	Course name: EE407 Computer Software Applications	Department: Electrical and Electronics Engineering	Semester
			5
	Spring	**Methods of Education**	**Credit (ECTS)**

Lecture	Recitation/ (Etud)	Lab	Project/ Field Study	Homework	Other	Total	5
45	45	0	0	45	15	150	

Language	English
Compulsory/Elective	Elective
Prerequisites	None
Course Contents	Introduction to Matlab and matrix operation. Solving linear set of equations: using Cramer's rule, solve command, and Simulink toolbox. Symbolic math: differentiation, integration, limit, Laplace transform and inverse Laplace transform. Solving differential equations: using Laplace transform, dsolve and ODE45 commands, and Simulink toolbox. Ploting multiple graphs in the same plot and plotting multiple plots on the same page. Examples of step response, bode and nyquist diagrams. Generating output and some useful Matlab commands. **Midterm Exam**. Overview of Matlab GUI. Matlab's GUI design hierarchy. Using the GUIDE Layout Editor to arrange the GUI components, such as push buttons, radio buttons, toggle buttons, pop-up menus, list boxes, sliders, editable text and static text. Setting properties for GUI components. Matlab GUI programming techniques. Programming the GUI. Saving and running the GUI. Case studies in electrical and electronics engineering.
Course Objective	The aim of this course is to provide techniques for programming graphical user interfaces in the Matlab technical computing environment. The students will also become proficient in the computation, visualization and data analysis.
Learning Outcomes and Competences	• Use matrices and determinants for solving linear set of equations. • Solve the differential equation by using different techniques. • Customize the Matlab figure window in a variety of manners. • Understand advanced GUI design principles and programming techniques. • Design, use and maintain GUI Matlab applications. • Preparing the students to apply the knowledge of Computer Software Applications to other courses of the program
Textbook and /or References	**Main Textbooks:** 1. Amos Gilat, "*Matlab an Introductions with Applications*", Fourth Edition, John Wiley and Sons, Inc., 2011. 2. Patrick Marchand, O. Thomas Holland, "*Graphics and GUIs with MATLAB*", Third Edition, Chapman & Hall / CRC, 2003. 3. MATLAB, "*Creating Graphical User Interfaces*", The MathWorks, Inc., R2014a. 4. İlyas Çankaya, Devrim Akgün ve Sezgin KAÇAR, "*Mühendislik Uygulamaları İçin MATLAB*", Seçkin Yayıncılık A.Ş., Ankara, Şubat 2015 (in Turkish). **Supplementary texbooks :** 1. Ali H. Assi, "Engineering Education and Research Using MATLAB", InTech, Croatia, 2011. 2. Patrick Marchand, O. Thomas Holland, "*Graphics and GUIs with MATLAB*", Third Edition, Chapman & Hall / CRC, 2003. 3. Steven T. Karris, "*Numerical Analysis Using Matlab and Excel*", Third Edition, Orchard Publications, 2007. 4. S.R. Otto and J.P. Denier, "*An Introduction to Programming and Numerical Methods in MATLAB*", Springer-Verlag London Limited, 2005. 5. A.J. Okyere, "*Matlab Fundamentals: Electronics and Circuit Analysis Using MATLAB*", CC Press, 1999. 6. J.T. Manassah, "*Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB*", CRC Press, 2001. 7. Stormy Attaway, "MATLAB : Introduction to Programming and Problem Solving", Elsevier, Inc., ISBN : 978-0-75-068762-1, 2009.

		8. www.mathworks.com			
			If any, mark as (X)		**Percentage (%)**
Assessment Criteria	Midterm Exams		X		40
	Quizzes				
	Homework		X		20
	Projects				
	Laboratory work				
	Other				
	Final Exam		X		40
Instructors		Prof. Dr. İlyas ÇANKAYA			

Weekly Schedule

Week		Subject
1		Introduction to MATLAB and matrix operations
2		Solving the linear set of equations: using Cramer's rule, solve command, and Simulink toolbox
3		Symbolic math: Integration, differentiation, limit, Laplace transform and inverse Laplace transform
4		Solving differential equations: using Laplace transform, dsolve and ODE45 commands
5		Solving differential equations using Simulink toolbox
6		Ploting multiple graphs in the same plot and plotting multiple plots on the same page. Examples of step response, bode and nyquist diagrams.
7		Ploting multiple graphs in the same plot and plotting multiple plots on the same page. Examples of step response, bode and nyquist diagrams.
8		Generating output and some useful MATLAB commands
9		**Midterm Exam**
10		Overview of Matlab GUI
11		Laying out GUIs and setting properties
12		Programming the GUI
13		Saving and running the GUI
14		Case studies in electrical and electronics engineering
15		Case studies in electrical and electronics engineering