

Course: VSC
Number Theory and Matrix Algebra

Semester: I **Credits:2** **Subject Code: BSVSCCSM12301** **Lectures: 30**

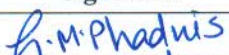
Course Outcomes:

At the end of this course, the learner will be able to:

- CO1- Classify different types of relations and apply the concepts of divisibility in Number Theory and its properties.
- CO2- Understand prime numbers, congruence relations and define real life problems using recurrence relation.
- CO3- Explore the equivalence between vector equations and matrix equations.
- CO4-Learn computations with matrices; apply different methods such as row echelon and LU decomposition to solve linear algebraic systems.

<p>Unit 1: Congruence and Divisibility</p>	15
<ul style="list-style-type: none"> • Well ordering principles • Division Algorithm (without proof) • Divisibility and its properties. • Euclid's Lemma (Without proof). • Definition of G.C.D and L.C.M, Expressing G.C.D of two integers as a linear combination of the two integers. • Relatively prime integers and Euclid's Lemma generalisation • Congruence relation and its properties, Residue Classes: Definition, Examples, addition and multiplication modulo n and composition tables. • Solve Congruence equations using Chinese remainder Theorem. • Euler's and Fermat's Theorem(Without proof) examples • Homogenous Recurrence Relation, types and solutions. • Assignment 	
<p>Unit 2: Matrices</p>	15
<ul style="list-style-type: none"> • Systems of Linear Equations • Row Reduction and Echelon Forms • Vector Equations • The Matrix Equation • Solution Sets of Linear Systems • Applications of Linear Systems • Linear Independence • Linear Models in Business, Science, and Engineering • Solving system of linear Equations using LU Decomposition • Assignment 	



Board of Studies	Department	Name	Signature
Chairperson (HoD)	B.Sc. (Computer Science)	Gitanjali Phadnis	 02/06/2023

Recommended Text Books:

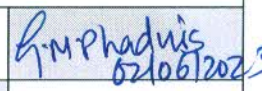
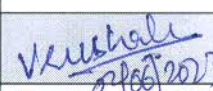
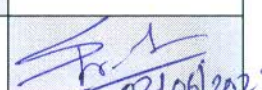

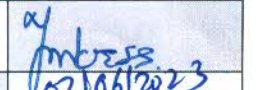
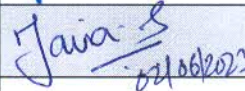
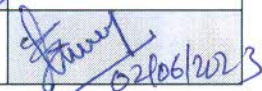
- David C. Lay, Steven R. Lay Judi J. Mc Donald *Linear Algebra and its Application*, Pearson Publication, Fifth Edition, 2016.
- David M. Burton, *Elementary Number Theory*, McGraw-Hill Science/Engineering/Math; 7th Edition February 4, 2010.

Reference Books:

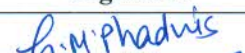
- Bernard Kolman, Robert Busby, Sharon Cutler Ross, Nadeem-ur-Rehman, *Discrete Mathematics Structure* Pearson Education, 5th Edition.
- Zukerman, *An Introduction to the Theory of Numbers*, Wiley Publication, 4th Edition

E-Resources:

- <https://swayam.gov.in/>
- <https://nptel.ac.in/>
- <http://ocw.mit.edu>

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Subject Expert (Outside SPPU)	Dr. Machchindra Gophane	 02/06/23
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