Department of Computer Science and Engineering

Details of Lesson Plan

S. No.	Particulars	Details
1.	Course Name	Discrete Mathematics
2.	Course Code	BSC-401
3.	Academic Year	2024-2025
4.	Semester	4th
5.	Number of Lesson plans	27
6.	Faculty Assigned	Dr Ria Gupta

Faculty Signature

Lesson Plan No. 1	Course Name: Discrete Mathematics Topic: Operations and Laws of Sets	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Sets. b. To learn about what are operations and laws of sets. c. Understand about operations and laws of sets with the help of an example.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions. What is a set? How can we represent sets in tabular and set-roaster form? What are different types of sets? What do you mean by universal set? - Introduce the students with the concept and explain what a set is in a simple way. - Talk about its applications. - Introduce the formal definition of a set through NPTEL portal - https://archive.nptel.ac.in/courses/111/106/111106086/ - Highlight the important characteristics of the sets and their types. - Highlight the operations and important laws of sets. 2. **Development** (30 minutes) a. Sets and their representation. - Introduce the concept of sets, their representation and their types https://www.youtube.com/watch?v=oaOm2pnKkyY b. Operations and Laws of Sets - Introduce the concepts of union, intersection and complement of a set with the help of examples. - Show Venn diagrams to illustrate the operations on sets. - Give examples on different types of sets and how an operation on sets works. c. Laws on Sets - Associative Law - Distributive Law - De-Morgan's Law - Generalized Form of laws - Give various results on operations and laws of sets.

	3. Exercise (10 minutes) – Give different examples and problems related to operations and laws of Sets.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Reading - Sharma Publications : Set theory: Pg no 31-48 3. Homework - Solve different problems on laws of sets and generalized results of family of sets. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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. 2	Course Name: Discrete Mathematics Topic: Finite & Infinite Sets	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Understand the concept of finite set and infinite set. b. Able to define and understand the concept of countable and uncountable set.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What are finite and infinite numbers? - What are countable and uncountable numbers? - Difference between finite and infinite numbers and countable and uncountable numbers. 2. **Development** (30 minutes) a. Introduction of finite and infinite set, countable and uncountable set. b. Explain the concept of finite set and infinite set. c. Explain the concept of countable and uncountable set. d. Explain the difference between finite set and countable set. e. Explain various examples. f. Explain the difference between infinite set and uncountable set. g. Do various problems of countable and uncountable sets. Web Link: https://archive.nptel.ac.in/courses/111/106/111106086 3. Exercise: (10 minutes) - Do some problems based on finite, infinite, countable and uncountable set.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Covers the following: What is finite and infinite set, countable and uncountable set? 3. Homework: - Give some problems on finite and infinite set to solve. - Give some problems on countable and uncountable sets to solve.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 3	Course Name: Discrete Mathematics Topic: Introduction to Binary Relations and its types	Course No.: BSC- 401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Binary relation. b. Able to define various types of relation. c. Understand how to check type of relation through various problems.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is an ordered pair? - What is a binary relation? - Difference between relations and sets. - Introduce the formal definition of a Cartesian Product, different types of sets through NPTEL portal - https://archive.nptel.ac.in/courses/111/106/111106086/ 2. **Development** (30 minutes) a. Introduce the concept of binary relation. - Explain the concept of binary relation with examples. - Explain various types of relation: reflexive, symmetric and transitive relation. b. Explain the difference between reflexive, symmetric and transitive relation. - Explain various examples. c. Explain the concept of equivalence relation with the help of examples. - Explain the concept of partition and partial order relation with examples and some results. 3. **Exercise** (10 minutes) – - Do various problems on binary relation and its various types.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=jZXHzpq-vmM 3. Homework: - Give some problems on binary relation and its types to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 4	Course Name: Discrete Mathematics Topic: Function and its types	Course No.: BSC- 401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of functions. b. Able to define various types of functions. c. Understand how to check type of function through various problems.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is the image of a function? - What is domain and co-domain of a function? - Talk about its applications. - Introduce the formal definition of functions and its types through NPTEL portal. 