Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
MATH 540		1	3	0	0	3	7

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Elective
Course Level	Masters Degree
Objective	Teaching the working principles of Computer Algebra Systems (CAS) and forming students to be able to use these systems efficiently for their mathematical works.
Content	Structure of SageMath Arithmetic in SageMath Searching librarires of SageMath effectively, accessing the source code Linear Algebra in SageMath Real Analysis and Plotting in SageMath Solving Equations in SageMath Group Theory in SageMath using GAP Adding new functionalities to SageMath and documenting it
References	Computational Mathematics with SageMath, Zimmermann et al., https://dl.lateralis.org/public/sagebook/sagebook-ba6596d.pdf Lecture Notes of MSC320 Intoduction to Symbolic Computation, Jan Verschelde, Department of Mathematics, Statistics and Computer Science, University of Illinois at Chicago, https://homepages.math.uic.edu/~jan/mcs320/mcs320notes/index.html Lecture Notes of MAT007 Introduction to computer algebra and mathematical programming, Johannes Schmitt, University of Zurich, https://johannesschmitt.gitlab.io/mat007/index.html Sage for Undergraduates, 2nd Edition, Gregory V. Bard, American Mathematical Society SageMath ile Matematik, Sinan Kapçak, Nesin Yayınevi, 2023 https://nesinkoyleri.org/wp-content/uploads/2023/06/sagemath_kitap_20230510.pdf

Theory Topics

Week	Weekly Contents
1	Ways of using SageMath, its general structure
2	Arithmetic in SageMath
3	Solving Equations in SageMath
4	Plotting in SageMath
5	Midterm 1
6	Linear Algebra with SageMath
7	Linear Algebra with SageMath
8	Linear Algebra with SageMath
9	Polynomials with SageMath
10	Midterm 2
11	Polynomials with SageMath
12	Polynomials with SageMath
13	Group theory with SageMath

Week	Weekly Contents
14	Group theory with SageMath