Matlab Programming For Numerical Computations
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Introduction to MATLAB programming

Hello and welcome to this course on Matlab Programming for Numerical Computations. My name is Dr. Niket Kaisare, I am from Department of Chemical Engineering at IIT, Madras. This course primarily focuses on using Matlab for Numerical Programming basically for Numerical Programming that is of interest to engineers.

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Learning Objectives

- Basics of MATLAB programming

- Numerical Methods for engineering problems

- Use MATLAB to solve computational problems

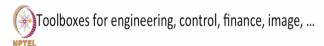Also see: "Computational Techniques" (http://nptel.ac.in/courses/103106074/)

The learning objectives for this course are listed over here. Primarily, this is a Matlab programming course, we are going to start off with basics of Matlab programming.

So, we are going to use this course to understand the numerical methods in context of how we are going to use them in Matlab. And, we are then going to use Matlab to solve some of these computation problems.

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About MATLAB

MATLAB is a high-level computing language.
It is widely used in computational analysis, control, signal processing and communication fields

- Portmanteau of **mat**rix **lab**oratory

- http://mathworks.com/

- One of popular computational software

- Toolboxes for engineering, control, finance, image, ...

About Matlab, Matlab is a high level programming language, it is widely used for computation analysis and controls, signal processing, communications and other fields. Matlab is a combination of the words matrix and laboratory. The link for Matlab website is given over here it is called mathworks.com. Matlab is one of the more popular computational software, commercial computational software out there.

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Course Prerequisites

- Prerequisite: Basics of linear algebra and calculus
  (covered in introductory Math courses)
- "Good to have"
  - Some knowledge of Computational / Numerical Techniques
  - Prior background in some programming

What are the prerequisites for this course, since this course is an introductory course on Matlab programming there are not too many prerequisites. We will basically assume some basics of linear algebra and calculus, that is usually covered in your first year under graduate. Besides, that are no other prerequisites for the course.

However, some of the other things which are good to have would be some background or some knowledge of computational or numerical techniques would be useful. Some prior background in programming will be useful. But, again in this course we are not going to make any assumptions with respect to prior background in programming.

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The software that will be used in this course is primarily, Matlab again the website for Matlab is given over here. If Matlab is not available in your college you can alternatively use Scilab. Scilab is an open source software that is somewhat similar to Matlab. Most of the things that we are going to cover in this course are also available in Scilab.

And, if Matlab is not available to you I highly recommend downloading the free software Scilab and trying out the examples using Scilab. There are some minor differences between Matlab and Scilab. But

the primary use of Scilab is similar to Matlab. Assignment problems will be set using Matlabs own course work website. The link for the website will be given to you in the due time. We will use this website in order to have assignment problems given to registered student on this course.

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Books and Resources

- Recommended Reading
  - *Numerical Methods using MATLAB, Laurene Fausett*
  - Numerical Methods for Engineers, S.C. Chapra and S. Canale
  - Numerical Methods for Chemical Engineers, S.K. Gupta
- Related course (theoretical aspects):
  "Computational Techniques" (http://nptel.ac.in/courses/103106074/)

The book that I highly recommend for this course is the book by Professor, Laurene Fausett called Numerical Methods using Matlab. It is a book that we are primarily going to follow in this course. Other recommended text books are the, text books on Numerical Methods by Professor, Chapra and Professor, Canale. And, the Numerical Methods for Chemical Engineering text book by Professor, S. K. Gupta.

This course is general course, general purpose course for a people with Engineering and Science background. So we are going to take up examples, which are general in nature. A related course to this course is the Computational Techniques Course where I have covered theoretical aspects of numerical methods that we are going to cover in this Matlab programming course.

However, we are not going to use any of the theoretical aspects of this computational methods. We are primarily going to study, how to implement this computational methods in Matlab. With this I come to

the end of this introduction. I hope you will follow this course in order to learn Matlab programming. Thank you, and see you in module one. Bye.