MATLAB PROGRAMMING FOR NUMERICAL COMPUTATION

PROF. NIKET KAISARE
Department of Chemical Engineering
IIT Madras

TYPE OF COURSE : Rerun | Elective | UG/PG
COURSE DURATION : 8 weeks (18 Jan’ 21 - 12 Apr’ 21)
EXAM DATE : 21 Mar 2021

PRE-REQUISITES : The students for this course are expected to know basics of linear algebra and calculus. These are covered in Introductory Math course(s) for Engineers (typically done in first year). This is intended to be practical (laboratory) course. Some prior background in programming will be useful, though not required. Likewise, students who have either completed or are currently doing "Numerical Methods" "Computational Techniques" will find it easier to follow this course.

INTENDED AUDIENCE : This course is targeted towards scientists and engineers interested in using MATLAB programming for numerical computations. Examples taken in this course will be of generic interest to a wide range of students. This is a hands-on (like a laboratory) elective course. Intended audience include undergraduates, people with BE / ME / MS / MSc degrees; The course may be useful for PhD students also

COURSE OUTLINE :
MATLAB is a popular language for numerical computation. This course introduces students to MATLAB programming, and demonstrate it's use for scientific computations. The basis of computational techniques are expounded through various coding examples and problems, and practical ways to use MATLAB will be discussed.

ABOUT INSTRUCTOR :
Dr. Niket Kaisare is an Associate Professor of Chemical Engineering in IIT-Madras. He works in the area of modeling, design and control for energy applications. He has over 7 years of research/teaching experience in academia, and three-year experience in Industrial R&D. He uses computational software, including MATLAB, FORTRAN, Aspen and FLUENT extensively in his research and teaching.

COURSE PLAN :
Week 1: Introduction to MATLAB Programming
Week 2: Approximations and Errors
Week 3: Numerical Differentiation and Integration
Week 4: Linear Equations
Week 5: Nonlinear Equations
Week 6: Regression and Interpolation
Week 7: Ordinary Differential Equations (ODE) - Part 1
Week 8: Ordinary Differential Equations (ODE) - Practical aspects