/L01.html</a></li> </ol> </li> <li>3. Exercise (10 minutes) – <ul style="list-style-type: none"> <li>- Do various problems and theorem on groups and subgroups.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>2. Suggested video links: <a href="https://www.youtube.com/watch?v=uqMFcwi8PsY">https://www.youtube.com/watch?v=uqMFcwi8PsY</a></li> <li>3. Homework: <ul style="list-style-type: none"> <li>- Give some problems on group and subgroup to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 9</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Cosets and Lagrange's Theorem</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of Coset and its properties.</li><li>Describe various results of cosets and Lagrange's Theorem.</li><li>Talk about its applications in day to day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction (5 minutes)</b><ul style="list-style-type: none"><li>Ask questions</li><li>What is group and subgroup?</li><li>What is semigroup?</li><li>Talk about cosets and Lagrange's Theorem</li><li>Keeping the properties of integers and rotation of some figures like a line segment or equilateral triangle about their axes of symmetry, in mind, we come to know about groups, permutations groups.</li></ul></li><li><b>Development (30 minutes)</b><ol style="list-style-type: none"><li>Introduce Cosets.<ul style="list-style-type: none"><li>Explain the concept of Cosets and its properties.</li><li>Introduce the formal concept of Cosets by NPTEL <a href="https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod01lec01.mp4">https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod01lec01.mp4</a>.</li></ul></li><li>Introduce the concept of Lagrange's Theorem: <a href="https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod02lec08.mp4">https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod02lec08.mp4</a></li></ol></li><li><b>Exercise (10 minutes) –</b><ul style="list-style-type: none"><li>Do various problems on Cosets and its properties.</li><li>Do various problems on Lagrange's Theorem.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links: <a href="https://www.digimat.in/nptel/courses/video/111106113/L42.html">https://www.digimat.in/nptel/courses/video/111106113/L42.html</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on Cosets and Lagrange's theorem to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<ul style="list-style-type: none"><li>Spend 5 minutes to evaluate student assimilation of the lesson contents.</li></ul></li></ol>



<b>Lesson Plan No. 10</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Normal subgroup and group homomorphism</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of Normal subgroup and group homomorphism with examples and its properties.</li> <li>b. Describe various results of Normal subgroup and group homomorphism.</li> </ul>
<b>Teaching Aids (if any)</b>	<ul style="list-style-type: none"> <li>a. Chalk &amp; talk</li> <li>b. Group discussion</li> </ul>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is one-one function?</li> <li>- What is onto function?</li> <li>- Introduce about kernel of a homomorphism.</li> <li>- Tell them about homomorphism.</li> </ul> </li> <li>2. <b>Development</b> (30 minutes) <ul style="list-style-type: none"> <li>a. Introduce Normal subgroup and group homomorphism. <ul style="list-style-type: none"> <li>- Explain the concept of Normal subgroup and its properties.</li> <li>- Introduce the formal concept of group homomorphism.</li> <li>- Tell them the difference between subgroup and normal subgroup.</li> </ul> </li> <li>b. Explain various examples and theorem related to normal subgroup and group homomorphism.</li> </ul> </li> <li>3. <b>Exercise</b> (10 minutes) – <ul style="list-style-type: none"> <li>- Do various problems on normal subgroup and group homomorphism.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>2. Suggested video links: <a href="https://www.youtube.com/watch?v=FXbnrsv4Z3g">https://www.youtube.com/watch?v=FXbnrsv4Z3g</a></li> <li>3. Homework: <ul style="list-style-type: none"> <li>- Give some problems on normal subgroup and group homomorphism to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 11</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Rings and Integral domain</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of rings and its properties, integral domain.</li> <li>b. Describe and provide examples of a ring.</li> <li>c. Describe various results of ring and integral domain.</li> </ul>
<b>Teaching Aids (if any)</b>	<ul style="list-style-type: none"> <li>a. Chalk &amp; talk</li> <li>b. Group discussion</li> </ul>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is binary operation?</li> <li>- What is abelian group?</li> <li>- Tell them about binary operations used in ring.</li> <li>- Talk about applications of ring theory.</li> </ul> </li> <li>2. <b>Development</b> (30 minutes) <ol style="list-style-type: none"> <li>a. Introduce ring and integral domain. <ul style="list-style-type: none"> <li>- Explain the concept of ring and its properties.</li> <li>- Explain the formal concept of integral domain.</li> <li>- Tell them about zero divisor and division ring.</li> </ul> </li> <li>b. Explain various examples and theorems of ring and integral domain.</li> </ol> </li> <li>3. <b>Exercise</b> (10 minutes) – <ul style="list-style-type: none"> <li>- Do various problems on ring and integral domain.