Semester	AUG 2022
Open to semester	5,21
Course code	**EC3134/EC6144**
Course title	**Applied Mathematical Methods**
Credits	4 /4
Course Coordinator & participating faculty (if any)	Joy Merwin Monteiro
Nature of Course	Lectures and Tutorials
Pre-requisites	Basic Calculus and Linear Algebra, Python programming
Objectives (goals, type of students for whom useful, outcome etc)	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 contents (details of topics /sections with no. of lectures for each)	Linear Algebra: Projection and completeness, Eigenvalue decomposition of matrix, function of matrix, singular value decomposition, Fourier transforms, coordinate transformations 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. PDEs and their analysis: non-dimensionalization, asymptotic analysis, derivation of approximate equations and solutions of heat wave and laplace’s equations Descriptive and inferential statistics: Moments of a distribution and their estimation; hypothesis testing
Evaluation /assessment	End-Sem Examination-40% Mid-Sem Examination-20% Others-40%%
Suggested readings (with full list of authors, publisher, year, edn etc.)	1. Roel Sneider and Kasper van Wijk, 2015, A Guided tour of mathematical methods for the Physical sciences Third Edition , Cambridge University Press 2. Boas, M.L.,2006, Mathematical methods in Physical sciences, John Wiley & sons, Inc

	3. Arfken GB and Weber HJ, 2005, Mathematical method for physicists,