2. **Development** (30 minutes) a. Introduce the definition of function. - Explain the concept of function. - Explain various types of function: one-one and onto function. - Explain the difference between one-one and onto function. - Explain why every relation is not a function. b. Explain the concept of Bijective function with the help of examples. 3. Exercise (10 minutes) – - Do various problems on function and its various types.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://youtu.be/jZXHzpq-vmM 3. Covers the following: What are function and its various types? 4. Homework: - Give some problems on functions and its types to solve. Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	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. 5	Course Name: Discrete Mathematics Topic: Principal of Mathematical Induction	Course No.: BSC- 401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of mathematical induction. b. Understand how to find mathematical induction through various problems.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - Tell them that principle of mathematical induction is a tool that is used to prove different kinds of mathematical statements. 2. **Development** (30 minutes) a. Introduce the principle of mathematical induction. - Explain the concept of principle of mathematical induction. - Talk about its applications in various mathematical results. b. 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 n with the help of examples. 3. Exercise (10 minutes) – - Do various problems on principle of mathematical induction.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=qJDieyIpRfI 3. Homework: - Give some problems on principle of mathematical induction to solve. Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	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. 6	Course Name: Discrete Mathematics Topic: Principle of Inclusion & Exclusion	Course No.: BSC- 401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of principle of inclusion and exclusion. b. Understand the concept through Venn diagram. c. Able to find problems on principle of inclusion and exclusion.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is union and intersection of two sets? - When two sets are disjoint? - Talk about representation of sets and operations of sets through Venn diagram - Introduce the concept of principle of Exclsuion & Inclusion through NPTEL portal 2. **Development** (30 minutes) a. Introduce the principle of inclusion and exclusion. - Explain the concept of principle of inclusion and exclusion. - Explain the concept through Venn diagram. - Talk about its applications in combination and probability. b. Explain the concept of principle of inclusion and exclusion for two sets and three sets with the help of examples. 3. Exercise (10 minutes) – - Do various problems on principle of inclusion and exclusion.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=As7cm17KI 3. Homework: - Give some problems on principle of inclusion and exclusion to solve. Spend 5 minutes to wrap up and consolidate the learnings.
Evaluation	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. 7	Course Name: Discrete Mathematics Topic: Pigeonhole Principle	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Pigeonhole principle. b. Able to find problems on Pigeonhole principle. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - Introduce simple form of Pigeonhole principle. 2. **Development** (30 minutes) a. Introduce Pigeonhole principle. - Explain the concept of Pigeonhole principle. - Explain how we use Pigeonhole principle to use problems. - Talk about its applications in real world. b. Explain the strong form of Pigeonhole principle with the help of examples. 3. Exercise (10 minutes) – - Do various problems on Pigeonhole principle.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.digimat.in/nptel/courses/video/106106094/L27.html 3. Homework: - Give some problems on Pigeonhole principle to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 8	Course Name: Discrete Mathematics Topic: Groups and subgroups	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of group, subgroup and its properties. b. Gain some knowledge about algebraic structure with one binary operation. c. Talk about its applications in day to day life
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is set and subset? - Talk about binary operation. - Introduce the concept of groups and subgroups through NPTEL portal **Development** (30 minutes) a. Introduce group and subgroup. - Explain the concept of group and subgroup and their various properties. - Explain when an operation is a group and subgroup. - Talk about its applications in engineering. b. Explain examples of group through this link: https://www.digimat.in/nptel/courses/video/111106113/L01.html 3. Exercise (10 minutes) – - Do various problems and theorem on groups and subgroups.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=uqMFcwi8PsY 3. Homework: - Give some problems on group and subgroup to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 9	Course Name: Discrete Mathematics Topic: Cosets and Lagrange's Theorem	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Coset and its properties. b. Describe various results of cosets and Lagrange's Theorem. c. Talk about its applications in day to day life.