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>2. Suggested video links: <a href="https://nptel.ac.in/courses/111106131">https://nptel.ac.in/courses/111106131</a></li> <li>3. Homework: <ul style="list-style-type: none"> <li>- Give some problems on ring and integral domain to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 12</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Field</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Articulate the concept of field with examples and its properties.</li> <li>Describe various results based on field.</li> <li>Talk about applications of ring and field in engineering.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk &amp; talk</li> <li>Group discussion</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction</b> (5 minutes)           <ul style="list-style-type: none"> <li>Ask questions</li> <li>What is ring and integral domain?</li> <li>What is zero divisor rings?</li> <li>Talk about non-commutative division ring.</li> <li>Tell them about applications of field theory.</li> </ul> </li> <li><b>Development</b> (30 minutes)           <ol style="list-style-type: none"> <li>Introduce the concept of field.               <ul style="list-style-type: none"> <li>Explain the concept of field and its properties.</li> <li>Explain them the relation between integral domain and field.</li> </ul> </li> <li>Explain various examples and theorems of field.</li> </ol> </li> <li>Exercise (10 minutes) –           <ul style="list-style-type: none"> <li>Do various problems on field.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>Suggested video links: <a href="https://nptel.ac.in/courses/111106131">https://nptel.ac.in/courses/111106131</a></li> <li>Homework:           <ul style="list-style-type: none"> <li>Give some problems on field and integral domain to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.           <ul style="list-style-type: none"> <li>Quiz based activity including MCQs.</li> </ul> </li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 13</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Propositional logic and logical connectives</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>a. Articulate the concept of Propositional logic and Logical Connectives.</li> <li>b. Describe various results of Logical Connectivity.</li> </ol>
<b>Teaching Aids (if any)</b>	a. Chalk & talk
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes)           <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- Is it cold outside?</li> <li>- This is not a preposition, as it's answer can have both the value true and false.</li> </ul> </li> <li>2) Sun is bright.           <ul style="list-style-type: none"> <li>- This is a preposition, as this statement can either be true or false but not both.</li> <li>- Talk about its applications in day-to-day life.</li> </ul> </li> <li>2. <b>Development</b> (30 minutes)           <ol style="list-style-type: none"> <li>a. Introduce propositional logic and logical connectives.               <ul style="list-style-type: none"> <li>- Explain the concept of propositional logic and logical connectives.</li> <li>- Tell them about its properties.</li> </ul> </li> <li>b. Highlight the important characteristics of logic Connectivity and propositional logic.</li> </ol> </li> <li>3. Exercise (10 minutes) –           <ul style="list-style-type: none"> <li>- Do various problems on propositional logic and logical connectives.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>2. Suggested video links: <a href="https://www.youtube.com/watch?v=xIUFkMKSb3Y">https://www.youtube.com/watch?v=xIUFkMKSb3Y</a></li> <li>3. Homework:           <ul style="list-style-type: none"> <li>- Give some problems on propositional logic and logical connectives to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <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. 14	Course Name: Discrete Mathematics Topic: Truth table	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of truth table.</li><li>Able to understand about the Truth Table of AND, OR, NOR etc.</li><li>Talk about the applications of truth table.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li><li>Group discussion</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What are binary numbers?</li><li>What is logic?</li><li>Tell them about binary operations like AND, OR, NOR etc.</li><li>Talk about its applications in day-to-day life.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce truth table.<ul style="list-style-type: none"><li>Explain the concept of truth table.</li><li>Tell them about logical operations.</li><li>Explain them the truth tables for all the operations.</li></ul></li><li>Describe them about conditional and bi-conditional operations.<ul style="list-style-type: none"><li>Explain them about truth table with the help of examples.</li></ul></li></ol></li><li>Exercise (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on truth table.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links: <a href="https://www.youtube.com/watch?v=YYQfYBNIfZg">https://www.youtube.com/watch?v=YYQfYBNIfZg</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on truth table to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 15</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Conjunctive and disjunctive form</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to:  a. Articulate the concept of normal form: conjunctive and disjunctive. b. Describe and provide examples of conjunctive and disjunctive form. c. Able to understand about difference between conjunctive and disjunctive.
