

<b>Department</b> Department of Mathematics			<b>Academic Year</b> 2022-2023	<b>Date</b> 01/12/2022	
<b>Course Unit Code</b> MATH3116	<b>Course Unit Title</b> Difference Equations		<b>Semester/Year</b> Spring/ 3	<b>Number of ECTS Credits</b> 5	
<b>Language of Instruction</b>	Turkish				
<b>Type of Course Unit</b>	Elective				
<b>Prerequisites and co-requisites</b>	-				
<b>Address of course</b>	-				
<b>Local Credit</b>	<b>Theoretical</b>	<b>Practical</b>	<b>Laboratory</b>	<b>Presentation</b>	<b>Project</b>
3	2	2	-	-	-
<b>Name of Lecturers</b>	Associated Professor Münevver TUZ				
<b>Assistants</b>	-				

<b>Course content</b>	The properties of difference and shift operators, the similarities between difference and differential operators, the properties of inverse difference operator, scalar difference equations, the theory of the first order and higher order linear difference equations, some applications of undetermined coefficients method, the method of variation of constants, nonlinear difference equations and difference equations.
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Weekly Detailed Course Contents	
Week	Topic
1	Difference Operator
2	Properties of difference and shift operators
3	Similarities between difference and differential operators
4	Properties of inverse difference operator
5	Scalar difference equations
6	Theory of linear difference equations
7	First order linear difference equations
8	Second order linear homogeneous difference equations and its solutions
9	General application
10	Undetermined coefficients method
11	Applications of undetermined coefficients method
12	Variation of parameters method
13	Applications of variation of parameters method
14	A brief evaluation of the course content and topics

<b>Course Resources</b>	Fark Denklemleri (Hüseyin Bereketoğlu-Vildan Kutay)
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<b>Assessment Methods and Criteria</b>	<b>In-Term studies</b>	Quantity	<b>Percentage (%)</b>
	<b>Mid-Term Exams</b>	1	40
	<b>Quizzes</b>	-	-
	<b>Assignments</b>	-	-
	<b>Projects</b>	-	-
	<b>Term assignment</b>	-	-
	<b>Laboratory</b>	-	-
	<b>Other</b>	-	-
	<b>Final exam</b>	1	60
<b>On Assessment Methods and Criteria</b>	A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS.		

	Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course.
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<b>Percentage of Course Category (%)</b>	<b>Mathematics and Basic Sciences</b>	100
	<b>Computer Sciences</b>	0
	<b>Programming Design</b>	0
	<b>Social sciences</b>	0

<b>Course Outcome</b>	Students learn the features of difference and shift operators, similarities between differential and differential operators, properties of inverse difference operator, scalar difference equations, the theory of first step and higher stepwise linear difference equations, uncertain coefficient methods, constant exchange methods, nonlinear difference equations
<b>Aims of the course</b>	Introducing difference equations, teaching solution methods and examining application areas.
<b>The way of processing course</b>	Face to face

<b>Relation of the course with program outcomes</b>				
Learning outcomes		1	2	3
<b>1</b>	To have advanced theoretical and applied knowledge in a way to prioritize the scientific approach supported by textbooks containing up-to-date information in the field, application tools and other resources		X	
<b>2</b>	Adapting and transferring the knowledge gained in the field to secondary education			
<b>3</b>	Ability to independently carry out an advanced study in the field			
<b>4</b>	Be aware of the necessity of lifelong learning and continuously improve their professional knowledge and skills.			X
<b>5</b>	Using a foreign language at least at the European Language Portfolio B1 General Level, following the information in the field and being able to communicate with colleagues			
<b>6</b>	To be able to use information and communication technologies together with computer software at minimum advanced level of European computer license required by the field.			
<b>7</b>	Have the ability to make oral and written presentation in native language			
<b>8</b>	Having the ability to understand spoken English and use English at reading level			
<b>9</b>	To have the ability to assimilate mathematical concepts and understand the relationships between them, to recognize different aspects of the same concepts and relationships			
<b>10</b>	To have the ability to define and formulate the relationships between items in non-mathematical disciplines in the language of mathematics.		X	
<b>11</b>	To have the ability to use mathematical knowledge in different problems			
<b>12</b>	Having the ability to develop computer programs using mathematical knowledge			
<b>Contribution of the course: 1:No 2:Partially 3:Completely</b>				

**Preparer:** Associated Professor Münevver TUZ

**Preparation date:** 01/12/2022