ECTS COURSE INFORMATION FORM

Faculty	**Faculty of Engineering**	
Program	**B.Sc. in Electrical-Electronics Engineering**	**Required**
	B.Sc. in Industrial Engineering	**Elective**
	B.Sc. in Computer Engineering	**Required**
	B.Sc. in Mechanical Engineering	**Required**
	B.Sc. in Civil Engineering	**Required**

Course Code	MATH 213			
Course Title in English	Differential Equations			
Course Title in Turkish	Diferansiyel Denklemler			
Language of Instruction	English			
Type of Course	Flipped Classroom/Lecture/Exercise			
Level of Course	Undergraduate			
Course Category (by % of Content)	Basic Science	Basic Engineering	Engineering Design	General Education
	100	-	-	-
Semester Offered	Fall and Spring			
Contact Hours per Week	Lecture: 4 hours	Recitation: -	Lab:-	Other:-
Estimated Student Workload	168 hours			
Number of Credits	7 ECTS			
Grading Mode	Standard Letter Grade			
Pre-requisites	MATH106 Calculus II			
Expected Prior Knowledge	Prior knowledge of differentiation and integration of single and multivariable functions is required.			
Co-requisites	None			
Registration Restrictions	Only Undergraduate Students			
Overall Educational Objective	To learn the methods of solution of ordinary differential equations.			
Course Description	This course introduces ordinary differential equations, discusses their methods of solutions and introduces vector-valued functions Topics include: First order differential equations, second order linear differential equations, higher order linear differential equations, series solutions of linear differential equations, initial value problems, Laplace transforms and systems of first order linear differential equations. Vector-valued functions, the divergence and curl of vector-valued functions and their geometric applications.			
Course Description in Turkish	Bu ders diferansiyel denklemleri, onların çözüm yöntemlerini ve vektör-değerlikli fonksiyonları kapsar. Kapsanan konular: Birinci mertebeden diferansiyel denklemler, ikinci mertebeden diferansiyel denklemler, yüksek mertebeden diferansiyel denklemler, diferansiyel denklemlerin seri çözümü, başlangıç değer problemleri, Laplace dönüşümü ve birinci mertebeden diferansiyel denklem sistemleri. Vektör-değerlikli fonksiyonlar, diverjans, rotasyonel işlemleri ve geometric uygulamaları.			
Course Learning Outcomes and Competences	Upon successful completion of the course, the learner is expected to: 1. apply the methods of solution of first order differential equations, 2. solve first, second and higher order linear differential equations, 3. find the series solution of linear differential equations, 4. solve the initial value problem of linear equations by Laplace transform, 5. solve systems of first order linear differential equations, 6. utilize vector-valued functions, evaluate their divergence and curl, and use their properties for geometric applications.			

Relationship of the Course with the Student Outcomes	Level	Learning Outcome(s)	Assessed by
Student Outcomes	N=None S=Supportive H=High		Exam, Project, HW, Experiment, Presentation, etc.
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	H	1-6	Midterm exams, quizzes and flipped learning practice
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors			
(3) an ability to communicate effectively with a range of audiences			
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts			
(5) an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives			
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions			
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies			

Prepared by	Prof. Canfuad Delale June 2019	
Semester	Fall 2019-2020	
Name of Instructors	Prof. Canfuad Delale	
Course Contents	Week	Topic
	1.	First order differential equations
	2.	First order differential equations
	3.	Second order linear differential equations
	4.	Second order linear differential equations
	5.	Higher order linear differential equations
	6.	Series solutions of linear differential equations
	7.	Series solutions of linear differential equations
	8.	Initial value problems and Laplace transform
	9.	Initial value problems and Laplace transform
	10.	Initial value problems and Laplace transform
	11.	System of linear differential equations
	12.	System of linear differential equations
	13.	Vector-valued functions, the divergence and curl of vector-valued functions and their geometric applications
	14.	Vector-valued functions, the divergence and curl of vector-valued functions and their geometric applications
	15.	Final Examination/Project/Presentation Period
	16.	Final Examination/Project/Presentation Period
Required/Recommended Readings	W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, Tenth Ed., Wiley, 2013.	
Teaching Methods	Lectures/contact hours using "flipped classroom" as an active learning technique	
Homework and Projects	-	

Laboratory Work	-
Computer Use	-
Other Activities	-
Assessment Methods	Types of assessment — Number — Ratio (%) Midterm Exams — 3 — 60 (each contributing 20%) Quizzes — 2 — 20 (each contributing 10%) Flipped Classroom Practice — 28 — 20 **Total** — 100
Course Administration	**Instructor's office and phone number**: 5th Floor, (0212) 3953651 **office hours:** Wednesday 13:00-15:00 **email address:** canfuat.delale@mef.edu.tr **Rules for attendance:** Classroom practice contributes to 20% of the final grade. **Missing a quiz:** Provided that proper documents of excuse are presented, each missed quiz by the student will be given a grade by taking the average of all of the other quizzes. No make-up will be given. **Missing a midterm**: Provided that proper documents of excuse are presented, each missed midterm by the student will be given a grade by taking the average of all of the other midterm exams. No make-up will be given. **A reminder of proper classroom behavior, code of student conduct**: YÖK Regulations **Statement on plagiarism**: YÖK Regulations (http://www.mef.edu.tr/icerikler/files/lisans_onlisans_yonetmelik%20(1.pdf)

ECTS Student Workload Estimation

Activity	No/Weeks	Hours			Calculation	Explanation
	No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
Lecture/Flipped Classroo	14	2	4	2	112	A*(B+C+D)
Quizzes	2	6	1		14	A*(B+C+D)
Midterm(s)	3	12	2		42	A*(B+C+D)
Assingment, Project, Presentation	0	0			0	A*(B+C+D)
Total Workload					168	
Total Workload/25					6,72	
ECTS					**7**	