<b>Teaching Aids (if any)</b>	a. Chalk & talk
<b>Teaching Development</b>	<ol style="list-style-type: none"><li>1. <b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>- Ask questions</li><li>- Define truth table?</li><li>- What is the difference between truth table of AND and OR?</li><li>- Talk about its application in real world.</li></ul></li><li>2. <b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>a. Introduce normal form: conjunctive and disjunctive.<ul style="list-style-type: none"><li>- Explain the concept of conjunctive and disjunctive form.</li><li>- Tell them about its properties.</li></ul></li><li>b. Highlight the important characteristics of conjunctive and disjunctive form.<ul style="list-style-type: none"><li>- Explain them about conjunctive and disjunctive with the help of examples.</li></ul></li></ol></li><li>3. <b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>- Do various problems on conjunctive and disjunctive form.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>2. Suggested video links:</li><li>4. Homework:<ul style="list-style-type: none"><li>- Give some problems on conjunctive and disjunctive form to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 16</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Conjunctive and disjunctive form</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to:  a. Articulate the concept of validity of well-formed formula. b. Describe the concept through various examples and its properties.
<b>Teaching Aids (if any)</b>	a. Chalk & talk
<b>Teaching Development</b>	<ol style="list-style-type: none"><li>1. <b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>- Ask questions</li><li>- What are the symbolically notions of AND, OR, NOR?</li><li>- Explain the possible connective symbols.</li><li>- Talk about its application in real world.</li></ul></li><li>2. <b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>a. Introduce validity of well-formed formula.<ul style="list-style-type: none"><li>- Explain the concept of validity of well-formed formula.</li><li>- Tell them about its properties.</li></ul></li><li>b. Highlight the rules of validity of well-formed formula.<ul style="list-style-type: none"><li>- Explain them about the concept with the help of examples.</li></ul></li></ol></li><li>3. <b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>- Do various problems on validity of well-formed formula.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>1. Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>2. Suggested video links:</li><li>3. Covers the following:<ul style="list-style-type: none"><li>- Concept of validity of well-formed formula.</li></ul></li><li>4. Homework:<ul style="list-style-type: none"><li>- Give some problems on validity of well-formed formula form to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 17</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Modus ponens and tollens</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Articulate the concept of Propositional inference rules.</li> <li>Able to understand about the concepts of modus ponens and modus tollens.</li> <li>Describe the concept through various examples.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk &amp; talk</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction</b> (5 minutes)           <ul style="list-style-type: none"> <li>Ask questions</li> <li>What is well formed formula?</li> <li>Tell them about hypothetical proposition.</li> <li>Talk about its application in real world.</li> </ul> </li> <li><b>Development</b> (30 minutes)           <ol style="list-style-type: none"> <li>Introduce Propositional inference rules.               <ul style="list-style-type: none"> <li>Explain the concept of validity of modus ponens and modus tollens.</li> <li>Tell them about its properties.</li> </ul> </li> <li>Highlight the rules of modus ponens and modus tollens.               <ul style="list-style-type: none"> <li>Explain them about the concept with the help of examples.</li> </ul> </li> </ol> </li> <li>Exercise (10 minutes) –           <ul style="list-style-type: none"> <li>Do various problems on modus ponens and modus tollens.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>Summarize the lesson learning outcomes and get affirmation from students on these.</li> <li>Suggested video links: <a href="https://www.digimat.in/nptel/courses/video/111106052/L15.html">https://www.digimat.in/nptel/courses/video/111106052/L15.html</a></li> <li>Homework:           <ul style="list-style-type: none"> <li>Give some problems on modus ponens and modus tollens to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.           <ul style="list-style-type: none"> <li>Quiz based activity including MCQs.</li> </ul> </li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 18</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Predicate logic</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of predicate logic.</li><li>Able to understand the concept through various examples.