

CENG ELEC 1 Introduction to Matlab

| CENG ELEC 1 Introduction to Matlab | | | | | | | | |
|------------------------------------|----------------|----------|-----|-------|-------------|--------|------|--|
| Course Name | Course Code | Semester | h/w | Appl. | Lab. h/w | Credit | ECTS | |
| Introduction to Matlab | CENG ELEC1 | 1 | 3 | 0 | 0 | 3 | 4 | |

| Prerequisites | No |
|----------------------------------|---------------------------------------|
| Course Language | English |
| Course Type | Compulsory |
| Course Level | Undergraduate |
| Way of teaching | Face to face, online |
| Learning and teaching techniques | Expression, question answer, homework |

Course Objectives

The course utilizes the MATLAB environment to provide students with a working knowledge of computerbased problem-solving methods relevant to science and engineering, including programming and numerical analysis techniques. This course aims to give an introduction to MATLAB, a powerful programming language and development environment for engineers and scientists. Programming concepts in MATLAB are illustrated with various engineering application examples.

Course Educational / Learning Outcomes

| Students who can successfully complete this course will be able to; | | | | | |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|
| 1. | use MATLAB effectively to analyze and visualize data. | | | | |
| 2 | apply numeric techniques and computer simulations to solve engineering-related problems. | | | | |
| 3 | apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives. | | | | |
| 4 | design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation and debugging by another programmer, and to anticipate and resolve user errors. | | | | |
| 5 | demonstrate understanding and use of fundamental data structures (classes). | | | | |
| 6 | create and control simple plot and user-interface graphics objects in MATLAB. | | | | |
| 7 | | | | | |

Topics Covered

Overview of MATLAB features; problem-solving methodology; arrays; use of files; functions and data structures; programming; plotting; solution of linear algebraic equations; numerical methods for calculus and differential equations; and basics of symbolic methods; 2D and 3D visualization of scientific data



| Weekly Topics and Releated Preparation Studies | | | | | |
|------------------------------------------------|-----------------------------------------------------|-------------|--|--|--|
| Week | Topics | Preparation | | | |
| 1 | Basics – variables, arrays, matrices, plotting, I/O | | | | |
| 2 | Basics – operators, functions, strings, cells | | | | |
| 3 | Matrices | | | | |
| 4 | Plotting | | | | |
| 5 | User-defined functions | | | | |
| 6 | Input-output formatting | | | | |
| 7 | Relational and logical operations | | | | |
| 8 | Midterm Exam | | | | |
| 9 | Loops | | | | |
| 10 | Matrix algebra – solving linear equations | | | | |
| 11 | Numerical methods, part 1 | | | | |
| 12 | Numerical methods, part 2 | | | | |
| 13 | Midterm Exam | | | | |
| 14 | Strings, cell arrays, and structures | | | | |
| 15 | Final Exam | | | | |
| 16 | | | | | |

Textbook

H. Moore, MATLAB for Engineers, 4th ed., 2014, Prentice Hall, ISBN-13: 978-0133485974.

| Assessment System | | | | |
|-------------------------------------------------------------------------|--------|--------------|--|--|
| Works | Number | Contribution | | |
| Attendance | | | | |
| Laboratory | | | | |
| Practice | | | | |
| Field Study | | | | |
| Course-Specific Internship (if applicable) | | | | |
| Quizzes | | | | |
| Homework | 4 | 20 | | |
| Presentation | | | | |
| Project | | | | |
| Report | | | | |
| Seminar | | | | |
| Midterm Exams / Midterm Jury | 2 | 40 | | |
| Final Exam / Final Jury | 1 | 40 | | |
| | Total | % 100 | | |
| Contribution to the success grade of semester studies | | % 60 | | |
| Contribution of the studies at the end of semester to the success grade | | % 40 | | |
| | Total | % 100 | | |

| Course Category | | | | |
|---------------------------------------------|---|--|--|--|
| Basic Vocational Courses | Х | | | |
| Expertise / Field Courses | | | | |
| Support Courses | | | | |
| Communication and Management Skills Courses | | | | |



Transferable Skill Courses

| The Relationship between Course Learning Outcomes and Program Competencies | | | | | | | |
|-------------------------------------------------------------------------------|---------------------------------|---|--------------------|---|---|---|--|
| No | Brogrom Competencies / Outcomes | | Contribution Level | | | | |
| NO | Program competencies / Outcomes | 1 | 2 | 3 | 4 | 5 | |
| 1 | | | | | | | |
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| ECTS/Workload Table | | | | |
|---------------------------------------------------------------------|--------|----------|-------------------|--|
| Activities | Number | Time (h) | Total Workload | |
| Course hours (Including exam week: 16 x total weekly course hoursi) | 16 | 3 | 48 | |
| Laboratory | | | | |
| Application | | | | |
| Course specific internship | | | | |
| Field Study | | | | |
| Out-of-class study time | | | | |
| Presentation/Seminar Preparation | | | | |
| Projects | | | | |
| Reports | | | | |
| Homeworks | 4 | 2 | 8 | |
| Quizzes | | | | |
| Preparation time for Midterm Exams / Midterm Jury | 2 | 20 | 40 | |
| Preparation time for Final Exam / Final Jury | 1 | 20 | 20 | |
| Total Workload | | | 116 | |