AGU Graduate School of Engineering and Science Advanced Materials and Nanotechnology Program

COURSE RECORD

Code	**AMN581**
Name	**Numerical Methods and Applications in Nanotechnology**
Hour per week	3 (Theory + Practice)
Credit	3
ECTS	7,5
Level/Year	Graduate
Semester	Fall
Type	Elective
Location	
Prerequisites	None
Special Conditions	None
Coordinator(s)	Dr. Turgut Tut
Webpage	
Content	This course offers an introduction to numerical methods to solve problems encountered in science and nanotechnology. Topics include solutions to linear systems of equations, roots of polynomials and other nonlinear functions, statistical applications, determinants, eigenvalues, and eigenvectors, solutions to differential equations; applications of FFT. For the software, we will use Matlab.
Objectives	-To learn numerical methods -Apply these methods to problems encountered in scientific research -To write algorithms for problems -To write codes in Matlab
Learning Outcomes	LO1: To learn how to model natural phenomena and develop appropriate algorithms LO2 : Write efficient code in Matlab software
Requirements	Expected requirements of the course.
Reading List	Applied Numerical Methods with MATLAB for engineers and scientists Steven C. Chapra, Fourth Ed., McGraw Hill Education(Textbook), Numerical Methods for Physics, Second Ed. Alejandro L. Garcia, Prentice Hall (Supplementary)
Ethical Rules and Course Policy	

LEARNING ACTIVITIES *Please, use this one as a reference for your course*

Activities	**Number**	**Weight (%)**
Lecture	3	50%
Weekly Assignments	8	50%
	Total	100

ASSESSMENT

Evaluation Criteria	**Weight** (%)
Lecture	20%
Weekly Assignments	80%
Total	100%

For a detailed description of grading policy and scale, please refer to the website https://goo.gl/HbPM2y section 28.

COURSE LOAD *Please, use this one as a reference for your course*

Activity	**Duration** (hour)	**Quantity**	**Work Load** (hour)
In class activities	2	14	28
Lab	1	7	7
Group work	2	12	24
Research (web, library)	2	12	24
Required Readings	2	10	20
Pre-work for Presentation	2	7	14
Lab reports	1	7	7
		General Sum	**124**

ECTS: 7,5 (Work Load/25-30)

CONTRIBUTION TO PROGRAMME OUTCOMES*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PO13	PO14
LO1	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LO2	4	4	4	4	4	4	4	4	4	4	4	4	4	4
LO3														
LO4														

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

WEEKLY SCHEDULE

W	**Topic**	**Outcomes**
1	Mathematical Modeling, Numerical Matlab and Problem Solving	LO1, LO2
	Lab/Activity:	
2	Matlab Fundamentals	LO1, LO2
	Lab/Activity:	
3	Matlab Fundamentals	LO1, LO2
	Activity:	
4	Writing algoriths for problems	LO1, LO2
	Activity:	
5	Roots finding and optimization	LO1, LO2
	Activity:	
6	Roots finding and optimization	LO1, LO2
	Activity:	
7	Linear Systems and Matrices	LO1, LO2
	Activity:	
8	Linear Systems and Matrices	LO1, LO2
	Activity:	
9	Curve Fitting	LO1, LO2
	Activity:	
10	Curve Fitting	LO1, LO2
	Activity:	
11	İntegration and differentiation	LO1, LO2
	Activity:	
12	İntegration and differentiation	LO1, LO2
	Activity:	
13	Ordinary differential equations	LO1, LO2
	Activity:	
14	Ordinary differential equations	LO1, LO2
	Activity:	

Prepared by
Date