</li><li>Talk about its application in day to day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction (5 minutes)</b><ul style="list-style-type: none"><li>Ask questions</li><li>What is propositional logic?</li><li>Tell them about the concept of predicates and quantifiers.</li><li>Talk about its application in real world.</li></ul></li><li><b>Development (30 minutes)</b><ol style="list-style-type: none"><li>Introduce predicate logic.<ul style="list-style-type: none"><li>Explain the concept of predicate logic.</li><li>Tell them about its properties.</li><li>Tell them about how predicate logic is an extension of propositional logic.</li></ul></li><li>Explain them about the concept with the help of examples.</li></ol></li><li><b>Exercise (10 minutes) –</b><ul style="list-style-type: none"><li>Do various problems on predicate logic.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links:</li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on predicate logic to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<ul style="list-style-type: none"><li>Quiz based activity including MCQs.</li></ul></li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



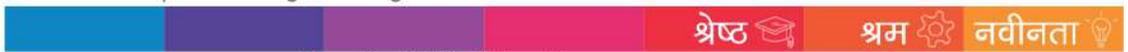
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Lesson Plan No. 19	Course Name: Discrete Mathematics Topic: Universal quantification	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of type of quantifiers.</li><li>Able to understand about the concepts of universal quantification.</li><li>Describe the concept through various examples.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What are the negation of AND, OR, FOR, there exist?</li><li>Tell them about quantifiers.</li><li>Talk about its application in real world.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce universal quantification.<ul style="list-style-type: none"><li>Explain the concept of universal quantification.</li><li>Tell them about its properties.</li><li>Explain them about the forms of universal quantification.</li></ul></li><li>Highlight them about the rules of universal quantification.<ul style="list-style-type: none"><li>Explain them about the concept with the help of examples.</li></ul></li></ol></li><li>Exercise (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on universal quantification.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links:</li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on universal quantification to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



Lesson Plan No. 20	Course Name: Discrete Mathematics Topic: Universal quantification	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of type of quantifiers.</li><li>Able to understand about the concepts of existential quantification.</li><li>Talk about its applications in day to day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk &amp; talk</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What are quantifiers?</li><li>What is universal quantification?</li><li>Tell them about existential quantification.</li><li>Talk about its application in real world.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce existential quantification.<ul style="list-style-type: none"><li>Explain the concept of existential quantification.</li><li>Tell them about its properties.</li><li>Explain them about the forms of existential quantification.</li></ul></li><li>Highlight them about the rules of existential quantification.<ul style="list-style-type: none"><li>Explain them about the concept with the help of examples.</li></ul></li></ol></li><li>Exercise (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on existential quantification.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the lesson learning outcomes and get affirmation from students on these.</li><li>Suggested video links:</li><li>Homework:<ul style="list-style-type: none"><li>Give some problems on existential quantification to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the leanings.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, Why, Who?). Allow students to answer and discuss.<ul style="list-style-type: none"><li>Quiz based activity including MCQs.</li></ul></li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



<b>Lesson Plan No. 21</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Graphs and its types</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Able to define the basic concepts of graphs, directed graphs, and weighted graphs.</li> <li>Able to understand the concept of connectivity, walk and path, circuits and cycles, shortest path in weighted graphs understand the importance of the order of vertices of graphs.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk and talk</li> <li>Group discussion</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction (5 minutes)</b> <ul style="list-style-type: none"> <li>Ask questions</li> <li>What is vertex?</li> <li>What is an edge?</li> <li>What is a point?</li> <li>Talk about the concept of basic concepts of graph.</li> <li>Talk about its applications in day-to-day life.</li> </ul> </li> <li><b>Development (30 minutes)</b> <ol style="list-style-type: none"> <li>Introduce the concept of Graphs and its types               <ul style="list-style-type: none"> <li>Explain various types of graphs with examples</li> <li>Talk about its applications in everyday life.</li> </ul> </li> </ol> </li> <li>Exercise (10 minutes) –           <ul style="list-style-type: none"> <li>Do various problems on graphs and its properties.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li> <li>Suggested Video:</li> <li>Homework           <ul style="list-style-type: none"> <li>Given some questions on graphs and its types to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>Reflective Questions (What, why, Who?). Allow students to answer and discuss.</li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



