AGU Graduate School of Engineering & Science
Industrial Engineering Program

COURSE RECORD

Code	**IE 536**
Name	**Programming in Mathematica**
Hour per week	3 (3 + 0)
Credit	3
ECTS	7.5
Level/Year	Graduate
Semester	Fall/Spring
Type	Elective
Prerequisites	-
Description	This course will introduce the design principles that Wolfram Language based on. Mathematica (MMA) combines the procedural, functional, and rule-based programming styles in a single coherent system. Each of these programing styles will be covered in detail in this course. Properties of Mathematica notebooks, FrontEnd, Kernel and Documentation Center, basics of symbolic and numeric computations, an overview of built-in functions in MMA including the ones for fundamental mathematical procedures from Calculus and Linear Algebra are covered. To develop and analyze code in MMA the course covers the following subjects: Expressions and their manipulations, assignments and evaluation, pattern matching, repetitive and iterative processes, lexical and dynamic scopings, data types and building packages.
Objectives	Making students familiar with the basics of the components of MMA by working on Notebooks, FrontEnd, Kernel, Documentation Center, Online Sources. Guiding students to master the design principles that Wolfram Language based on by explaining these principles and providing various examples in detail. Helping students be able to do programming efficiently in MMA by letting them to work on exercises of various levels and on projects related to their own research.
Learning Outcomes	*By the end of the course, the student will be able to* LO1. Compute any type of scientific computation by using MMA. LO2. Write codes/programs in MMA that runs fast and efficiently. LO3. Construct their own "Packages" in MMA. LO4. Use MMA efficiently at any level for research or educational purposes.

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6
LO1	4	4	0	0	0	1
LO2	4	4	0	0	0	1
LO3	4	4	0	0	0	1
LO4	4	4	0	0	4	3

* Contribution Level: 0: None, 1: Very Low, 2: Low, 3: Medium, 4: High, 5: Very High

COURSE CONTENT DETAILS

Topics	**Outcomes**
Components of MMA (Notebooks, FrontEnd, Kernel, Doc. Centers)	LO1, LO2, LO4
Built-in functions in MMA and their symbolic and numeric computations	LO1, LO2, LO4
Procedural, Functional and Rule-Based programming	LO2
Expressions, modifying expressions and pattern matching	LO2, LO4
Repetitive and iterative processes	LO2, LO4

Operating on lists and generating and manipulating arrays	LO2, LO4
Maintaining Control: Scoping Constructs, Naming of Functions, and Data Types	LO2, LO4
Creating Packages, Package Installation and existing Packages.	LO3, LO4

DERS BİLGİLERİ

Kodu	
İsmi	**Mathematica'da Programlama**
Haftalık Saati	3 (3 + 0)
Kredi	3
AKTS	7.5
Seviye/Yıl	Lisansüstü
Dönem	Güz/Bahar
Dersin Dili	İngilizce
Tip	Seçmeli
Ön Şart	Yok
İçerik	Bu ders, Wolfram Programlama Dili'nin üzerine temellendirildiği dizayn prensiplerini takdim eder. Mathematica (kısaca MMA), prosedürel, fonksiyonel ve kural-tabanlı programlama stillerini tek ve bütüncül bir sistemde birleştirmiştir. Bu ders bu programlama stillerini detaylı olarak ele alacaktır. Mathematica'daki 'Notebook', 'FrontEnd', 'Çekirdek', 'Dökümantasyon Merkezi' ve bunların özellikleri, sembolik ve nümerik hesaplamalara dair temel bilgiler, MMA'daki halihazırdaki fonksiyonlar (Kalkülüs ve Doğrusal Cebir'deki temel matematiksel prosedürler hakkindakiler dahil) bu ders kapsamında işlenecektir. Sonrasında, MMA'da kod/program geliştirme ve analiz etmeye dair detaylar işlenecektir. Şöyle ki, "Expressions" ve ilgili kullanımları, "Assignments" ve değer hesaplamalar, "Pattern Matching" (Örgü/kural eşleştirmeleri), tekrarlı ve İterasyonlu işlemler, "lexical" ve dinamik "scopings", veri tipleri ve Paket program oluşturma konuları ele alınacaktır.