

Lesson Plan

Lesson: INTRODUCTION TO MATLAB

Timeframe: 75 Mins

Materials needed:

Laptop/Lab computers, LCD projector, handout of PowerPoint slides, handout of in-class matlab experiments, MATLAB software installed on all computers/laptops

Objectives:

Basic:

1. Understand the usefulness of Matlab
2. Learn main components of maTlab
3. Get familiar with workspace, m-files, variables, etc.
4. Learn to write and compile a simple code

Advanced:

1. Get a high-level overview of Matlab
2. Build an appreciation towards the usefulness of the software
3. Develop an intuition of when this tool might be useful for problem solving

Background:

This is a required 1-unit course needed to introduce the basic knowledge of programming and use of MATLAB, which is a computational tool in widespread use across all Engineering disciplines. MATLAB is de-facto a modern version of a calculator for an Engineer. This introductory 75 min long session is planned to *introduce* the students to the world of MATLAB. It is intended to highlight the importance of MATLAB in current Engineering work and related research. After the introduction and motivation, students will gradually be exposed to the know-how of the tool. They will learn to open the tool, understand a few basic features of GUI, run a sample code, and evaluate the results.

Introduction to Lesson:

The classroom session begins with an interactive session where instructor asks the students what they know about MATLAB. The idea of this activity is to engage the students and introduce MATLAB formally in class, giving each student an opportunity to speak about the activities performed in individual space and at the end summarizing from instructor's point of view.

After that, instructor explains what we are going to do in the next 50 minutes. Instructor will make clear that after this session they will be able to open the MATLAB software, will be able to write and run a simple software code.

Procedure [Time needed, include additional steps if needed]:

Pre-Class Individual Space Activities and Resources:

Steps	Purpose	Estimated Time	Learning Objective
Step 1: Watch an Introductory video of various simulation/calculation tools available for Engineers	This video will provide the history and evolution of various tools used for scientific research. Goal is to provide enough motivation and highlight the importance of this tool.	15 mins	Students learn various available tools. Students appreciate the importance of this tool in engineering
Step 2: Watch an Introductory video of MATLAB	This video will very basic information about MATLAB. It will show how to open a MATLAB software, all the features and buttons in the graphical user interface etc. It will also write a very basic sample code, save it on computer and run it in MATLAB	15 mins	Students get familiar to the lay out and various functionalities of MATLAB Students learn how to compile and learn a simple code.
Step 3: Go over the provided presentation and solve the inbuilt examples simultaneously	These presentation slides will be a step-by-step guide to provide some hands on experience in MATLAB. Slides will present a concept and then it will be immediately by an example code. Students will type in the code in the MATLAB code, run it and match the results	1 hr	Provide hands on experience to students. This activity will help students getting familiar to the tool and also build confidence as they themselves are making it work.

In-Class Group Space Activities and Resources:

Steps	Purpose	Estimated Time	Learning Objective
Step 1: Interactive Session	Getting to know students and gauge their understanding of MATLAB. Summarize and introduce the topic formally.	10 mins	Clear understanding of <i>what</i> and <i>why</i> about MATLAB.
Step 2: Think pair share	Handouts will be provided to all the students containing 5 simple problems. Students will pair up and work jointly on each one of them, one by one. After each problem, instructor will invite volunteers to share their approach and then provide an optimal solution.	15 mins	Students write the codes themselves. Learn deeper insights and knowledge through interaction and problem solving
Step 3: Deeper into the subject	Instructor will begin introducing more features and functionalities such as, arrays, for loops, while loops etc. After each key concept, they will be an in-class problem where students will be given time to solve individually, and then instructor will discuss it.	35 mins	Students learn advanced features and at the same time try themselves on their computer to build confidence.

Closure/Evaluation: [10 mins]

Analysis:

- Ask students what they enjoyed the most today.
- Ask students what was their favorite *function* of all the ones studied today.
- Ask students to recall all the *functions* and their uses that we studied today. Conclude and summarize all the *functions* for a recap.

Post-Class Individual Space Activities:

- Revision of lecture slides
- A programming assignment with four questions directly using the concepts and functions taught in this class.

Connections to Future Lesson Plan(s): [5 mins]

Conclude the class with details about the topics of the next lecture, and tell the students how the concepts learned today will serve as a foundation for future classes.