Lesson Plan No. 22	Course Name: Discrete Mathematics Topic: Eulerian and Hamiltonian graph	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>• Understand Eulerian and Hamiltonian graphs.</li> <li>• Able to understand algorithm of shortest path.</li> <li>• Explains basic results related with Eulerian and Hamiltonian graphs.</li> <li>• Able to understand Eulerian paths and circuits.</li> </ul>
<b>Teaching Aids (if any)</b>	a. Chalk and talk b. Group discussion
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>1. Introduction (5 minutes)</b> <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is Graph?</li> <li>- What is path and walk?</li> <li>- Talk about Eulerian and Hamiltonian graphs.</li> <li>- Talk about its applications in day-to-day life.</li> <li>- Introduce the formal concept of Eulerian and Hamiltonian graphs by NPTEL</li> <li>- <a href="https://nptel.ac.in/courses/106104170">https://nptel.ac.in/courses/106104170</a></li> <li>- Highlight the important characteristics of Eulerian graph and Hamiltonian</li> <li>- <a href="https://www.youtube.com/watch?v=f1JTtMP6NGw">https://www.youtube.com/watch?v=f1JTtMP6NGw</a></li> </ul> </li> <li><b>2. Development (30 minutes)</b> <ol style="list-style-type: none"> <li>a. Introduce the concept of Eulerian graph and Hamiltonian graph . <ul style="list-style-type: none"> <li>- Explain about the algorithm of shortest path with example.</li> <li>-Explains basic results related with Eulerian and Hamiltonian graphs and its properties.</li> </ul> </li> </ol> </li> <li><b>3. Exercise (10 minutes) –</b> -Do various problems on Eulerian and Hamiltonian graphs, its properties and algorithm of shortest path.</li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li> <li>2. Suggested video: <a href="https://www.youtube.com/watch?v=f1JTtMP6NGw">https://www.youtube.com/watch?v=f1JTtMP6NGw</a></li> <li>3. Homework: Give some problem on Eulerian and Hamiltonian graphs and its properties to solve.  Spend 5 minutes to wrap up and consolidate the learning's.</li> </ol>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents.</li> </ol>



<b>Lesson Plan No. 23</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Chinese Postman Theorem</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of Chinese Postman Theorem and Kohinberg bridge problem.</li> <li>b. Able to solve problems on Chinese postman problem and Kohinberg bridge problem.</li> <li>c. Talk about its applications in day-to-day life.</li> </ul>
<b>Teaching Aids (if any)</b>	<ul style="list-style-type: none"> <li>a. Chalk and talk</li> <li>b. Group discussion</li> </ul>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- In 1962, a Chinese mathematician called Kuan Mei-Ko was interested in a postman delivering mail to a number of streets such that the total distance walked by the postman was as short as possible. How could the postman ensure that the distance walked was a minimum?</li> <li>- Talk about the concept of Chinese Postman Theorem and Kohinberg bridge problem.</li> <li>- Talk about its applications in day-to-day life.</li> <li>- Introduce the formal concept of Chinese Postman Theorem by NPTEL <a href="https://www.youtube.com/watch?v=fke5x0rmhpA">https://www.youtube.com/watch?v=fke5x0rmhpA</a></li> <li>- Highlight the important characteristics of Chinese Postman Theorem. <a href="http://staff.ustc.edu.cn/~xujm/Graph16.pdf">http://staff.ustc.edu.cn/~xujm/Graph16.pdf</a></li> </ul> </li> <li>2. <b>Development</b> (30 minutes) <ul style="list-style-type: none"> <li>a. Introduce the concept of Chinese Postman problem, Kohinberg bridge problem and its properties.</li> <li>b. Please consult this <a href="https://archive.nptel.ac.in/courses/111/106/111106052/">https://archive.nptel.ac.in/courses/111/106/111106052/</a></li> </ul> </li> <li>3. <b>Exercise</b> (10 minutes) – <ul style="list-style-type: none"> <li>-Do various problems on Chinese Postman Problem and its properties.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li> <li>2. Suggested Video: <a href="https://www.youtube.com/watch?v=fke5x0rmhpA">https://www.youtube.com/watch?v=fke5x0rmhpA</a></li> <li>3. Homework: <ul style="list-style-type: none"> <li>- Give some problems on Chinese Postman Problem and Kohinberg bridge problem to solve.</li> </ul> </li> </ol>



	Spend 5 minutes to wrap up and consolidate the learning's.