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is group and subgroup? - What is semigroup? - Talk about cosets and Lagrange's Theorem - 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. 2. **Development** (30 minutes) a. Introduce Cosets. - Explain the concept of Cosets and its properties. - Introduce the formal concept of Cosets by NPTEL https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod01lec01.mp4. b. Introduce the concept of Lagrange's Theorem: https://nptel.ac.in/content/storage2/111/106/111106113/MP4/mod02lec08.mp4 3. Exercise (10 minutes) – - Do various problems on Cosets and its properties. - Do various problems on Lagrange's Theorem.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.digimat.in/nptel/courses/video/111106113/L42.html 3. Homework: - Give some problems on Cosets and Lagrange's theorem to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 10	Course Name: Discrete Mathematics Topic: Normal subgroup and group homomorphism	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Normal subgroup and group homomorphism with examples and its properties. b. Describe various results of Normal subgroup and group homomorphism.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is one-one function? - What is onto fuction? - Introduce about kernel of a homomorphism. - Tell them about homomorphism. 2. **Development** (30 minutes) a. Introduce Normal subgroup and group homomorphism. - Explain the concept of Normal subgroup and its properties. - Introduce the formal concept of group homomorphism. - Tell them the difference between subgroup and normal subgroup. b. Explain various examples and theorem related to normal subgroup and group homomorphism. 3. Exercise (10 minutes) – - Do various problems on normal subgroup and group homomorphism.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=FXbnrsv4Z3g 3. Homework: - Give some problems on normal subgroup and group homomorphism to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 11	Course Name: Discrete Mathematics Topic: Rings and Integral domain	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of rings and its properties, integral domain. b. Describe and provide examples of a ring. c. Describe various results of ring and integral domain.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is binary operation? - What is abelian group? - Tell them about binary operations used in ring. - Talk about applications of ring theory. 2. **Development** (30 minutes) a. Introduce ring and integral domain. - Explain the concept of ring and its properties. - Explain the formal concept of integral domain. - Tell them about zero divisor and division ring. b. Explain various examples and theorems of ring and integral domain. 3. Exercise (10 minutes) – - Do various problems on ring and integral domain.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://nptel.ac.in/courses/111106131 3. Homework: - Give some problems on ring and integral domain to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 12	Course Name: Discrete Mathematics Topic: Field	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of field with examples and its properties. b. Describe various results based on field. c. Talk about applications of ring and field in engineering.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is ring and integral domain? - What is zero divisor rings? - Talk about non-commutative division ring. - Tell them about applications of field theory. 2. **Development** (30 minutes) a. Introduce the concept of field. - Explain the concept of field and its properties. - Explain them the relation between integral domain and field. b. Explain various examples and theorems of field. 3. Exercise (10 minutes) – - Do various problems on field.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://nptel.ac.in/courses/111106131 3. Homework: - Give some problems on field and integral domain to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 13	Course Name: Discrete Mathematics Topic: Propositional logic and logical connectivites	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Propositional logic and Logical Connectives. b. Describe various results of Logical Connectivity.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - Is it cold outside? - This is not a preposition, as it's answer can have both the value true and false. 2) Sun is bright. - This is a preposition, as this statement can either be true or false but not both. - Talk about its applications in day-to-day life. 2. **Development** (30 minutes) a. Introduce propositional logic and logical connectives. - Explain the concept of propositional logic and logical connectives. - Tell them about its properties. b. Highlight the important characteristics of logic Connectivity and propositional logic. 3. Exercise (10 minutes) – - Do various problems on propositional logic and logical connectives.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=xlUFkMKSB3Y 3. Homework: - Give some problems on propositional logic and logical connectives to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 14	Course Name: Discrete Mathematics Topic: Truth table	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of truth table. b. Able to understand about the Truth Table of AND, OR, NOR etc. c. Talk about the applications of truth table.
