

## IISER Pune - Course Content

Semester	AUG 2024
Open to Semester	5,21
Course Code	DS3154
Course title	Applied Mathematical Methods
Nature of Course	LE - Lecture
Credit	4
<b>Coordinator</b> and participating faculty (if any)	<b>Dr. Joy Merwin Monteiro</b>
Pre-requisites	
Objectives	The course is application of mathematical methods to solve physical problems. Though most of the examples to be treated are from Earth Science and Physics, the concept are equally applicable to any other branch. A certain basic knowledge of calculus and algebra is needed. We shall have many computer exercises in this course.
Course content	<p>Linear Algebra: Projection and completeness, Eigenvalue decomposition of matrix, function of matrix, singular value decomposition, Fourier transforms, coordinate transformations</p> <p>Differential Equations and Dynamical Systems: Methods of solution of DEs, qualitative theory of DEs: stationary points and their classification, introduction to bifurcation theory and its application in climate.</p> <p>PDEs and their analysis: non-dimensionalization, asymptotic analysis, derivation of approximate equations and solutions of heat wave and laplace's equations</p>
Evaluation / Assessment	30% Mid-term, 30% Final exam and 40% assignments
Suggested readings	<p>1. Roel Sneider and Kasper van Wijk, 2015, A Guided tour of mathematical methods for the Physical sciences Third Edition , Cambridge University Press</p> <p>2. Boas, M.L.,2006, Mathematical methods in Physical sciences, John Wiley &amp; sons, Inc</p> <p>3. Arfken GB and Weber HJ, 2005, Mathematical method for physicist,</p>
When Next	
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