<b>Evaluation</b>	1. Reflective Questions (What, why, Who?). Allow students to answer and discuss.  Spend 5 minutes to evaluate student assimilation of the lesson contents.



Lesson Plan No. 24	Course Name: Discrete Mathematics Topic: Travelling Salesman Problem	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of Travelling Salesperson problem.</li><li>Able to solve problems on Travelling Salesperson problem.</li><li>Talk about its applications in day-to-day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk and talk</li><li>Group discussion</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What is path?</li><li>How we can travel from one vertex to another vertex with shortest path?</li><li>Talk about the concept of Travelling Salesperson problem.</li><li>Talk about its applications in day-to-day life.</li><li>Introduce the formal concept of Travelling Salesperson problem by NPTEL <a href="https://www.youtube.com/watch?v=-cLsEHP0qt0">https://www.youtube.com/watch?v=-cLsEHP0qt0</a></li><li>Highlight the important characteristics of Travelling Salesperson problem.</li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce the concept of travelling Salesperson problem.<ul style="list-style-type: none"><li>Explain the the concept of Travelling Salesperson problem and its properties.</li></ul></li><li>Please consult this <a href="https://www.youtube.com/watch?v=-cLsEHP0qt0">https://www.youtube.com/watch?v=-cLsEHP0qt0</a></li></ol></li><li><b>Exercise</b> (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on Travelling Salesperson problem and its properties.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li><li>Suggested video <a href="https://www.youtube.com/watch?v=-cLsEHP0qt0">https://www.youtube.com/watch?v=-cLsEHP0qt0</a></li><li>Homework<ul style="list-style-type: none"><li>Give some questions on Travelling Salesperson problem to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, why, Who?). Allow students to answer and discuss. Spend 5 minutes to evaluate student assimilation of the lesson contents.</li></ol>



Lesson Plan No. 25	Course Name: Discrete Mathematics Topic: Planar graph and Euler's formula	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"><li>Articulate the concept of Planar graph and Euler's formula.</li><li>Able to solve problems on Planar graph and Euler's formula.</li><li>Talk about its applications in day-to-day life.</li></ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"><li>Chalk and talk</li><li>Group discussion</li></ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"><li><b>Introduction</b> (5 minutes)<ul style="list-style-type: none"><li>Ask questions</li><li>What is Euler graph?</li><li>Talk about the concept of planar graph and Euler's formula.</li><li>Talk about its applications in day-to-day life.</li><li>Introduce the formal concept of planar graph and Euler's formula by NPTEL. <a href="http://www.digimat.in/nptel/courses/video/111106102/L37.html">http://www.digimat.in/nptel/courses/video/111106102/L37.html</a></li></ul></li><li><b>Development</b> (30 minutes)<ol style="list-style-type: none"><li>Introduce about planar graph and Euler's formula.<ul style="list-style-type: none"><li>Explain the concept of Planar graph and its properties.</li></ul></li><li>Define Euler's formula and result based on Euler's formula.</li></ol></li><li>Exercise (10 minutes) –<ul style="list-style-type: none"><li>Do various problems on planar graph and Euler's formula.</li></ul></li></ol>
<b>Closure</b>	<ol style="list-style-type: none"><li>Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li><li>Suggested video <a href="http://www.digimat.in/nptel/courses/video/111106102/L37.html">http://www.digimat.in/nptel/courses/video/111106102/L37.html</a></li><li>Homework:<ul style="list-style-type: none"><li>Give some problems based on planar graph and Euler's formula to solve.</li></ul></li></ol> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"><li>Reflective Questions (What, why, Who?). Allow students to answer and discuss.</li></ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



Lesson Plan No. 26	Course Name: Discrete Mathematics Topic: Trees and cut set	Course No.: BSC-401
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ul style="list-style-type: none"> <li>a. Articulate the concept of Trees.</li> <li>b. Able to understand the concept of trees, rooted trees, path lengths in rooted trees and its properties.</li> <li>c. Talk about its applications in day-to-day life.</li> </ul>