Teaching Aids (if any)	a. Chalk & talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What are binary numbers? - What is logic? - Tell them about binary operations like AND, OR, NOR etc. - Talk about its applications in day-to-day life. 2. **Development** (30 minutes) a. Introduce truth table. - Explain the concept of truth table. - Tell them about logical operations. - Explain them the truth tables for all the operations. b. Describe them about conditional and bi-conditional operations. - Explain them about truth table with the help of examples. 3. Exercise (10 minutes) – - Do various problems on truth table.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.youtube.com/watch?v=YYQfYBNlfZg 3. Homework: - Give some problems on truth table to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 15	Course Name: Discrete Mathematics Topic: Conjuctive and disjunctive form	Course No.: BSC-401

Objectives	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.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - Define truth table? - What is the difference between truth table of AND and OR? - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce normal form: conjunctive and disjunctive. - Explain the concept of conjunctive and disjunctive form. - Tell them about its properties. b. Highlight the important characteristics of conjunctive and disjunctive form. - Explain them about conjunctive and disjunctive with the help of examples. 3. Exercise (10 minutes) – - Do various problems on conjunctive and disjunctive form.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: 4. Homework: - Give some problems on conjunctive and disjunctive form to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 16	Course Name: Discrete Mathematics Topic: Conjuctive and disjunctive form	Course No.: BSC-401

Objectives	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.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What are the symbolically notions of AND, OR, NOR? - Explain the possible connective symbols. - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce validity of well-formed formula. - Explain the concept of validity of well-formed formula. - Tell them about its properties. b. Highlight the rules of validity of well-formed formula. - Explain them about the concept with the help of examples. 3. Exercise (10 minutes) – - Do various problems on validity of well-formed formula.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: 3. Covers the following: - Concept of validity of well-formed formula. 4. Homework: - Give some problems on validity of well-formed formula form to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 17	Course Name: Discrete Mathematics Topic: Modus ponens and tollens	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Propositional inference rules. b. Able to understand about the concepts of modus ponens and modus tollens. c. Describe the concept through various examples.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is well formed formula? - Tell them about hypothetical proposition. - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce Propositional inference rules. - Explain the concept of validity of modus ponens and modus tollens. - Tell them about its properties. b. Highlight the rules of modus ponens and modus tollens. - Explain them about the concept with the help of examples. 3. Exercise (10 minutes) – - Do various problems on modus ponens and modus tollens.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: https://www.digimat.in/nptel/courses/video/111106052/L15.html 3. Homework: - Give some problems on modus ponens and modus tollens to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 18	Course Name: Discrete Mathematics Topic: Predicate logic	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of predicate logic. b. Able to understand the concept through various examples. c. Talk about its application in day to day life.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is propositional logic? - Tell them about the concept of predicates and quantifiers. - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce predicate logic. - Explain the concept of predicate logic. - Tell them about its properties. - Tell them about how predicate logic is an extension of propositional logic. b. Explain them about the concept with the help of examples. 3. Exercise (10 minutes) – - Do various problems on predicate logic.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: 3. Homework: - Give some problems on predicate logic to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 19	Course Name: Discrete Mathematics Topic: Universal quantification	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of type of quantifiers. b. Able to understand about the concepts of universal quantification. c. Describe the concept through various examples.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What are the negation of AND, OR, FOR, there exist? - Tell them about quantifiers. - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce universal quantification. - Explain the concept of universal quantification. - Tell them about its properties. - Explain them about the forms of universal quantification. b. Highlight them about the rules of universal quantification. - Explain them about the concept with the help of examples. 2. Exercise (10 minutes) – - Do various problems on universal quantification.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: 3. Homework: - Give some problems on universal quantification to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	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. 20	Course Name: Discrete Mathematics Topic: Universal quantification	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of type of quantifiers. b. Able to understand about the concepts of existential quantification. c. Talk about its applications in day to day life.
