CBCS Syllabus as per NEP 2020 for F.Y.B.Sc.(Comp.Sci.) Mathematics
(2023 Pattern)

Name of the Programme	**:** B.Sc.(Comp.Sci.) Mathematics
Program Code	**:** USCOS
Class	**:**F.Y.B.Sc. (Comp.Sci.)
Semester	**:** I
Course Type	**:** Skill Enhancement Course (SEC)
Course Name	**:** Mathematics for Computer Science
Course Code	: COS-126-SEC(MT)
No. of Teaching Hours	**:** 60
No. of Credits	**:** 2

A) CourseObjectives:

1. Solvesystemoflinear equationusingmultiplemethods.
2. Learnhowtocreatematrices,performbasicmatrixoperations.
3. Learnhowtocreateplots,graphsandchartstorepresentandanalyzedata.
4. ApplyScilabtoreal-worldproblemsandpracticeproblem-solvingskills.
5. Learnhowtoperformprime factorization,greatestcommondivisor(GCD), least common multiple (LCM).
6. Learnthebasicprinciplesofset, basicset equalities,thebasicconceptsofrelations and functions.
7. Learnhowtowriteanargument using logicalnotationanddetermine ifthe argument is valid or invalid.

B) CourseOutcome:

CO1. Studentwillbeabletounderstandthebasicprinciplesofset,basicset equalities, the basic concepts of relations and functions.

CO2. Studentwillbeabletowriteanargument usinglogicalnotationand determine if the argument is valid or invalid.

CO3. Studentwillbeabletoapplythese mathematicalconceptsinthestudyof computer science.

CO4. Studentwillbeabletoapplylogicalreasoningto solveavarietyofproblems. CO5. Student will be able to solve linear equations.

CO6. Studentwillbeabletoidentifythe specialpropertiesofmatrices.

CO7. Able to use Scilab and Maxima Software to solve problems.

List of Practical’s:

1. Introduction of Scilab with some basic commands.
2. GraphPlottingin2-Dand3-DusingScilab.
3. Basic operations on matrices using Scilab.
4. Solution for system of linear equation using Scilab.
5. Basic Commands for logic using Scilab.
6. Introduction of Maxima using basic commands.
7. Polynomial, Sets, Function and Inverse of a Function in Maxima.
8. Basic Commands for Numbers, Complex Number, Prime Numbers in Maxima.
9. Graphplottingin2-Dand3-DusingMaxima.
10. Basic operations on matrices using Maxima.
11. Solution for system of linear equation using Maxima.
12. Basic Commands for logic using Maxima.

Mapping of Program Outcomes with Course Outcomes

Class: F.Y.B.Sc.(Comp.Sci.)(Sem I) **Subject**: Mathematics

Course Name: Mathematics for Computer Science

Course Code: COS-126-SEC(MT)

Weightage: 1= weak or low relation, 2= moderate or partial relation, 3= strong or directrelation

	Programme Outcomes (POs)						
Course Outcomes	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	1	2				2	1
CO 2	2	3				2	2
CO 3	2		2				1
CO 4	2	3	1			1	1
CO 5	1	2				2	1
CO 6	2	3	3			2	2
CO 7	3	2	3			1	1

Justification for the mapping

PO1: Computer Knowledge

CO1: Understanding algorithms equips students with problem-solving prowess and strategic thinking, pivotal for unraveling complexities in computer science applications and fostering a profound grasp of the discipline.

CO2: Proficiently calculating and interpreting vertex degrees in diverse graph structures demonstrates students' mastery in graph analysis, a critical skill for solving real-world problems in computer science.

CO3: Developing a comprehensive understanding of graph theory definitions enables students to apply analytical skills for problem-solving in diverse computer science scenarios.

CO4: Proficiently identifying and analyzing bridges within a graph demonstrates students' capacity to discern crucial components in network structures, enhancing their expertise in computer science.

CO6: Mastering the concepts of flow and cuts in directed graphs showcases students' proficiency in analyzing network flows, a critical skill for solving complex problems in computer science.

CO7: Acquiring the ability to comprehend matrix representation of graphs empowers students to effectively utilize this powerful tool for problem-solving in diverse graph structures within the realm of computer science.

PO2: Design / Development of solution

CO1: Understanding algorithms is crucial for students in the design and development of solutions in computer science, enabling efficient problem-solving, optimized coding practices, and the creation of innovative and effective software solutions.

CO3: Developing a comprehensive understanding of graph theory definitions equips students to analyze and solve problems in the design and development of solutions, fostering effective representation and manipulation of complex relationships in various computational scenarios.

CO5: Applying algorithms to solve the Travelling Salesman Problem showcases students' proficiency in addressing optimization challenges within graph theory, a critical skill for designing and developing efficient solutions in various computational contexts.

PO3: Modern tool usage

CO2: Calculating and interpreting vertex degrees in various graph structures demonstrates students' proficiency in graph analysis, a crucial skill in modern tool usage for understanding and manipulating complex networks and relationships.

CO4:Identifying and analysing bridges within a graph demonstrates the student's ability to recognize critical components in network structures, showcasing essential skills for effective analysis and optimization in modern tool usage.

CO5:Applying algorithms to solve the Travelling Salesman Problem showcases the student's proficiency in utilizing modern tools for solving complex optimization problems in graph theory, a valuable skill for algorithmic analysis and practical problem-solving in diverse applications.

CO6: Understanding and applying concepts of flow and cuts in directed graphs demonstrates the student's proficiency in modern tool usage, showcasing their ability to analyze network flows effectively—a critical skill for optimizing transportation, communication, and resource allocation in various applications.

PO6: Individual and Team work

CO1: Understanding algorithms is essential for effective individual and team work in computer science, fostering collaborative problem-solving, streamlined workflows, and innovative solutions.

CO3:Developing a comprehensive understanding of graph theory definitions and their application fosters effective problem analysis and solving, enhancing individual and team capabilities in tackling diverse challenges collaboratively.

CO7:Comprehending matrix representation of graphs and utilizing it for problem-solving enhances individual and team capabilities, enabling collaborative analysis and efficient solutions in diverse graph-related challenges.

PO7: Innovation, employability and Entrepreneurial skills

CO1: Understanding algorithms in computer science fosters innovation, employability, and entrepreneurial skills by equipping individuals with the problem-solving and computational thinking necessary to drive technological advancements and succeed in dynamic, competitive professional landscapes.

CO3: Developing a comprehensive understanding of graph theory definitions and applying them enhances innovation, employability, and entrepreneurial skills, enabling individuals to address complex challenges and create solutions with a strategic and inventive mindset.

CO4:Identifying and analyzing bridges within a graph demonstrates the ability to recognize critical components in network structures, fostering innovation, employability, and entrepreneurial skills through a nuanced understanding of complex relationships and system optimization.

CO6: Identifying and analyzing bridges within a graph showcases the ability to recognize critical components in network structures, enhancing innovation, employability, and entrepreneurial skills by enabling strategic optimization and problem-solving in complex systems.

CO7:Comprehending matrix representation of graphs and utilizing it for problem-solving enhances innovation, employability, and entrepreneurial skills by providing a powerful analytical tool for optimizing solutions and fostering strategic thinking in diverse graph-related challenges.