<b>Teaching Aids (if any)</b>	<ul style="list-style-type: none"> <li>a. Chalk and talk</li> <li>b. Group discussion</li> </ul>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li>1. <b>Introduction</b> (5 minutes) <ul style="list-style-type: none"> <li>- Ask questions</li> <li>- What is graph?</li> <li>- What are the types of graphs?</li> <li>- What is tree?</li> <li>- Talk about the tree and its applications in day to day life.</li> <li>- Introduce the formal concept of Trees by NPTEL <a href="http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html">http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html</a></li> <li>- Highlight the important characteristics of Trees and Cut- Set <a href="https://www.youtube.com/watch?v=f1JtMP6NGw">https://www.youtube.com/watch?v=f1JtMP6NGw</a></li> </ul> </li> <li>2. <b>Development</b> (30 minutes) <ol style="list-style-type: none"> <li>a. Introduce the concept of tree. <ul style="list-style-type: none"> <li>- Explain them about its properties.</li> <li>- Highlight the concept of tree <a href="https://archive.nptel.ac.in/courses/111/106/111106050/">https://archive.nptel.ac.in/courses/111/106/111106050/</a></li> </ul> </li> <li>b. Explain various theorems based on tree.</li> </ol> </li> <li>3. <b>Exercise</b> (10 minutes) – <ul style="list-style-type: none"> <li>-Do various problems on Tree and its properties.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>1. Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li> <li>2. Suggested video: <a href="http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html">http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html</a></li> <li>3. Homework <ul style="list-style-type: none"> <li>- Give some questions on Tree to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss.</li> </ol> <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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<b>Lesson Plan No. 27</b>	<b>Course Name: Discrete Mathematics</b> <b>Topic: Cut set and spanning tree</b>	<b>Course No.: BSC-401</b>
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<b>Objectives</b>	At the end of the lesson the student shall be able to: <ol style="list-style-type: none"> <li>Articulate the concept of cut-Set and spanning tree.</li> <li>Able to understand its various properties.</li> <li>Talk about its applications in day-to-day life.</li> </ol>
<b>Teaching Aids (if any)</b>	<ol style="list-style-type: none"> <li>Chalk and talk</li> <li>Group discussion</li> </ol>
<b>Teaching Development</b>	<ol style="list-style-type: none"> <li><b>Introduction</b> (5 minutes)           <ul style="list-style-type: none"> <li>Ask questions</li> <li>What is tree?</li> <li>What are the properties of tree?</li> <li>What is cut set?</li> <li>Talk about the concept of cut set and spanning tree.</li> <li>Talk about its applications in day-to-day life.</li> <li>Introduce the formal concept of spanning tree by NPTEL</li> <li><a href="https://www.youtube.com/watch?v=k9jemw3SZe0">https://www.youtube.com/watch?v=k9jemw3SZe0</a></li> <li>Highlight the important characteristics of cut- Set and spanning tree.</li> </ul> </li> <li><b>Development</b> (30 minutes)           <ol style="list-style-type: none"> <li>Introduce the concept of cut-Set and spanning tree.               <ul style="list-style-type: none"> <li>Explain the concept of cut-Set, spanning tree and its properties.</li> </ul> </li> <li>Explain various theorems based on cut set and spanning tree.</li> <li>Highlight the concept through nptel <a href="https://nptel.ac.in/courses/111106050">https://nptel.ac.in/courses/111106050</a></li> </ol> </li> <li><b>Exercise</b> (10 minutes) –           <ul style="list-style-type: none"> <li>Do various problems on Cut- Set, spanning tree and its properties.</li> </ul> </li> </ol>
<b>Closure</b>	<ol style="list-style-type: none"> <li>Summarize the Lesson Learning Outcomes and get affirmation from students on these.</li> <li>Suggested video:</li> <li>Homework           <ul style="list-style-type: none"> <li>Give some problems based on cut set and spanning tree to solve.</li> </ul> </li> </ol> <p>Spend 5 minutes to wrap up and consolidate the learning's.</p>
<b>Evaluation</b>	<ol style="list-style-type: none"> <li>Reflective Questions (What, why, Who?). Allow students to answer and discuss.           <ul style="list-style-type: none"> <li>Quiz based activity including MCQs.</li> </ul> </li> </ol> <p>Spend 5 minutes to evaluate student assimilation of the lesson contents.</p>



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