Teaching Aids (if any)	a. Chalk & talk
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What are quantifiers? - What is universal quantification? - Tell them about existential quantification. - Talk about its application in real world. 2. **Development** (30 minutes) a. Introduce existential quantification. - Explain the concept of existential quantification. - Tell them about its properties. - Explain them about the forms of existential quantification. b. Highlight them about the rules of existential quantification. - Explain them about the concept with the help of examples. 3. Exercise (10 minutes) – - Do various problems on existential quantification.
Closure	1. Summarize the lesson learning outcomes and get affirmation from students on these. 2. Suggested video links: 3. Homework: - Give some problems on existential quantification to solve. Spend 5 minutes to wrap up and consolidate the leanings.
Evaluation	1. Reflective Questions (What, Why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.

Lesson Plan No. 21	Course Name: Discrete Mathematics Topic: Graphs and its types	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Able to define the basic concepts of graphs, directed graphs, and weighted graphs. b. 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.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is vertex? - What is an edge? - What is a point? - Talk about the concept of basic concepts of graph. - Talk about its applications in day-to-day life. 2. **Development** (30 minutes) a. Introduce the concept of Graphs and its types - Explain various types of graphs with examples - Talk about its applications in everyday life. 3. Exercise (10 minutes) – -Do various problems on graphs and its properties.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video: 3. Homework - Given some questions on graphs and its types to solve. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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. 22	Course Name: Discrete Mathematics Topic: Eulerian and Hamiltonian graph	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: • Understand Eulerian and Hamiltonian graphs. • Able to understand algorithm of shortest path. • Explains basic results related with Eulerian and Hamiltonian graphs. • Able to understand Eulerian paths and circuits.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is Graph? - What is path and walk? - Talk about Eulerian and Hamiltonian graphs. - Talk about its applications in day-to-day life. - Introduce the formal concept of Eulerian and Hamiltonian graphs by NPTEL - https://nptel.ac.in/courses/106104170 - Highlight the important characteristics of Eulerian graph and Hamiltonian https://www.youtube.com/watch?v=f1JTtMP6NGw 2. **Development** (30 minutes) a. Introduce the concept of Eulerian graph and Hamiltonian graph . - Explain about the algorithm of shortest path with example. -Explains basic results related with Eulerian and Hamiltonian graphs and its properties. 3. Exercise (10 minutes) – -Do various problems on Eulerian and Hamiltonian graphs, its properties and algorithm of shortest path.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested video: https://www.youtube.com/watch?v=f1JTtMP6NGw 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.
Evaluation	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. 23	Course Name: Discrete Mathematics Topic: Chinese Postman Theorem	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Chinese Postman Theorem and Kohinberg bridge problem. b. Able to solve problems on Chinese postman problem and Kohinberg bridge problem. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - 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? - Talk about the concept of Chinese Postman Theorem and Kohinberg bridge problem. - Talk about its applications in day-to-day life. - Introduce the formal concept of Chinese Postman Theorem by NPTEL https://www.youtube.com/watch?v=fke5x0rmhpA - Highlight the important characteristics of Chinese Postman Theorem. http://staff.ustc.edu.cn/~xujm/Graph16.pdf 2. **Development** (30 minutes) a. Introduce the concept of Chinese Postman problem, Kohinberg bridge problem and its properties. b. Please consult this https://archive.nptel.ac.in/courses/111/106/111106052/ 3. Exercise (10 minutes) – -Do various problems on Chinese Postman Problem and its properties.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested Video: https://www.youtube.com/watch?v=fke5x0rmhpA 3. Homework: - Give some problems on Chinese Postman Problem and Kohinberg bridge problem to solve.

	Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Travelling Salesperson problem. b. Able to solve problems on Travelling Salesperson problem. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is path? - How we can travel from one vertex to another vertex with shortest path? - Talk about the concept of Travelling Salesperson problem. - Talk about its applications in day-to-day life. - Introduce the formal concept of Travelling Salesperson problem by NPTEL https://www.youtube.com/watch?v=-cLsEHP0qt0 - Highlight the important characteristics of Travelling Salesperson problem. 2. **Development** (30 minutes) a. Introduce the concept of travelling Salesperson problem. - Explain the the concept of Travelling Salesperson problem and its properties. b. Please consult this https://www.youtube.com/watch?v=-cLsEHP0qt0 3. Exercise (10 minutes) – - Do various problems on Travelling Salesperson problem and its properties.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested video https://www.youtube.com/watch?v=-cLsEHP0qt0 3. Homework - Give some questions on Travelling Salesperson problem to solve. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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. 25	Course Name: Discrete Mathematics Topic: Planar graph and Euler's formula	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Planar graph and Euler's formula. b. Able to solve problems on Planar graph and Euler's formula. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is Euler graph? - Talk about the concept of planar graph and Euler's formula. - Talk about its applications in day-to-day life. - Introduce the formal concept of planar graph and Euler's formula by NPTEL. http://www.digimat.in/nptel/courses/video/111106102/L37.html 2. **Development** (30 minutes) a. Introduce about planar graph and Euler's formula. - Explain the concept of Planar graph and its properties. b. Define Euler's formula and result based on Euler's formula. 3. Exercise (10 minutes) – - Do various problems on planar graph and Euler's formula.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested video http://www.digimat.in/nptel/courses/video/111106102/L37.html 3. Homework: - Give some problems based on planar graph and Euler's formula to solve. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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. 26	Course Name: Discrete Mathematics Topic: Trees and cut set	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of Trees. b. Able to understand the concept of trees, rooted trees, path lengths in rooted trees and its properties. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is graph? - What are the types of graphs? - What is tree? - Talk about the tree and its applications in day to day life. - Introduce the formal concept of Trees by NPTEL http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html - Highlight the important characteristics of Trees and Cut- Set https://www.youtube.com/watch?v=f1JTtMP6NGw 2. **Development** (30 minutes) a. Introduce the concept of tree. - Explain them about its properties. - Highlight the concept of tree https://archive.nptel.ac.in/courses/111/106/111106050/ b. Explain various theorems based on tree. 3. Exercise (10 minutes) – -Do various problems on Tree and its properties.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested video: http://www.nitttrc.edu.in/nptel/courses/video/111106102/L09.html 3. Homework - Give some questions on Tree to solve. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	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. 27	Course Name: Discrete Mathematics Topic: Cut set and spanning tree	Course No.: BSC-401

Objectives	At the end of the lesson the student shall be able to: a. Articulate the concept of cut-Set and spanning tree. b. Able to understand its various properties. c. Talk about its applications in day-to-day life.
Teaching Aids (if any)	a. Chalk and talk b. Group discussion
Teaching Development	1. **Introduction** (5 minutes) - Ask questions - What is tree? - What are the properties of tree? - What is cut set? - Talk about the concept of cut set and spanning tree. - Talk about its applications in day-to-day life. - Introduce the formal concept of spanning tree by NPTEL - https://www.youtube.com/watch?v=k9jemw3SZe0 - Highlight the important characteristics of cut- Set and spanning tree. 2. **Development** (30 minutes) a. Introduce the concept of cut-Set and spanning tree. - Explain the concept of cut-Set, spanning tree and its properties. b. Explain various theorems based on cut set and spanning tree. c. Highlight the concept through nptel https://nptel.ac.in/courses/111106050 3. Exercise (10 minutes) – -Do various problems on Cut- Set, spanning tree and its properties.
Closure	1. Summarize the Lesson Learning Outcomes and get affirmation from students on these. 2. Suggested video: 3. Homework - Give some problems based on cut set and spanning tree to solve. Spend 5 minutes to wrap up and consolidate the learning's.
Evaluation	1. Reflective Questions (What, why, Who?). Allow students to answer and discuss. - Quiz based activity including MCQs. Spend 5 minutes to evaluate student assimilation of the lesson contents.